Online Social Networking in Older Individuals: A Study of Hertfordshire

Abstract

The penetration rate of Online Social Networks (OSNs) within older individuals of society is still not as large as within the younger generation. Using this as motivation this research aimed to identify and understand the adoption, use and diffusion of OSNs within UK's older population. For this purpose, a conceptual framework was formed that was then empirically determined using the older individuals demographic group of society. Findings revealed that of the overall 538 aged over 65 participants 66.3% did not use OSNs. It was also found that older individuals will adopt Internet technologies if technology facilitating conditions such as 'anytime access' to Internet capable devices and a fast reliable internet connection had significant positive effects on OSN intentions. In terms of influences of peers, it was revealed that older individuals do consider and act upon the views of members in one's social circle. Contributions for academia include empirical findings of a model for OSNs specific to a demographic group of society. For industry this study identifies specific factors of consideration for the wider penetration of OSNs in UK's older population. Policymakers can also identify factors that will influence older people to adopt and use OSNs.

Keywords: Online Social Networks, Adoption, Older individuals, Households.

1 Introduction

Rapid advances in the development of internet capable technologies combined with widespread household access to super fast and reliable broadband has paved the way for Online Social Networks (OSNs) to become an increasingly important and popular venue for technology adoption (Peng & Mu, 2011). OSNs such as Facebook, Linkedin and Twitter are "applications allowing users to build personal websites accessible to other users for exchange of personal content and communication" (Constantinides & Fountain, 2008). For this research social networks are defined as: "When a computer network connects people, it is a social network. Just as a network is a set of machines connected by a set of cables, a social network is a set of people … connected by a set of socially meaningful relationships" (Wellman, 1996 p1). A current example of OSN adoption and growth is the widely known OSN Facebook, which has within 6 years of launch an estimated 8% of the world's population subscribed as members. These numbers amount to 845 million active users, across the globe (Facebook, 2012). LinkedIn a leading professional OSN currently hosts over 100 million users (Qualman, 2011). Twitter, a micro blogging orientated OSN hosts 106 million users (DigitalSurgeons, 2010). It can be seen that based on these three leading OSNs over 1 billion global individuals have adopted and become regular users of OSNs.

Globally, OSN websites are considered to be the most popular online category when ranked by average time spent per Internet user (NielsenWire, 2009). In Europe, United Kingdom (UK) has seen the largest numbers of OSN adopters and users (Gadsby, 2010). For a growing number of Internet users, maintaining an OSN profile page has become a part of their daily activities (Schaefer, 2008). Professional use of OSNs as an easy and efficient way to build and maintain offline social networks in an online manner is also emerging in business practice management (O'Murchu et al, 2004). Further, governments are also viewing OSNs as an important channel to maintain interaction between online government agencies and citizens; therefore, efforts to leverage web 2.0 initiatives for citizen-to-government interaction are also being made (Chang & Kannan, 2008). However, although OSN popularity is assumed to be diverse and widespread, this is not apparent when analyzing the age split of UK OSN users. Statistics reveal that younger adults (50 years and below) hold the majority of users while older adults (50+ years) remain the minority adopters of leading OSNs such as Facebook, MySpace and Twitter (Lyons, 2010). It is these observations that led to a research gap being identified and one that this research study intends to minimize.

A note to readers, older individuals are defined as internet users 50 years old or above and are also referred to as 'silver surfers' (Netlingo, 2012). Whilst penetration and adoption rates of OSNs reveal differences, research of older users is pertinent for the following reasons: (1) Little is still known about the reasons and motivations underlying older adults' adoption or non-adoption of ICTs such as OSNs (Selwyn, 2004); yet the world's population is viewed to be rapidly ageing with over 60s set to rise to 22% in 2050 (UN DESA, 2007). The UK is also anticipated to have an ageing population, which is anticipated earlier than 2050 (Jeavans, 2004): 'More than one third of the UK's population will be over 55 by 2025' (Jeavans, 2004); (2) Digital technologies can facilitate daily tasks; thereby enabling disadvantaged demographic groups users, such as, older adults to remain independent longer. By doing so, information such as, advanced and updated medical advances and technologies information can be obtained and implemented such that their quality of life can be increased (Mitzer et al, 2010).

As the reasons for examining this group of society are critical and gaps in research examining the acceptance of OSNs amongst the older population were existent, this research study's aim was formed to be: ***To identify and understand the adoption, use and diffusion of OSNs within UK's older population***. As a rejoinder, the scope of this research is limited to adoption and use of OSNs by **internet consumers aged 50 years or above** in the **household** context.

By conducting this research, the contributions to academia are viewed to be the development of a theoretical framework that can assist in understanding OSN usage, diffusion and adoption behavior for the older population. For industry, Internet Service Providers, OSN providers can determine whether their developed and implemented policies and strategies will lead to success by referring to a research study as this. Policy makers can use research findings to assist developments in internet based government-to-citizen communication and drive digital and social inclusion for older adults; thereby reducing the digital divide in the UK.

