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Examining Online Social Networks (OSNs) Adoption and Use within Older Adults: A Facebook and Twitter, Hertfordshire Study (16)

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Research in Progress

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Abstract

As the quality of life improves, an ageing population is the outcome. This group of society is also a low adopting and use group of Online Social Networks that are proliferating daily lives. Therefore, this research in progress paper formed the aim: To identify, understand and explain the adoption, use and diffusion of OSN within the older adult population residing in Hertfordshire households of the UK. This paper provides the theoretical foundations and hypothesis of this study. It also explains how it will provide contributions for academia, policy makers and industrial sectors and offers a conclusion to this paper.

Keywords: Online Social Networks (OSN's), Older Adults, Household Adoption, Diffusion, Usage, United Kingdom.

1. Introduction

Presently, Information & Communication Technologies (ICT) have proliferated daily lives such that research interest into their impacts has rapidly grown (Osoiro, et.al. 2013). Although ICT have become significant to society, there is also evidence suggesting that not all groups of society, which is the older adult population, are adopting & using them; hence low adopters of ICT (Damant and Knapp, 2015). Older adults have become important to society due to the improvements in their mortality rates that has led to an improved quality of life & wellbeing thanks to novel ICT applications & awareness (Sara and Sharit, 2009). This has led to them becoming important to organizations, society & economies. For organizations, older adults offer lower absenteeism, reduced staff turnover, better retention levels & a wealth of skills & knowledge transferable to younger workers (Pride, 2013). To economies, annually, older adults aged 65 & above have contributed around £45 billion in taxes & are expected to pay by 2030, an estimated figure of £82 billion (Pride, 2013). The contribution of older adults has also been revealed in a recent study in the UK that

highlights the contribution of older adults, specifically, women over the age of 70 years still being in employment (BBC, 2017).

To familiarise readers to the term older adults, we define the term 'older adults' as individuals aged 50 years & above, who have the knowledge and ability of using ICT & are known as 'silver surfers' (Netlingo, 2016). Older adults' categorization begins from 50 years & above, as at this age adults health, cognitive skills & vision begin to decline, which, in turn, affects their daily activities & underlying performance (Albert & Heaton, 1988). When considering older adults, there are three categories used to identify them, which are: the Pre-seniors (aged 50-64); young-old (aged 65-74); & older-old (aged 75+) (Lee et al, 2011).

As mentioned earlier, globally, the population is ageing & increasing, with the UK, the country of interest to this study, being no exception facing an ageing population (ONS, 2015). The UK population is currently at 65.1 million, with the older adult population continuing to increase. There are over 11.6 million people aged 65 or over in the UK, and 23.6 million individuals aged 50 & above, which is over a third of the total UK population (AGEUK, 2016).

Due to novel ICT developments, internet based Online Social Networks (OSN), platforms or applications such as Facebook, Twitter, or LinkedIn have largely penetrated daily life activities. As knowledge of OSN increases, there are also synonymous terms being used for them including, "Social Network Sites (SNS)" or "Social Media". In this research-in-progress paper, we are using the term OSN as social media is more synonymous with the subject of Marketing, which this study is not. In terms of OSN penetration rates within society, Facebook is the most popular OSN as it was the first OSN platform to surpass 1 billion registered accounts with over 1.71 billion monthly active users. Comparatively Twitter, which is a comparable social and celebrity application, has 313 million monthly active users while LinkedIn has 106 million active users (Statista, 2016).

According to the UK ONS (2016) 5.3 million adults in the UK have never used the internet, with 0.9 million using the internet, but not in the last 3 month. Several

research studies have raised questions on the social impact caused due to the widespread of OSNs sites such as Facebook, Twitter, Linkedln. Pew Research (2011) investigated and examined OSN, exploring how the use of these technologies is related to trust, social support and community and political engagement. Pew (2011) results showed there is a considerable difference in the way people use OSNs. For example, there were 52% Facebook users and 33% Twitter users engaging with the platform on a daily basis. However in terms of use, most users engaged in two or more OSNs platform, with the most popular OSNs being Facebook and Twitter. The research results also show Facebook users are more trusting and get more social support than users of other OSN platform (Hampton, et.al, 2011). In terms of Facebook, older adults and the UK, there has been previous research that has examined the adoption and use of OSN within older adults in Hertfordshire, but it was focused on Facebook (Choudrie and Vyas, 2014).

Due to the diversity & numerous numbers of OSN platforms, this research will be focused on contrasting the two most dominant OSN utilised both for personal and in certain instances, such as, for advertising, or business, Facebook & Twitter. LinkedIn is an OSN that is used mostly for professional services; thus discounted for our study. The UK regulator study of OSN users Ofcom revealed that older adults' & individuals from unemployed, lower grade occupations & semi-skilled or unskilled manual skills backgrounds, also known as narrow users have not adopted ICTs as much as other groups with their user numbers remaining unchanged since 2014 (OFCOM, 2016).

