Hospitality inside seniors' homes: The impact of trust and social presence through connected health technologies

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Abstract:

Bringing hospitality inside seniors' homes is an essential challenge. The objective of this paper is to focus on the impact of trust and social presence through connected health technologies on the quality of service perceived. We used SERVQUAL for measuring the quality of service delivered by home care companies. We also adapted SERVQUAL to our context by adding a new dimension called communication. As far as the methodology is concerned, we distributed our survey by post to 605 seniors. We targeted elderly people using connected health technologies (assistive alarm, telecare, sensors, etc.) at home and receiving health care at home. We received 213 questionnaires back. As we had several latent variables, we used partial least squares (PLS), a variance-based structural equation modeling method. The results show that the level of trust in these technologies impacts significantly almost all dimensions of SERVQUAL. In parallel, the perception of the social presence with the use of these technologies impacts positively the empathy and tangibles dimensions of SERVQUAL. These results are particularly relevant to stakeholders in the health industry in their quest to improve their products/services. A better understanding of the relation that the elderly have with connected health technologies is an essential prerequisite to supporting the development of new solutions capable of meeting the specific needs of our seniors.

Keywords: Connected health technologies; Smart homes; SERVQUAL; Trust; Social presence

1. Introduction

Life expectancy is increasing worldwide. According to the World Health Organization (2011), this trend shows no sign of slowing in the coming years. Due to chronic health problems that arise with increased life expectancy, improving the quality of life of elderly people represents a major challenge for today's society. Faced with an exploding elderly population and longer life expectancies, seniors increasingly need care and new healthcare technologies that can be useful in improving their quality of life at home. Indeed, we have to rethink the way in which services are provided to the elderly.

Seniors expect and desire to stay at home as long as possible instead of going to nursing homes (Townsend *et al.*, 2011; Demiris *et al.*, 2004). Connected technologies cannot prevent transfer

to a nursing home but may enable the elderly to stay in their houses for longer. Continuing home care is therefore becoming a pressing objective. In this context, connected technologies (e.g. assistive alarm, telecare, sensors, etc.) may play a key role. One such concept is the "smart home", which refers to a house equipped with technology that enhances the safety of elderly people at home and monitors their health (Demiris *et al.*, 2004). The system is able to track the senior and trigger an alarm if any abnormal vital signs are detected (Virone *et al*., 2002). It is also able, for example, to collect data such as respiratory or sleeping disorders in order to have a better understanding of the senior's problems (Nishida *et al*., 2000). Obviously, the choice of the connected technology depends on the pathology, the context, and the kind of care desired. As mentioned by Höpflinger *et al.* (2011), although healthcare needs are the first cause of a transfer to a nursing home, other factors such as age-related fragility (increased risk of falls) or social, mental and economic problems (social isolation, depression, alcoholism and other addictions, poverty) also play a decisive role. Nevertheless, we have to ask ourselves several questions about these technologies that strengthen healthcare services, including: Do seniors have trust in these solutions? Can these technologies impact the perception of social presence? Do these solutions impact the overall quality of service delivered by firms at seniors' home? By answering the above mentioned research questions we expect to contribute to the enrichment of knowledge about the elderly's perception of smart home technologies.

The goal of this study is to focus on the feeling of social presence (the perception that there is personal human contact) with these connected technologies and the degree of trust of elderly people using these systems. We want to identify if these two aspects (social presence and trust) can have an impact or not on the quality of service delivered by home care service companies. To the best of our knowledge, this is something new for the academic world in this context. Our challenge is to bring hospitality inside seniors' homes by the use of connected health technologies.