2 Literature Review

2.1 Online Social Networks

Examining Facebook and MySpace, Muscanell & Guadagno (2012) revealed gender and personality to be predictors of OSN behavior. Further, gender and personality were related to participants' reasons for using OSNs and their usage and participation in OSN socializing patterns (Muscanell & Guadagno, 2012). When comparing and contrasting real world social networks with those of OSNs a reason for adopting a new technology is strongly influenced by the actions of the connected others within the online social group (Peng & Mu, 2011). In terms of identifying the theoretical foundations of this research Niehaves & Plattfaut (2011) utilized MATH theory to comparatively analyse *internet* adoption within three different age groups (39 and below, 40 – 59 and 60+). Results proved that MATH is of great value when predicting usage intention among all age groups, especially among the elderly (60 years and older). Maier et al (2011) also examined the adopters and non-adopters of OSNs using MATH (Venkatesh and Brown, 2001) and found the MATH model being suitable for examining elderly people. Further, hedonic outcomes (fun) had no impact on intentions towards OSN use (Maier et al, 2011). Currently Facebook is freely available to users, but if there is a fee is imposed upon users, Bauer et al, 2012) found that 48.1 % of participants are not willing to afford any monetary payments; therefore, valuing their personal information at zero.

2.2 Older Individuals

McMurtrey et al (2011) examined older individuals and technology adoption and use (67+) and learnt that over 90% of participants did not use OSNs with strong indicators showing reasons for this being attributed to a lack of older individuals' adoption and use of OSNs. Focusing on older individuals (50+) and computer and internet use Lee et al (2011) discovered that technology use changes at different stages within the 50+ age groups. Older individuals' adoption of video based user generated internet services by Ryu et al (2009) found that participants were not highly resistant to change and would adopt video User Created Content (UCC) if the required conditions are satisfied. Interest and communication have been found to be factors that have been found to be very pertinent factors that for older individuals when adopting and using a technology (Choudrie et al, 2008). Researching older individuals (65+) and barriers to internet use, Carpenter & Buday (2007) identified barriers to more frequent internet use included cost, complexity, ergonomic impediments, and a lack of interest. Selwyn (2004) found that older individuals were not interested in computer usage, especially when compared with other pastimes and activities that they were participating in. Use of computers and OSNs also emphasizes the biological and psychological perspectives of aging where declining physical and cognitive abilities impact computer use (Eilers, 1989).

3 Theoretical Foundations

Having identified the existing theoretical gap this section details the conceptual development of the Model of Older Online Social Networking (MOSN) which was used to examine the identified OSN phenomenon. For this, the foundations were drawn from the Model of Adoption of Technology in Households (MATH) (Venkatesh & Brown, 2001), Decomposed Theory of Planned Behavior (DTPB) (Taylor & Todd, 1995a), and e-services adoption model (Featherman & Pavlou, 2003).

4 MOSN – Research Framework Development

Consistent with Decomposed Theory of Planned Behavior (DTPB) (Taylor & Todd, 1995) and Model of Adoption of Technology in Households (MATH) (Vekantesh & Brown, 2001), selected constructs have been categorized into three groups, which are according to TPB: attitudinal beliefs, normative beliefs and control beliefs.

Attitudinal Beliefs

Attitudinal beliefs refer to an individual's positive or negative feelings when performing a behavior (Eagly, & Chaiken, 1993). Consistent with the rationale and application in MATH (Venkatesh & Brown. 2001) hedonic outcomes, utilitarian outcomes and social outcomes have been assigned as attitudinal belief structures. The innovation attribute Relative advantage drawn from the Diffusion of Innovations (DoI) theory, reflects feelings towards an innovation (OSNs) relative to the innovation/s that it supersedes (Rogers, 2003). In this case OSNs superseding innovations include mobile telecoms, e-mail & SMS. Relative advantage has been applied in MOSN on the basis that OSNs functionality exceeds the capabilities and advantages of mobile telecoms, e-mail and SMS and positive feelings/thoughts/views will emerge toward OSN adoption and use.

A new factor of consideration is privacy based upon Shin (2010) determining privacy concerns being significant for security, trust and attitudes towards OSN adoption and use. Privacy and individuals intention to adopt e-services such as, OSNs were considered by Featherman & Pavlou(2003) who then

developed the e-services adoption model that included seven explanatory constructs that assist in addressing this issue. Using these two research studies as precedence and a larger emphasis given to Shin (2010) findings, Privacy Risk was identified as a necessary construct that was integrated as an attitudinal belief construct in the MOSN.

Normative Beliefs

Normative beliefs refer to subjective issues such as, peer influences and superior influences (Venkatesh & Brown, 2001). Such constructs can be used to identify and explain the influence of different reference groups on perceptions, views and attitudes when considering whether to use or not to use a particular technology (Macredie & Mijinyawa, 2011). MATH suggests that normative beliefs include three sub groups of normative influence: (1) friends and family (2) secondary sources such as TV or newspapers (media) and (3) workplace influences. Since this research focuses on householders OSN use and not OSN use in the workplace, workplace influences were not applicable to this research; therefore the normative belief categories are primary normative influence (primary influence) and secondary source normative influence (secondary influence).