Recognising that disparities between users & OSN exist, as Choudrie and Vyas, (2014) acknowledge, there is need for more quantitative research into adoption and use of OSN. Therefore, this research study was motivated to explore impacts of other factors in adoption, use and diffusion within the older adult population of novel technologies by using two popular OSNs; hence, the research aim was formed:

To Identify, understand, examine & explain the adoption, use & diffusion of OSN: namely, Facebook vs Twitter within the older population of UK.

The contributions of this study are viewed to be a comparison of the factors leading to OSN adoption within the older adult population. By doing so, the theoretical adoption models can be enhanced and extended to consider a demographic groups needs in

terms of OSN. From such studies, industry can identify what factors should, or not be emphasised when targeting consumers from this marginal group of society. For policymakers, this research will identify factors to emphasise when promoting their online (electronic government) services.

To familiarise readers to the contents of this paper, the following section explains & understands the theoretical aspects surrounding this research. This is then followed by a conclusion to this paper.

2. Theoretical Foundations of this study

2.1 Older Adults, OSN, Internet based Research in the UK

The UK Government has constantly maintained its stand that technology is an integral part of the future of health and social care, with over 80 million pound invested in three preventive technologies to support over 7,500 older adults long term care needs (AGEUK, 2008). The findings also indicate that providing assistive technology such as, broadband at home along with home care support can half the average stay in residential care for many people. For older adults accessing the internet, OSN are a useful means of keeping in touch with family and friends, with active users within the age of 55 and above spending an average 42 hours online every month (AGEUK, 2008). This function is pertinent given that in later life, family structure and ties change, which can lead to some older adults to become lonely (Ellwardt et al, 2013).

The loss of network members (including family members and work colleagues) can result in a reshuffling of social influences and norms. This, in turn, can give rise to *anomia*, or a sense of normlessness or detachment from society (Deflem, 1989). This sense of normlessness can increase stress and suppress immune function (Graham, Christian, & Kiecolt-Glaser, 2006), which can have negative health consequences. Anomia may derive not only from the loss of pre-existing social routines with a given lost network member, but also from disruption in the larger social network in which that person was embedded.

Further research has shown that individuals who are lonely or detached from society have twice the risk of developing Alzheimer's disease, and generally experience more rapid cognitive decline than individuals who are connected socially (Amieva et al., 2010;Wilson et al., 2007). A considerable numbers of research studies in gerontology

have demonstrated mixed effects of social support on cognitive functioning. Empirical findings show that the quality rather than the quantity is protective of cognitive decline (Krueger et al., 2009), and that emotional support seems to have more beneficial effects than instrumental support (Amieva et al., 2010, Glymour et al., 2008, Holtzman et al., 2004 and Seeman et al., 2001).

The previous views of loneliness being combatted by OSN is supported by recent findings from the Office for National Statistics (2015) report that showed that internet use for older age groups (55-64 and 65+) is more likely to be emphasised on functional tasks. Functional tasks are described as, tasks such as, sending and receiving emails, which we believe will combat loneliness, finding information and using services for travel and accommodation, which we also feel is pertinent for overcoming some signs of dementia (Ellwardt et al, 2013).

In the Information Systems arena, OSN use is a form of social networking that assists with the management and prevention of mental and health care (Garcia et.al, 2005). Social ties formed on OSN reduce the risk of depression among older adults and boosts their self-confidence. With greater access to internet services, the availability of information becomes easier. However access to certain information from the internet may be harmful, as internet users face certain challenges accessing relevant and literacy-sensitive information such as, health information (Cline and Haynes, 2011). Individuals without adequate skills to navigate the internet such as, OSN services are more likely to access health information that is inaccurate and potentially dangerous to their health (Neter and Brainin, 2012). This particular issue is problematic for the aging population due to the aging process rendering older adults to become vulnerable to chronic diseases (CDCP, 2011).

Several studies have highlighted the use of technology to facilitate older adults living independently in their own homes for longer due to additional assistive technology and telehealth (AGEUK, 2017). The term assistive technology is defined as any product or service designed to enable independence for disabled and older people. A study investigating the effectiveness of IT-based telehealth designed to combat cognitive impairment within the older adult population in USA found that artificial intelligence for older adults was useful for cognitive impairments as artificial

intelligence offered reassurance, location reminding, and provided assurance through communication (Pollack, 2005). Experts agree that OSN and telehealth are pertinent beyond just the marketing aspect. Reports show that one third of consumers use OSN for medical information, with researchers suggesting that OSN is in fact a form of telemedicine (Kim, 2012). Additional studies have found that states that perhaps one of the most exciting impacts of social media on healthcare is its rapid use in tracking fast moving illnesses such as, the flu (Yvonne, 2014), a view supported by the Business of Federal Technology: "Flu spreads fast, but tweets spread faster" in comparison to updating a status on the OSN, twitter (Konkel, 2013).