Control Beliefs

Control belief structure relates to an individual's perception regarding difficulties when performing a behavior (Eagly & Chaiken, 1993). Drawn from DTPB, Facilitating Conditions (F.C) is described as "money, time and technology that are needed to make use of an innovation" (Taylor & Todd, 1995a p144). Facilitating conditions were important for this research as OSN use requires internet access and an internet providing device for participating in OSN activities. Consistent with the decomposition of F.Cs of Macredie & Mijinyawa (2011), facilitating conditions have been further deconstructed into two constructs; 'technology F.C' and 'resource F.C'. First, Technology F.C refers to technologies required to operate OSNs such as, internet access (broadband) and access to or ownership of internet capable devices such as laptops, computers, smart phones and PDAs. Second, resource F.Cs pertain to the time available to individuals when using OSNs and monetary expenses required for households purchasing an internet service and internet providing devices. Acknowledging that prior technology adoption research has identified that not possessing the requisite knowledge to use a computer will significantly inhibit adoption (Venkatesh & Brown, 2001), 'requisite knowledge' was applied as the final construct to the control belief category. Following understanding the aforementioned constructs were combined to provide determinants of the dependent variable 'Actual Use'. This was done in order to determine significance and positive or negative influences on actual adoption and use of OSNs.

5 Research Approach

Survey & Construct Measure Development

Consideration of available resources such as time, logistics, manpower and an increased probability of obtaining a substantial sample size led to data collection in the form of an online survey questionnaire. Guided by Dillman's (2007) suggested principles for questionnaire design the questionnaire comprised three sections; (1) demographics (2) Internet Usage (3) OSN usage that led to 63 items. MOSN was operationalized using contextually adapted construct measures that were originally tested within DTPB, MATH and the Privacy Risk Model. A Likert scale of 7 points was also employed [1: strongly disagree > 7: strongly agree] (*see* appendix 2).

Sample Frame & Sampling Method

The sampling frame comprised residents from the Hertfordshire area of the UK, Southeast England. This area was specifically selected due to its current economic contributions to economic growth in the UK. The south east of England is the second largest economic contributor amongst regions of England and UK and is responsible for nearly 15% of the UK's Gross Value Added (GVA) to the economy (ONS, 2012a). Gross household income per head in Hertfordshire is the fourth highest in England (ONS, 2012b).

Sampling was undertaken from June 29th 2012 – September 29th (2012). A two-phase multi-stage random sampling method was devised. Phase 1 included geographically stratifying the Hertfordshire area into its 267 towns and areas. Using Microsoft Excel systematic random sampling method was applied to a randomly ordered list of the 267 towns and areas that resulted in 67 selections. Phase 2 pertained to household selection. Each of the 67 selected towns/areas from the sampling list cardinal directions were assigned a number (1- north, 2 – south, 3 – each and 4 – west). Using Microsoft Excel, a number ranging from 1 to 4 was randomly assigned to each town/area. Google Maps was then used to identify the geographic starting point for flyers distribution. In consideration of manpower resources,

175 flyers were distributed to each selected area. However, not all selected towns and areas consisted of 175 households, which led to 7480 households being selected to participate in this research project.

After disseminating the overall survey flyers for one entire month, the survey link was left open for 2 full months. 1119 responses were collected in total. Data cleansing was then undertaken that led to 39 incomplete replies. The final count of complete and useable responses was at 1080 (14.4% response rate). A rough guide to any researcher is that a response rate of 20% implies a good result (Denscombe, 2009). This led the team to conclude that response rate was acceptable.

Demographics

The final sample population included a diverse demographic spread of older individuals. Frequencies of the five key socio-economic variables are as follows:

Age: 50-60 (34.1%), 61-70 (35.5%) and 71+ (30.4%). Gender: Male (52.2%) and Female (47.8%). Education: University educated (42.3%), college educated (35.5%), high school educated (19.4%). The remainder of 2.8% held industry specific qualifications. Race: white background (76.1%), other white background (5.2%), Asian British Indian (4.8%), Black/African (4.3%). The remaining 9.6% participants were mixed white/Asian, other Asian background or selected other. Occupation: Legislator/managers/professionals (38.5%), service/sales (16.8%), craft/trade (12.1%), freelance (9.5%), academics/teachers (7.5%), clerks (8.1%), and minority groups were machine operators (2.7%) and agriculture (4.7%). In terms of health that displays the physical and cognitive aspects of aging participants rated themselves as excellent (20.6%); good (75.2%) and poor (4.2%).

6 Instrument Validity

The survey instrument used for this research was validated on the basis that: 'Instrument validation is a critical step that researchers should employ in order to ensure a generation of scientifically valid knowledge' (Kim, 2009; p. 1178). To ensure scientifically valid findings, a literature review of the most appropriate and widely used instrument validation procedures led to the selection of content validation, pretest, pilot test, construct validation and construct measurement reliability (*see* Boudreau et al , 2001; p.8).