The context of this research is the household as the demographic group being used for this research are older adults. This was on the basis of the finding: that one third of all households in UK consist of individuals aged 55 and above, while more than half of projected new households will be headed by someone aged 65 and over(JRF, 2012). To familiarise readers to the term 'household' we offer the following discussion. N-Parker (2005) defines the basic features of the household as one where members co-reside under one rooftop. A household can consist of more than one family, or no families in the case of unrelated people. Brown (2008) identifies household as the location whereby high intake of technology adoption and use takes place. William et.al (2004) research found that there is an emergence of the technology-contextualized home environment that has in turn generated numerous issues worthy of investigation, including awareness, adoption and usage of emerging technologies and online services and social exclusion due to unequal adoption by different segment of society. Therefore, we selected the 'household' as the context of this research.

Having provided a background in the context of this research the next section provides reasoning for the theoretical foundations of the research model to be applied to this study.

2.2 Theoretical foundations of the research model

For this research, selected IS theoretical models enables wider investigation on the identified OSN phenomena, having considered other theories from a range of well-established IS, social and phycology theories. The Model for the Adoption of

Technologies in the Household (MATH) model is the main framework for this research. This was on the basis that the model incorporates the context of this study, the "household", which can be associated not only to older adults but to novel innovation as well.

What is also known is that the model MATH was formed and is based on the Decomposed Theory of Planned behaviour (DTPB) and Theory of Planned Behaviour (TPB) models. Therefore these theories and other such as, the Diffusion of Innovations (DOI) theories are vital for this research and ignoring them will leave the research discounted on some factors needed when investigation pre-adoption.

The identified constructs are drawn from the selected models MATH, DTPB, TPB & DOI theories. The research discounted some factors when investigating the pre-adoption aspect. Pre-adoption was selected because it is also known that older adults are a demographic group of society that is still considering adopting novel ICT. Constructs drawn from the identified theories were classified into three groups: the TPB attitudinal beliefs, Subjective Normative beliefs & Control beliefs. The constructs drawn from existing theories & models led to the formation of the hypothesis for this research & a conceptual model. To highlight the comparison between the OSN, this research will be guided by three sets of hypothesis.

This research will also consider *adoption intention*, thus included the Expectation Confirmation Model (ECM). The ECM enables researchers to identify the levels of satisfaction or quality of service for adopters that serve as indicators of continuous intention to use novel technologies such as OSN. Satisfaction indicates the sense of satisfaction or disappointment obtained through comparison of performance on products or services (Chen, et.al. 2010). User satisfaction has a significant impact on loyalty (continuance) in virtual communities (Lin, 2008); thus, for this research the hypothesis will measure user satisfaction between Facebook & Twitter. The second variable, service quality, has been identified as a major determinant of IS success (Delone & Mclean, 2004) & defined as a consumers' perception of what a standard service should deliver & measure against what is delivered (Zhao et al., 2012).

Model	**Constructs**	**Hypothesis**
ECM	Satisfaction	**H1 (i): User satisfaction will have a positive effect on older adult's behavioural intention to continue using Facebook.** **H1 (ii): User satisfaction will have a positive effect on older adult's behavioural intention to continue using Twitter.** **H1 (iii): User satisfaction level on Twitter is perceived different from the equivalent associated effect with Facebook.**
	Service Quality	**H2 (i): Service Quality will have a positive effect on older adult's behavioural intention to continue using Facebook** **H2 (ii): User satisfaction will have a positive effect on older adult's behavioural intention to continue using Twitter.** **H2 (iii): Service Quality level on Twitter is perceived different from the equivalent associated effect with Facebook.**

Table 2. ECM constructs & proposed hypothesis

2.1.1 Attitudinal Beliefs

Attitudinal beliefs are an individual's positive or negative feelings when performing a target behaviour (Lee and Tsai, 2010). For this research, the theoretical models associated with the attitudinal beliefs are MATH and DOI. Choudrie & Vyas (2014) identified household based older adults (i.e. private and voluntary settings) using OSN, which we also do; hence, the MATH & DOI models were viewed to be suitable for this research. Although the MATH model initially emphasised personal computers within households, it has been applied to other technologies, including OSN. For example, the MATH model was used to investigate technology adoption in households, with findings revealing concerns over usability, privacy, and affordability (Coughlin et.al, 2007). As we focus on older adults' attitudes & behaviours, the MATH model was suitable for this research. The DoI model suggests that the innovation decision process over which an individual or possible other decision making unit passes its first knowledge of an innovation leads to an attitude towards

adoption or rejection of the innovation (Rogers, 2003). The constructs drawn from DoI will aid in explaining different levels of adoption, particularly, in terms of innovation such as, OSN; thus viewed to be suitable.

Table 2.1.1 below provides the constructs drawn from the models.