6.1 Content Validity (CV)

It is accepted in social science research that construct measures must demonstrate content validity before the measures can hold any other type of validity (Rossiter, 2008). Therefore, Lawshe (1975) content validity method was employed. A Content Validity Panel (CVP) of 5 industry and 5 academic experts were self-selected to participate. Experts were then asked to rate each survey item as either (a) essential (b) useful, but not essential (c) not necessary. CV ratios were calculated using Microsoft Excel 2010. All the measurements met the accepted value.

6.2 Pretest

Pretesting is generally agreed to be an indispensable stage in development of survey questionnaires (Presser & Blair, 1994). Presser & Blair (1994) found that on average the expert panel pretest method was most productive in the number of problems identified within a survey instrument and was also pursued by this study. The expert panel was diverse and comprised 20 experts: 3 academic researchers, 3 researchers from industry, 3 industry professionals, 3 medical professionals and 8 academic graduates. Each expert was asked to complete the online questionnaire and provide feedback based on a set of criteria (misinterpretation, intrusiveness, clarity and appropriateness of answer format). The pretest resulted in rewording of nine survey items to remove misinterpretation and to improve clarity.

6.3 Pilot Test

A pilot test using a sample population of 250 was conducted over a 2 months period. This led to a revision of 4 survey items and identified the Partial Least Squares (PLS) path analysis algorithm to be most suitable analysis method. This was attributed to the use of a prediction-orientated, variance-based approach (Urbach & Ahelmann, 2010). SmartPLS 2.0 offers such functionality and employed for this research (Ringle et al, 2005)

6.3 Construct Validity

To test for construct validity evidence of convergent and discriminant validity must be demonstrated (Trochim & Donelly, 2006). A factor analysis was conducted and factor loadings were assessed for construct validation with the results discussed in the following sections.

Convergent & Discriminant validity

Convergent validity is evident when construct measures of a construct, which theoretically should be related to each other, are observed within the data (reality) to actually be related (Trochim & Donelly, 2006). Appendix 3 illustrates convergent validity being demonstrated by the overall constructs except for SI and RFC. This was due to RFC1 not converging with the related RFC measures (RFC2 & RFC3). Discriminant validity is evident when construct items (measures) that should not be related theoretically are observed within the data (reality) to not be related (Trochim & Donelly, 2006). This was determined as all three factors loadings for the same construct, load far greater than those factors loadings of any other construct within the factor analysis. Appendix 3 also shows the overall constructs except for RFC demonstrating discriminant validity. The results of construct validation showed that all the measures for the overall constructs were appropriate except for SI and RFC.

6.4 Measurement Reliability

Reliability refers to reproducibility or stability of data and observations (Litwin, 1995). Three available methods of assessing measure reliability were employed with the results displayed in appendix 2.

Cronbachs (*a*)

Cronbachs alpha (*a*) is one specific method of estimating the internal consistency reliability of a set of measures (Trochim & Donnelly, 2008). To determine good validity levels of 0.70 or more are generally accepted (Litwin, 1995). Appendix 2 illustrates that using this method led to the overall constructs illustrating very high levels of reliability. This suggests that dependable reliability in the applied construct measures will produce the same result assuming that the underlying phenomenon does not change (Trochim & Donnelly, 2008). However, RFC did not meet the accepted level by a marginal difference of 0.0012; thereby, demonstrating that the dependability of RFC measures to be lower then acceptable.

Composite Reliability

'The interpretation of the composite reliability is similar to that of Cronbach's alpha, except that it also takes into account the actual factor loadings' (Liao & Wang, 2011; p 121). To determine significance composite reliability must be no lower that 0.6 (Henselar et al, 2009). All the constructs demonstrated accepted levels of composite reliability.

Average Variance Extracted (AVE)

The AVE indicates what percentage of the variance of a construct any individual item explains (Liao & Wang, 2011). To provide an understanding the Average Variance Extracted (AVE) coefficient should be higher than 0.5 (Henselar et al, 2009 p 300). All constructs had acceptable AVE levels except SI.

7 Data Analysis and Findings

Following data acquisition path analysis was conducted using SmartPLS M3.

7.2 OSN Adoption (MOSN Model Testing)

To test the model, structural equation modeling was conducted where statistical significances of path coefficients (p-value) were observed. Due to the limited page limits it is not possible to include an illustration of the path analysis; however, interested peers can seek a copy from the researchers. The coefficient of determination (R_2) value (0.92) was used to estimate the proportion of variance in the dataset that was accounted for and explained by the statistical model. The result of 92% supports the applicability and usefulness of the MOSN framework in examining OSN phenomenon. This supports the value of developed framework for future studies.

Significant Results

Six theoretical constructs had significant influences on the key dependent variable behavioral intention. Hedonic outcomes was found to have the weakest positive effect (*p*-values <.05) on BI. This showed that although not strongly significant, participants' perceptions of fun and entertainment were motivational considerations toward OSN intention. The five other remaining significant constructs held extremely strong significant paths (*p*-values <.001) and these results are now interpreted.