Model	**Constructs**	**Hypothesis**
MATH	Hedonic Outcome:	**H3 (i): Hedonic outcomes will have a positive effect on older adult's behavioural intention to adopt & use Facebook** **H3 (ii): Hedonic outcomes will have a positive effect on older adult's behavioural intention to adopt & use Twitter** **H3 (iii): The effect of Hedonic outcomes on older adult's intention to adopt & use Twitter is perceived different from the equivalent associated effect with Facebook.**
	Utilitarian Outcome:	**H4 (i): Utilitarian Outcomes associated with Twitter will have a positive effect on older adult's behavioural intention to adopt & use OSN.** **H4 (ii): Utilitarian Outcomes associated with Facebook will have a positive effect on older adult's behavioural intention to adopt & use OSN.** **H4 (iii): Utilitarian Outcomes associated with older adult's intention to adopt & use Twitter is perceived different from the equivalent associated effect with Facebook.**
DOI	Relative Advantage	**H5 (i): Relative Advantage associated with Facebook will have a positive effect on older adult's behavioural intention to adopt & use OSNs.** **H5 (ii): Relative Advantage associated with Twitter will have a positive effect on older adult's behavioural intention to adopt & use OSNs.** **H5 (iii): Relative Advantage associated with older adult's intention to adopt & use Twitter is perceived different from the equivalent associated effect with**

		Facebook.
	Complexity	**H6 (i): Complexity level associated with Facebook will have a negative effect on older adult's behavioural intention to adopt & use OSN.** **H6 (ii): Complexity level associated with Twitter will have a negative effect on older adult's behavioural intention to adopt & use OSN.** **H6 (iii): Complexity level associated with Twitter is perceived different from the complexity level of Facebook with intention to adopt & use OSN.**
	Compatibility	**H7 (i): Compatibility level associated with Facebook will have a positive effect on older adult's behavioural intention to adopt & use OSN.** **H7 (ii): Compatibility level associated with Twitter will have a positive effect on older adult's behavioural intention to adopt & use OSN.** **H7 (iii): Compatibility level associated with Twitter is perceived different from the compatibility level of Facebook with intention to adopt & use OSN**.
E-Service	Trust:	**H8 (i): Trust will have a positive effect on older adult's behavioural intention to adopt & use Facebook.** **H8 (ii): Trust will have a positive effect on older adult's behavioural intention to adopt & use Twitter.** **H8 (iii): Trust level associated with Twitter is perceived different from the trust level of Facebook with intention to adopt & use OSNs**.

Table 2.1.1. Attitudinal belief constructs & proposed hypothesis

2.1.2 Subjective Normative Beliefs

Subjective norm reflects a user's perception that most individuals consider important when determining whether they should, or not perform a certain behaviour i.e. use of OSN. Venkatesh & Brown (2001) identify subjective-norm issues as peer influences

or superior influences. Ajzen & Madden, (1986) identify subjective norm as the larger numbers of individuals, which in this research are the older adults perceive the level of significance, others (family, friends, work associates or media) think of engaging in the behaviour, the greater an individual's level of motivation to either use or not use the technology. Table 2.1.2 below shows the constructs drawn from the factor.

Model	**Constructs**	**Hypothesis**
MATH	Primary Source:	**H9 (i): Primary Influence will have a positive effect on older adult's behavioural intention to adopt & use Facebook** **H9 (ii): Primary Influence will have a positive effect on older adult's behavioural intention to adopt & use Twitter.** **The effect of Primary Influence on older adult's intention to adopt and use H7 (iii): Twitter is perceived different from the equivalent associated effect with Facebook.**
	Secondary Source:	**H10 (i) Secondary Influence will have a negative effect on older adult's behavioural intention to adopt & use Facebook** **H10 (ii): Secondary Influence will have a negative influence on older adult's behavioural intention to adopt & use Twitter.** **The effect of Secondary Influence on older adult's intention to adopt & use H10 (iii): Twitter is perceived different from the equivalent associated effect with Facebook.**

Table 2.1.2. Subjective-Norm constructs & proposed hypothesis

2.1.3 Control Beliefs

Control Belief is defined as the extent to which individuals, if they are subjected to do so, believe they can use an innovation or perform a behaviour (Lange et.al. 2012). Behavioural control is in two forms: self-efficacy & facilitating conditions.

Facilitating conditions are tools such as, time, money and technology needed to make use of an innovation (Taylor and Todd, 1995a). Facilitating condition constructs provide two dimensions of control beliefs: one, resources for using an innovation such as, time & money termed as Resource FC. The other, Technology FC refers to the technology of operation such as, mobile devices, PCs or the internet enabling the performance of a task, which in this research is the OSN (Taylor and Todd, 1995). Other control belief structures drawn from MATH are Requisite Knowledge & Perceived Ease of Use.

Model	**Constructs**	**Hypothesis**
MATH	Requisite Knowledge	**H11 (i): Requisite Knowledge associated with Twitter will have a negative effect on older adult's behavioural intention to adopt & use OSNs.** **H11 (ii): Requisite Knowledge associated with Facebook will have a negative effect on older adult's behavioural intention to adopt & use OSNs** **H11 (iii): Requisite Knowledge associated with older adult's intention to adopt & use Twitter is perceived different from the equivalent associated effect with Facebook.**
	Perceived Ease of Use	**H12 (i): Perceived Ease of Use will have a positive effect on older adult's behavioural intention to adopt & use Facebook.** **H12 (ii): Perceived Ease of Use will have a positive effect on older adult's behavioural intention to adopt & use Twitter.** **H12 (iii): Perceived Ease of Use associated with older adult's intention to adopt & use Twitter is perceived different from the equivalent associated effect with Facebook.**
DTPB	Facilitating Conditions	**H13 (i): Technology F.C & Resource F.C will have a positive effect on older adult's behavioural intention to adopt & use Facebook.**

	H13 (ii): Technology F.C & Resource F.C will have a positive effect on older adult's behavioural intention to adopt & use Twitter. **H13 (iii): Technology F.C & Resource F.C associated with older adult's intention to adopt & use Twitter is perceived different from the equivalent associated effect with Facebook.**

Table 2.1.3. Control belief constructs & proposed hypothesis

These hypotheses & how they relate to the aim of this research are shown in Figure 1 below.

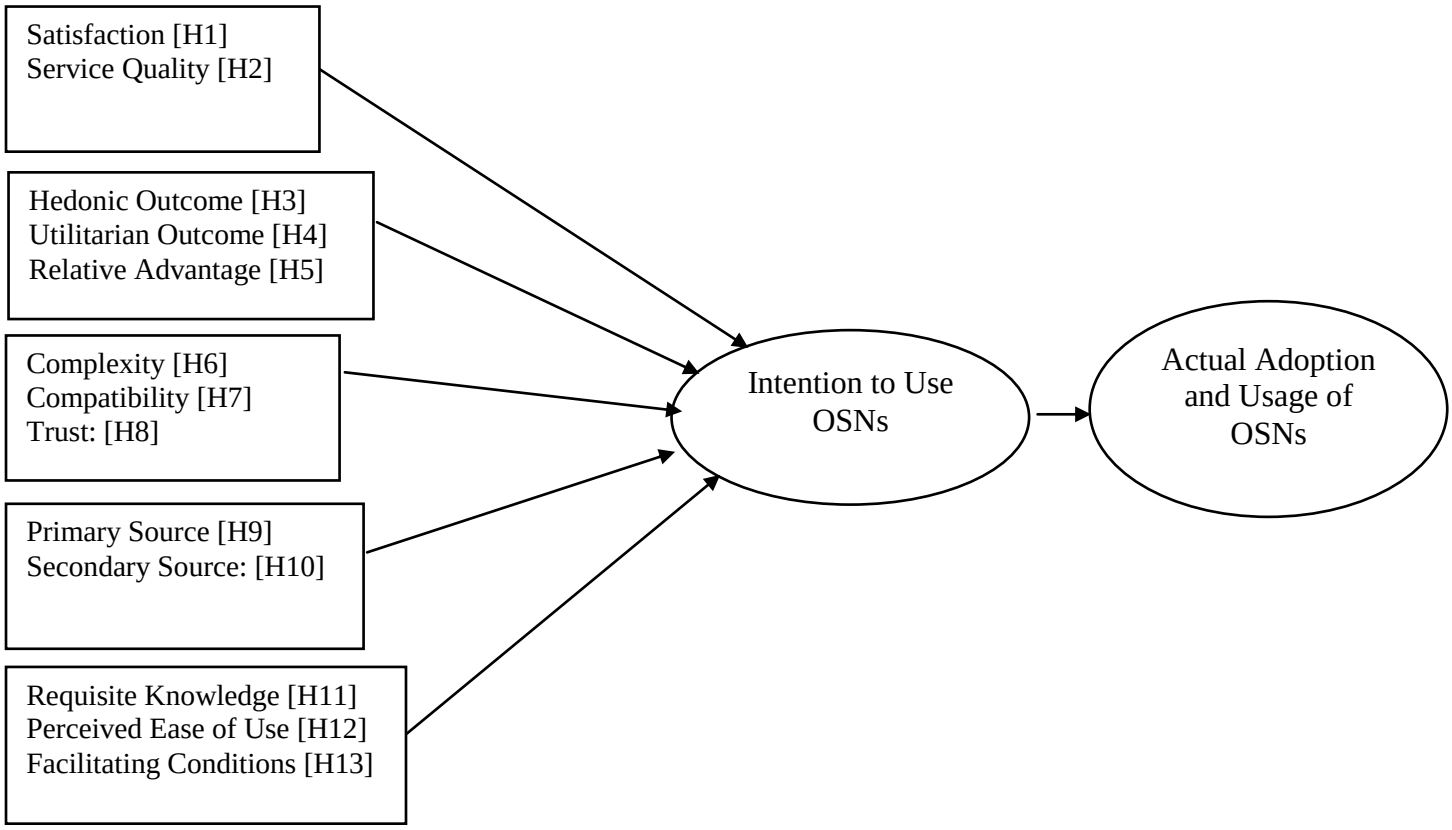

Figure 1. The conceptual model

3. Conclusion

The aim of this research study is to ***Identify, understand, examine and explain the adoption, use and diffusion of OSN: namely, Facebook vs Twitter within the older population of UK.*** To fulfil the aim, the theoretical foundations as well as a background to the problem were provided. It is recognised that currently this research is in development stages with future research being the application of a research approach that will utilise a quantitative approach & develop a survey instrument from the constructs of this research. Appropriateness of the constructs will be determined using a pre-construct validity test, followed by a pilot study of 250 completed replies. The pilot study & final phase (over 1000 completed replies) will collect data from Hertfordshire, UK. The limitation of this study is the emphasis on a sole vicinity of UK. This research is a comparative study of OSN, but also critical to understand. Therefore, there has been a previous study by Choudrie and Vyas, (2014) considering similar contexts and units of analysis; namely, the household, older adults, OSN, Facebook and Hertfordshire.