Privacy risk observed a significant negative influence on BI that showed the perceived loss of control over personal information; personal information being used without consent and criminal activity associated with internet services such as OSNs are impediments to the intention to use OSN for older individuals. Social Outcomes experienced a significant positive influence on BI confirming that older individuals perceive OSN use to have greater social status in terms of number or friends or respect from those they know and popularity among personal peers. Relative Advantage was found to have a significant positive influence on BI. Therefore if a participant experienced positive perceptions of OSN

use in terms improved communication and a more beneficial internet experience. These perceptions were motivational towards OSN adoption. As expected primary influence in the form of a participants friends, family and co-workers recommending OSN use was found to be a strongly significant positive explanatory construct of BI. The construct Technology F.C, which included 'anytime' access to the internet within the household, availability of internet devices and internet access that is perceived to be fast and reliable enough to support OSN use positively influenced an older individuals intention.

7.3 OSN Diffusion

Principally guided by Rogers (2003) Diffusion of Innovations (DoI) theory the diffusion of OSNs was another line of enquiry of this research. 'Diffusion is the process by which an innovation is communicated through certain channels over time and among members of a social system' (Rogers, 2003 p.5). The social system analyzed in this diffusion study is that of the participating older individuals. Communication channels are the means by which messages get transmitted from one individual to another. Rogers (2003) suggests 'mass media channels' such as radio, television and newspapers are communication channels that usually provide the most rapid and efficient means of informing potential adopters about the existence of an innovation, in this case OSNs. Consequently to examine the identified OSN phenomena using DoI, mass media channels of TV, newspaper, Internet, radio Word of Mouth (W.O.M) and magazines were examined.

All the participants, both OSN users and non-OSN users were asked about the communication channels they had obtained information on OSNs from. This was applicable to any context. A SmartPLS path analysis model was then developed using these communication channels as explanatory variables of BI.

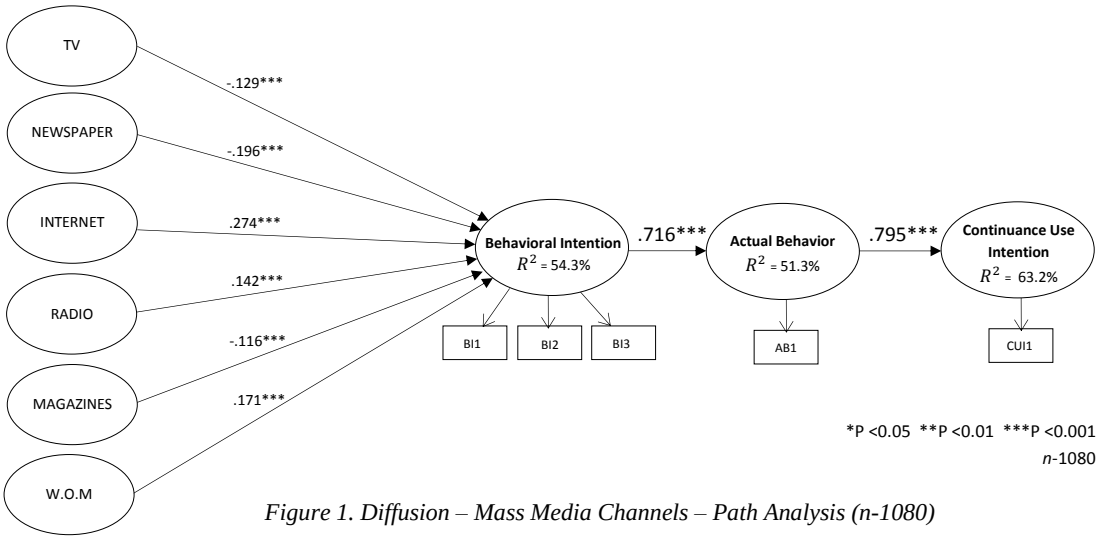

Figure 1. Diffusion – Mass Media Channels – Path Analysis (n-1080)

The path analysis model demonstrated that the chosen mass media channels accounted for and explained 54.3% of the variance of BI. All the mass media channels were found to have a highly significant (*p*-value: < .001) effect on BI. Information transmitted using TV, media, newspaper and magazines had a negative effect on OSN intention. Information transmitted using the internet, radio and word-of-mouth had significant positive effects on OSN intention. In the context of OSN diffusion these results provide preliminary evidence supporting theoretical suggestions that information transmitted using mass media channels do have significant effects on the adoption decision throughout the social systems of older individuals.

7.4 OSN Usage

To provide insights into older individuals OSN usage behavior, the survey items regarding OSN use were administered to the 519 participants who were at the time of the survey, currently OSN users. The following findings were extracted.

In terms of frequency of OSN usage, 46.8% used OSNs on a weekly basis, 37% on a daily basis for less than 2 hours, 14.6% on a monthly basis and <1.6% on a daily basis for more than 2 hours a day. Excluding their household, participants were asked to select other locations where access to OSNs was sought. It was found that participating older individuals also accessed OSNs from their workplace (20%), friends/family house (6.3%), restaurants (1%) and coffee houses (1%). The most popular activities when using OSNs were adding people you know (86%), commenting on pictures (57%),

sending messages (60%), viewing photos (55%), obtaining events information (41%) and obtaining media information (41%%). In terms of OSNs application for e-government, participants were found to use OSNs for central (14.6%) and local (1.2%) government interaction and communication.

It was observed that LinkedIn, Facebook and Twitter and are the most popular OSNs within the obtained sample: Facebook (66%), Twitter (47%), Linkedin (41%), Branch Out (10.4%) and Google+ (7.3%). Participants were asked if their OSN profile hosted a profile picture of themselves with 76% stating yes, no at 21%, not currently, but I intend to at 2% and I used to at <1%.

Within all the age groups laptops (84%) were the preferred method of OSN access. PCs (47%) were the next preferred device of choice. PCs were the only device cited for OSN use within the 81+ age category. Tablet PCs were used by (13.8%) for OSN access and 12.7% used their smart phones to access their OSN account.

8 Discussion

After employing a wide-scale quantitative survey questionnaire it was shown that for participating older individuals; hedonic outcomes, primary influence, relative advantage, social outcomes, privacy risk, primary influence and technology F.C are theoretical constructs that significantly influence BI. Furthermore the ten selected theoretical constructs that formulated the development of MOSN explained and accounted for 92% of the proportion of variance of BI.

Analyzing the use behavior of the 519 participating OSN adopters showed that Facebook, Twitter and Linkedin were the most popular OSNs with the majority of participants using OSNs on weekly or daily basis (for less than 2 hours a day). Devices for OSN access were fundamentally PCs and laptops. However participants were found to also use tablet PCs and smartphones in locations other then just the household that included friends/family households, restaurants and coffee shops.

With regards to diffusion, information about OSNs transmitted using mass media channels were examined where it was found that TV, newspapers, internet, radio, W.O.M and magazines all play a significant role in the OSN adoption process within social systems of older individuals.

From the standpoint of the literature reviewed within this paper, McMurtrey et al (2011) found 90% of the 67+ participants do not use OSNs, which is a lower percentage than that obtained by this research. Of the overall 538 participants aged 65+, 66.3% did not use OSNs. The non-technical adoption factors of relative advantage, social outcomes and primary influence were found to encourage OSN adoption and interaction; thereby supporting Choudrie et al (2008) investigations of internet use by older adults. Ryu et al (2009) found older individuals will adopt Internet technologies if certain conditions are satisfied. This finding was consistent as technology facilitating conditions such as ‘anytime access’ to Internet capable devices and a fast reliable internet connection had significant positive effects on OSN intention. Carpenter & Buday (2007) found cost to be an impediment of internet use. Comparatively, cost was measured through the construct resource F.Cs and was found to have no significant effect on OSN intention. Shin (2010) found privacy concerns to have significant effects on attitudes towards OSN adoption. This was supported as perceived privacy risks associated with OSN use observed a highly significant negative effect on intention. Consistent with Peng & Mu (2011) MOSN revealed a primary influence to positively and significantly affect OSN intention. This finding shows that older individuals are considerate and act upon views of members in one’s social circle. The theoretical constructs applied from the MATH model were found to be highly significant and confirmed Maier et al’s (2011) findings that MATH can be utilized to examine older individuals OSN adoption. In terms of OSN use, Pempek et al (2009) found OSNs being used for social interaction with friends, which our study also confirmed. Contrary to Maier et al (2011) who found that hedonic outcomes had no significant effect on the OSN adoption of elderly individuals this research found that hedonic outcomes had a weak (<.05) significant positive effect on behavioral intention. Niehaves et al (2008) research on senior citizens, the digital divide and e-government technology use suggested that concerns regarding service complexity, data security, and costs were deterrents of e-government service use. However this research identified privacy risk to be a significant deterrent of OSN adoption, and it was found that 15.8% of participating older individuals use OSNs for e-government purposes.

Implications of the research findings for academia are viewed to be a MOSN framework that has empirically demonstrated its value as a research framework for the examination of OSN technology adoption. Our research findings also provide evidence that OSNs are being utilized not only for social purposes but also for government interaction. This suggests for policymakers that efforts should be made to increase e-government functionality within the leading OSNs of Twitter, Facebook and LinkedIn since these were found to be most popular for older individuals in the UK. For industry, eg.

Internet Service Providers (ISPs), marketing departments of organizations seeking to provide OSNs, our diffusion findings suggest that to increase wider OSN penetration campaigns, information and advertising should be transmitted using the internet, radio and word of mouth.

9 Conclusions and Future Directions

The aim of this research is to identify and understand the adoption, use and diffusion of OSNs within UK's older population. Of the overall 538 participants of this research aged 65+, 66.3% did not use OSNs. It was also found that older individuals will adopt Internet technologies if technology facilitating conditions such as 'anytime access' to Internet capable devices and a fast reliable internet connection had significant positive effects on OSN intentions. In terms of influences of peers, it was revealed that older individuals consider and act upon the views of members in one's social circle. Privacy concerns were viewed to have significant effects on attitudes towards OSN adoption as perceived privacy risks associated with OSN use observed a highly significant negative effect on intention. When conducting this research it was found that due to a quantitative aspect to this research, a deeper and richer understanding of the demographic group and their reasons for adoption and using OSNs could not be found. An identification of factors that would lead to the adoption, diffusion and use was possible with this approach; however, for a better and deeper understanding this approach was not appropriate. Future directions include conducting this research aim using a qualitative aspect that could include interviews, observations or focus groups. By obtaining richer replies a better understanding can lead to more diffusion, adoption and use of OSNs within older individuals.