This research is extending Choudrie and Vyas (2014) as it is comparing two popular OSNs; Facebook and Twitter. The research impact would not only be focused on offering a significant and valuable theoretical contribution to literature regarding older adult view on ICTs use and adoption, including factors leading to older adult adoption or rejection of OSNs. The research process and method of application offers understanding of a demographic group that is very critical to the economy and society in UK and offers some evidence of an impact of this study. Also practitioners in this field of study stand to gain from results as identified factors on pre-adoption will be considered in future development strategies of the utilised OSNs of this research, or other online communities that could be formed in the future and allow a bridging of the digital divide.

4. References

AGEUK (2016) Later Life in the United Kingdom. Available at http://www.ageuk.org.uk/Documents/EN-GB/Factsheets/Later_Life_UK_factsheet.pdf?dtrk=true

AGEUK. (2008). Technology and Older People Evidence Review. Available at: http://www.ageuk.org.uk/documents/en-gb/for-professionals/computers-and-technology/evidence_review_technology.pdf?dtrk=true

AGEUK. (2017). Later Life in the United Kingdom AVAILABLE AT http://www.ageuk.org.uk/Documents/EN-GB/Factsheets/Later_Life_UK_factsheet.pdf?dtrk=true

Ajzen, I. and Madden, T. J. (1986). Prediction of goal directed behaviour: Attitude, intentions and perceived behavioral control Journal of Experimental Social Psychology, 22, 453–474.

Albert M.S. and Heaton RK. (1988). Intelligence testing. In: Albert MS, Moss MB, editors. Geriatric Neuropsychology. New York: Guilford Press; pp. 13–32.

Amieva, H., Stoykova, R., Matharan, F., Helmer, C., Antonucci, T. C., & Dartigues, J. (2010). What aspects of social network are protective for dementia? Not the quantity but the quality of social interactions is protective up to 15 years later. *Psychosomatic Medicine*, 72(9). pp. 905-911.

Avery, G., C. and Baker, G. (2002). Reframing the Informed Household-Workplace. Information & Organization. Vol. 12.

BBC (2017). The women still working into their 70s. Available at: http://www.bbc.co.uk/news/business-39344000. Viewed: March 22, 2017.

Boyd, D and Ellison N. (2007) Social Network Sites: Definition, History and Scholarship. Journal of Computer-Mediated communication. Vol.13 (1) pp.210-230.

Brown. S (2008) Household technology adoption, use and impacts: Past present and future. Information System Frontiers Vol.10 pp.397-402

Campbell, D. (2001) Can the Digital Divide Be Contained. International Labor Review Vol.140 N0.2.

Centres for Disease Control and Prevention. Healthy aging. (2011). Avilable: http://www.cdc.gov/chronicdisease/resources/ publications/aag/aging.htm

Chen.Y. (2010) Usability Analysis on online Social Networks for the elderly. Available athttp://www.cse.hut.fi/en/publications/B/5/papers/Chen_final.pdf

Chen, Yue-Y. Huang, Hui-L. Hsu, Yin-C., Tseng, Hsing-C., and Lee, Yun-C. (2010) Confirmation of Expectations and Satisfaction with the Internet Shopping: The Role of Internet Self-efficacy. *Computer and Science Information Journal*. Vol. 3, No. 3 pp. 1913-8997

Choudrie. J. and Vyas, A. (2014). Silver Surfers adopting and using Facebook? A quantitative study of Hertfordshire, UK applied to organizational and social change. Technological Forecasting and Social Change Journal. 89:.293-305.

Cline R.J, Haynes K.M. (2001). Consumer health information seeking on the Internet: *the state of the art*. Health Education Research Vol. 16(6) pp.671-692.

Coughlin. J.F, D'Ambrosio.L.A & Pratt.M.R (2007). Older adult's perception of smart home technologies: Implication for Research, Policy and Marketing Innovation in Healthcare *Proceeding of 29th Annual International Conferences of IEEE EMBS.*

Damant, J., and Knapp, M. (2015) What are the likely changes in society and technology which will impact upon the ability of older adults to maintain social (extra-familial) networks of support now, in 2025 and in 2040? Foresight, Government Office for Science. Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/463263/gs-15-6-technology-and-support-networks.pdf

Deflem M. From anomie to anomia and anomic depression: A sociological critique on the use of anomie in psychiatric research. (1989). Social Science & Medicine. 29:627–34

Delone, W. H. & Mclean, E. R. (2004). Measuring e-commerce success: Applying the delone & mclean information systems success model. *International Journal of Electronic Commerce*, 9**,** 31-47.