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Construct Measure	Mean	SD	Construct Measure Definition
Hedonic Outcomes $(HO)^a$			
HO1	3.79	2.42	- Online social networks provide much enjoyment
HO2	3.74	2.46	- Online social networks are fun to use
HO3	3.66	2.56	- I am able to use online social networks for entertainment
Utilitarian Outcomes $(UO)^a$			
UO1	3.78	2.60	- I find that online social networks have uses for personal reasons
UO2	2.00	1.74	- Online social networks are useful for me to work at home
UO3	1.91	1.68	- Online social networks are useful for my paid job
Relative Advantage $(RA)^a$			
RA1	3.83	2.61	- Online social networks provide more benefits from internet use
RA2	3.93	2.59	- There are benefits to using online social networks
RA3	3.79	2.69	- Using the internet and online social networks improves my communication with my contacts
Social Outcomes $(SO)^a$			
SO1	3.32	2.47	- People who use online social networks have more friends than those who do not
SO2	3.28	2.50	- People who use online social networks are highly respected by those they know
SO3	3.36	2.58	- Using online social networks improves a person's popularity
Primary Influence $(PI)^a$			
PI1	3.71	2.72	- My friends think I should use online social networks
PI2	3.82	2.69	- My family members think I should use online social networks
PI3	3.42	2.67	- My relatives think I should use online social networks
Secondary Influence $(SI)^a$			
SI1	1.81	1.32	- Newspapers suggest that I should use online social networks
SI2	1.89	1.43	- TV programs, advertising and films encourage me to use online social networks
SI3	1.53	1.02	- Based on what I have heard on the radio, I am encouraged to use online social networks
Technology (FCs) $(TFC)^a$			
TFC1	6.84	.567	- I have access to the internet whenever I want
TFC2	6.84	.661	- I have access to a computer, laptop or iPad whenever I want
TFC3	6.60	1.08	- My internet is fast and reliable enough to use online social networks
Resource (FCs) $(RFC)^a$			
RFC1	6.82	.675	- I can afford to pay for the internet and a computer, laptop or iPad
RFC2	5.63	2.14	- I have the time needed to set up an online social networking account
RFC3	5.47	2.25	- I have the time to use online social networks
Requisite Knowledge $(RK)^a$			
RK1	6.72	.884	- I feel comfortable using the internet on my own
RK2	6.75	.801	- If I wanted to, I could easily use the internet on my own
RK3	6.77	.798	- I can use the internet even if no one is there to help me
Privacy Risk $(PR)^a$			
PR1	4.22	2.46	- Using online social networks will cause me to lose control over the privacy of my personal information
PR2	4.28	2.57	- Using online social networks could lead to my personal information being used without my knowledge.
PR3	4.18	2.59	- Criminals might take control of my personal information if I used online social networks.
Behavioral Intention $(BI)^a$			
BI1	3.62	2.80	- I intend to start using online social networks
BI2	3.61	2.83	- I predict that I will start using online social networks
BI3	3.59	2.84	- I expect to start using online social networks in the near future

(1= Disagree 7 = Strongly Disagree)

n-1080

Appendix 1. Descriptive Statistics & Construct Measures (n-1080)

Construct	AVE[1]	Composite Reliability[2]	Cronbachs $(\alpha)^3$
Behavioral Intention(BI)[a]	.9936	.9979	.9968
Hedonic Outcomes (HO)[a]	.9677	.9890	.9833
Primary Influence (PI)[a]	.9456	.9812	.9712
Privacy Risk (PR)[a]	.9673	.9888	.9831
Relative Advantage (RA)[a]	.9567	.9851	.9774
Resource F.C (RFC)[a]	.6618	.8392	**.6988***
Requisite Knowledge (RK)[a]	.9162	.9704	.9542
Secondary Influence (SI)[a]	**.4524***	.6819	.8197
Social Outcomes (SO)[a]	9756	.9917	.9875
Technology F.C (TFC)[a]	.7061	.8781	.7969
Utilitarian Outcomes (UO)[a]	.6798	.8641	.7953

1 = Accepted (=> 0.5) (Henselar et al , 2009) 2 = Accepted (=> 0.6) (Henselar et al , 2009)
3 = Acceptable (=> 0.7) (Litwin, 1995) a = Likert Scale 1 - 7 (1 = Strongly Disagree 7 = Strongly Disagree) * Unacceptable

Appendix 2. Reliability Results (n-1080)