Dr. Kim.J (2012). The intersection of telemedicine and social media. Health IT Exchange. Available at http://searchhealthit.techtarget.com/healthitexchange/PracticalHealthIT4Docs/the-intersection-of-telemedicine-and-social-media/

Ellwardt, L. A., Marja A. B., Dorly D. B., Nardi S. A. (2013). Does loneliness mediate the relation between social support and cognitive functioning in later life? *Social Science & Medicine* Vol.98. pp. 116-124.

Featherman, M. S. and Pavlou, P. A. (2003). Predicting e-services adoption: a perceived risk facets perspective. International Journal of Human-Computer Studies, 59(4), 451e474.

Frank, K . (2013). Predictive analytics allows feds to track outbreaks in real time. The business of Federal Technology. Available at: https://fcw.com/articles/2013/01/25/flu-social-media.aspx

Graham J.E., Christian L.M., Kiecolt-Glaser J.K. Stress, age, and immune function: Toward a lifespan approach. (2006). *Journal of Behavioural Medicine*. 2: 389–400

Grantton, C. and Jones. I. (2010). Research methods for sports studies. 2nd Ed.

Hampton, N. K, Lauren S.G.,Lee, R., and Kristen., P. (2011) Social Networking sites and our Lives: *How people's trust, personal relationship, and civic and political involvement are connected to their use of social networking sites and other technologies.* Pew Research Centre's Internet & American Life Project. Available at: http://cn.cnstudiodev.com/uploads/document_attachment/attachment/46/pew_-_social_networking_sites_and_our_lives.pdf

Hertfordshire.Goverment.UK: Ageing Well in Hertfordshire 2014-2019. Available athttp://www.hertfordshire.gov.uk/docs/pdf/a/aws.pdf

Holtzman, R., Rebok, G., Saczynski, J., Kouzis, A., Doyle, K., & Eaton, W. (2004). Social network characteristics and cognition in middle-aged and older adults. *Journal of Gerontology Series B -Psychological Sciences and Social Sciences*. Vol. 59(6), pp.278- P284.

HootSuite; Dawley, S. (2017). A long list of Facebook statistics- And what they mean for your business. Available at https://blog.hootsuite.com/facebook-statistics/?utm_source=facebook&utm_medium=owned_social&utm_campaign=social_hootsuite.

Krueger, K. R., Wilson, R. S., Kamenetsky, J. M., Barnes, L. L., Bienias, J. L., & Bennett, D. A. (2009). Social engagement and cognitive function in old age. *Experimental Aging Research,* 35(1). pp. 45-60.

Lange. P. Kruglanski. A. and Higgins. T (2012) Handbook of Theories of Social Psychology Volume 1 Sage Publications

Lee, B., Chen, Y. and Hewitt, L. (2011). Age differences in constraints encountered by seniors in their use of computers and the internet. Computers in human behaviour, 27, 1231-1237.

Lee, M-Chi. And Tsai, T-Ru. (2010) What Drives People to Continue to Play Online Games? An Extention of Technology Model and Theory of Planned Behavior. INTL. JOURNAL OF HUMAN–COMPUTER INTERACTION, 26(6), 601–620

Lievrouw. L.A and Livingstone S. (2009) Hand book of New media: Social shaping and social consequences. LSE Research Online London, UK: Sage Publications. pp 1-14.

Limayem, M., Hirt, S. G., & Cheung, C. M. K. (2007). How habit limits the predictive power of intention: The case of information systems continuance. MIS Quarterly, 31(4), 705–737.

Lin, H. F. (2008). Antecedents of virtual community satisfaction and loyalty: An empirical test of competing theories. Cyber Psychology and Behavior, 11(2), 138–144

Lo´pez Garcı´a, E. J.R. Banegas, A. Graciani Pe´rez-Regadera, R. Herruzo Cabrera & F. Rodrı´guez-Artalejo. (2005). Social network and health-related quality of life in older adults: *A population-based study in Spain*. Quality of Life Research Issue14. Pp.511–520

NetLingo (2012) Silver Surfers: Definition Available at: http://www.netlingo.com/word/silver-surfer.php

Neter E, and Brainin E. (2012). eHealth literacy: Extending the Digital Divide to the Realm of Health Information. *Journal Meds Internet Research*.

Neves, B. B. and Amaro, F. (2012). Too old for technology? How the elderly of Lisbon use and perceive ICT. The Journal of Community Informatics. 8(1).

Niehaves, B. and Plattfaut, R. (2014). Internet adoption by the elderly: employing IS technology acceptance theories for understanding the age-related digital divide. European Journal of Information Systems, 23(6), pp. 708-726.

Niehaves, B. and Plattfaut, R. (2010). The Age-Divide in Private Internet Usage: A Quantitative Study of Technology Acceptance. Age, 8, 1-2010.

Ofcom (2014) Adults Media Use and Attitude Reports. Available athttp://stakeholders.ofcom.org.uk/market-data-research/other/research-publications/adults/adults-media-lit-14/

Ofcom (2015) The Communication Market Report. Available athttp://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr15/CMR_UK_2015.pdf

Ofcom (2016) The Communication Market Report. Available https://www.ofcom.org.uk/__data/assets/pdf_file/0023/26393/uk_internet.pdf

Office of National Statistics (ONS) (2012) Regional Profile South East- Economy. Available athttp://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/dcp171780_314461.pdf

Office of National Statistics (ONS) (2015) Estimates of the Very Old (including Centenarians): England and Wales and United Kingdom, 2002 to 2014. Available athttps://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/ageing/bulletins/estimatesoftheveryoldincludingcentenarians/2015-09-30#toc

Office of National Statistics (ONS) (2015) Estimates of the Very Old (including Centenarians): England and Wales and United Kingdom, 2002 to 2014. Available athttps://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/ageing/bulletins/estimatesoftheveryoldincludingcentenarians/2015-09-30#toc

Organization for Economic Co-Operation and Development (2011) Understanding the Digital Divide. Available at https://www.oecd.org/sti/1888451.pdf

Osorio-B, B., Dutta, S. and Lavin, B. (2013) The Global Information Technology Report: Growth and Jobs in a Hyper connected World. World Economic Forum. Available at: http://www3.weforum.org/docs/WEF_GITR_Report_2013.pdf

Pride, J. (2013). SEEFA Policy Panel on Later Life and Ageing: Summary of the Key Issues on Valuing the Older Population. SEEFA. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/368426/seefa-key-issues-on-valuing-the-older-population.pdf

Rogers, E.M (1995) Diffusion of Innovations Free Press, New York

Rogers, E.M (2003) Diffusion of Innovations Free Press, New York

Ronan, DE-k., Alan, H., and Elms, J. (2014). Household pre-purchase practices and online grocery shopping. Journal of Consumer Behavior, 13:364-372.

Sara, J. C. and Sharit. J. (2009) The Aging of the Population: Opportunities and Challenges for Human Factors Engineering. National Academy of Engineering. Vol. 39(1). Available at: https://www.nae.edu/Publications/Bridge/TechnologiesforanAgingPopulation/TheAgingofthePopulation.aspx

Seeman, T. E., Lusignolo, T. M., Albert, M., & Berkman, L. (2001). Social relationships, social support, and patterns of cognitive aging in healthy, high-functioning older adults: MacArthur Studies of Successful Aging. *Health Psychology*, 20(4), pp. 243-255.

Statistics Portal (2016): The most famous social networks worldwide as of September 2016, ranked by number of active users (in millions). Available at:https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/

Taylor, S. and Todd, P. (1995) 'Decomposition and crossover effects in the theory of planned behavior: A study of consumer adoption

Taylor, S. and Todd, P. (1995a). Assessing IT usage: The role of prior experience. MIS Quarterly, 19, 561–570. 25

Telecommunications Networks – a vital part of the Critical National Infrastructure Version 1. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/62279/telecommunications-sector-intro.pdf

Tiwana, A., & Bush, A. A. (2005). Continuance in expertise-sharing networks: A social perspective. IEEE Transactions on Engineering Management, 52(1), 85–101.

Venkatesh. V and Brown. S (2001) A Longitudinal Investigation of Personal Computers in Homes: Adoption Determinants and Emerging Challenges. MIS Quarterly Vol.25. (1) pp 71-102.

Venkatesh. V and Brown. S (2001). A Longitudinal Investigation of Personal Computers in Homes: Adoption Determinants and Emerging Challenges. MIS Quarterly Vol.25. (1) pp 71-102.

Wang, Y., Min Q. and Han. S. 2016 Understanding the effects of trust and risk on individual behaviour toward social media platforms: A meta-analyses of the empirical evidence. Journal of Computers in Human Behaviour Vol. 56 pp 33-44,

Warschauer, M. (2004). Technology and Social Inclusion: Rethinking the Digital Divide. The MIT Press. Available at https://goo.gl/ht3v74

William, M.D., Dwivedi, Y.K., Lal, B. and Schwarz, A. (2009), "Contemporary trends and issues in IT adoption and diffusion research", Journal of Information Technology, 24, (1): 1-10.

Wilson, R. S., Krueger, K. R., Arnold, S. E., Schneider, J. A., Kelly, J. F., Barnes, L. L., et al. (2007). Loneliness and risk of Alzheimer disease. *Archives of General Psychiatry*, 64(2). pp. 234-240.

Yvonne, P. (2014). Impact of Social Media in Healthcare and Telemedicine. University of Arizona. Available at:

http://telemedicine.arizona.edu/blog/impact-social-media-healthcare-and-telemedicine

Zajicek, M. (2007). Web 2.0: hype or happiness? In Proceedings of the 2007 international crossdisciplinary conference on Web accessibility (W4A). Pp 35-39. ACM.

Zhao, L., Lu, Y., Zhang, L. & Chau, P. Y. (2012). Assessing the effects of service quality and justice on customer satisfaction and the continuance intention of mobile value-added services: An empirical test of a multidimensional model. *Decision support systems*, 52**,** 645-656.