	BI	HO	PI	PR	RA	RFC	RK	SI	SO	TFC	UO
BI1	**0.9956**	0.9037	0.9312	-0.8735	0.9238	0.5260	0.2055	-0.1002	0.9121	0.2492	0.7920
BI2	**0.9980**	0.9053	0.9348	-0.8780	0.9244	0.5295	0.2111	-0.0975	0.9162	0.2460	0.7966
BI3	**0.9969**	0.9030	0.9341	-0.8765	0.9226	0.5323	0.2093	-0.1014	0.9150	0.2463	0.7948
HO1	0.8778	**0.9870**	0.8647	-0.8503	0.9232	0.4853	0.1910	-0.0436	0.8857	0.1155	0.8220
HO2	0.8918	**0.9908**	0.8805	-0.8627	0.9325	0.4945	0.1935	-0.0540	0.8929	0.1390	0.8243
HO3	0.9060	**0.9734**	0.8874	-0.8688	0.9335	0.5175	0.2035	-0.0515	0.8915	0.1870	0.8247
PI1	0.9193	0.8842	**0.9799**	-0.8477	0.8996	0.5107	0.1991	-0.0960	0.9203	0.2228	0.7690
PI2	0.9125	0.8591	**0.9721**	-0.8332	0.8800	0.5194	0.1803	-0.0924	0.8879	0.2367	0.7436
PI3	0.8997	0.8594	**0.9652**	-0.8204	0.8845	0.4877	0.1955	-0.0697	0.8977	0.2194	0.7810
PR1	-0.8409	-0.8507	-0.8162	**0.9783**	-0.8491	-0.4506	-0.1868	0.0692	-0.8138	-0.0995	-0.7535
PR2	-0.8783	-0.8643	-0.8640	**0.9870**	-0.8714	-0.4941	-0.1864	0.1062	-0.8549	-0.1403	-0.7539
PR3	-0.8728	-0.8665	-0.8488	**0.9851**	-0.8728	-0.4850	-0.1922	0.0798	-0.8473	-0.1184	-0.7639
RA1	0.8888	0.9046	0.8791	-0.8389	**0.9736**	0.5095	0.2213	-0.0454	0.8800	0.1828	0.8030
RA2	0.9077	0.9331	0.8947	-0.8657	**0.9842**	0.5172	0.2051	-0.0453	0.9001	0.1811	0.8324
RA3	0.9217	0.9354	0.9054	-0.8743	**0.9764**	0.5107	0.1918	-0.0777	0.9049	0.1822	0.8410
RFC1	0.1972	0.1321	0.1807	-0.1139	0.1601	**0.3832**	0.2711	-0.0752	0.1519	0.5882	0.0799
RFC2	0.4992	0.4891	0.4911	-0.4701	0.5005	**0.9644**	0.0921	0.0042	0.4654	0.2578	0.4175
RFC3	0.5208	0.5078	0.5134	-0.4871	0.5194	**0.9532**	0.1167	-0.0631	0.4902	0.2949	0.4213
RK1	0.2134	0.2049	0.2002	-0.1935	0.2182	0.1619	**0.9357**	-0.0198	0.1900	0.2877	0.1517
RK2	0.1983	0.1872	0.1856	-0.1831	0.1958	0.1359	**0.9698**	-0.0158	0.1703	0.2484	0.1391
RK3	0.1871	0.1780	0.1781	-0.1718	0.1878	0.1368	**0.9657**	-0.0151	0.1656	0.2469	0.1334
SI1	0.0131	0.0828	0.0551	-0.0311	0.0678	-0.0243	-0.0236	**0.5254**	0.0480	-0.1985	0.1778
SI2	-0.0761	-0.0168	-0.0583	0.0662	-0.0263	-0.0383	-0.0266	**0.9654**	-0.0638	-0.1903	0.0781
SI3	0.0134	0.0556	0.0212	0.0087	0.0488	0.0049	-0.0466	**0.3859**	0.0151	-0.1312	0.1328
SO1	0.8892	0.8870	0.9020	-0.8342	0.8937	0.4690	0.1715	-0.0823	**0.9858**	0.1817	0.7699
SO2	0.9108	0.8955	0.9177	-0.8467	0.9065	0.4886	0.1825	-0.0949	**0.9920**	0.1909	0.7739
SO3	0.9178	0.8987	0.9284	-0.8466	0.9113	0.4979	0.1904	-0.0968	**0.9854**	0.1976	0.7853
TFC1	0.1894	0.1028	0.1637	-0.0739	0.1217	0.3165	0.2856	-0.1538	0.1398	**0.8627**	0.0416
TFC2	0.1699	0.0826	0.1597	-0.0469	0.1216	0.2754	0.2260	-0.1373	0.1243	**0.8226**	0.0538
TFC3	0.2490	0.1734	0.2442	-0.1616	0.2065	0.3474	0.1907	-0.1277	0.2040	**0.8350**	0.1117
UO1	0.8931	0.9495	0.8764	-0.8629	0.9342	0.4814	0.1945	-0.0167	0.8817	0.1199	**0.8703**
UO2	0.4448	0.4628	0.4393	-0.4338	0.4733	0.2290	0.0419	0.0582	0.4411	0.0271	**0.8209**
UO3	0.4186	0.4208	0.4219	-0.3992	0.4662	0.2072	0.0607	0.0790	0.4087	0.0233	**0.7798**

Appendix 3. Factor Loadings – Construct Validity (n-1080)