2. Theoretical background and hypotheses

Social presence is described as the perception that there is personal, sociable, and sensitive human contact (Gefen and Straub, 2004; Etemad-Sajadi, 2016). Heerink *et al.* (2009) showed the impact of social presence on the acceptance of screen agents in eldercare. Their study showed that the feeling of social presence was indirectly impacting the intention to use the technology. Elders' perception of social presence can also be predictive of perceived enjoyment

when interacting with screen agents. Indeed, the presence or interaction with connected technologies is believed to potentially alleviate elders' loneliness (Broadent *et al.*, 2009; Portet *et al.*, 2013). Bickmore *et al.* (2005), found that seniors can consider the feeling of social presence as positive if they believe the technology is beneficial to them. Moreover, several authors identified that the perception of social presence can affect user trust (Sung and Mayer, 2012; Gefen and Straub, 2004; Hassanein and Head, 2007; Etemad-Sajadi, 2016). According to these authors, the inclusion of social cues facilitates the building of trust. The feeling that, through the use of these technologies, there is a connection between the senior and the external world may reassure and increase the feeling of trust. It would be interesting in our context to identify if the criteria of social presence can impact the perception of the quality of service delivered by home care service companies. Therefore, we propose the following hypothesis:

H1.   The more seniors judge positively the social presence through CHTs, the better they perceive the quality of service delivered by the home care service company.

Having trust in a technology is primordial for increasing its usage (Gefen and Straub, 2003; Kim, 2012). According to the literature, the facets of trust are reliability, ability, integrity, benevolence, and honesty (Kumar, 1996; Geffen and Straub, 2004). Since the system receives information of vital importance, the system has to make sure that the information reaches only the right people. Thus, CHTs must be respectful of privacy and should provide reassurance regarding who is going to access the collected private data (Portet *et al.*, 2013). In our context we want to identify if the degree of trust in these CHTs impact the perception of the quality of service delivered by home care service companies. Therefore, we propose the following hypothesis:

H2.   The more seniors have trust in CHTs, the better they perceive the quality of service delivered by the home care service company.

3. Methodology

3.1 Measures

Responses to the items presented below were used to create this current study's measures and to assess its hypothesized structural model. Response options for each item ranged from 1 (*strongly disagree*) to 7 (*strongly agree*).

Social presence was assessed with items adapted from Gefen and Straub (2003). We selected the following items: i) The technology used makes me feel connected with the external world, ii) There is a sense of human contact through the use of this connected technology, and iii) The technology used makes me feel less dependent on people.

Trust was assessed with items adapted from Gefen and Straub (2003), Gefen and Straub (2004), and Cyr *et al.* (2005). We used the following items: i) I trust the reliability of information delivered by this system, ii) I trust this technology to keep personal information secure, and iii) The technology used looks trustworthy.

Finally, SERVQUAL was readapted and used for measuring the quality of service. We used and adapted several items developed based on Parasuraman *et al.* (1988). SERVQUAL is composed of five dimensions which are:

(1) Reliability (ability to perform the promised service dependably and precisely);

(2) Assurance (knowledge and courtesy of employees and their ability to inspire confidence);

(3) Responsiveness (willingness to help customers and provide prompt service);

(4) Tangibles (physical facilities, equipment, personnel); and

(5) Empathy (individualized attention given to customers).

For *reliability*, one of our items among others was: When the home care service company promises to do something, it does so. As far as the *assurance* dimension is concerned, one items among the others was: I Feel safe in my interaction with employees of the home care service company. For *responsiveness*, one of our items among others was: The home care service company gives prompt services. For *tangibles*, we used items such as the following: The home care service company gives up-to-date equipment. Finally for *empathy*, one of our items among others was: The home care service company gives individual attention.

We added a new dimension called '*communication*' to the five traditional dimensions of SERVQUAL. The reason is the fact that according to several interviews done before launching this study, we identified that in the context of service delivery for elderly, communication is a real issue. We are not only talking about the communication between the company and the senior himself/herself. The communication between the company and the senior's family or even the communication between the company and other solutions providers is very important. The following items used were i) Employees take time to communicate with me in order to better understand my needs, ii) The communication between the company and me is good, iii) The communication between the company and my family is good, and finally, iv) The communication between the company and other solutions providers is good.

3.2 Sampling and data collection procedures

For the distribution of the questionnaire, we had the opportunity to reach the clients of the Croix-Rouge (Neuchâtel), Secutel, and Domosafety. We sent the questionnaire by post (with a return stamped envelope) to 605 seniors. We targeted elderly people using CHTs (assistive alarm, telecare, sensors, etc.) at home and receiving healthcare at home. As far as the technologies are concerned, our respondents use the traditional assistive alarm and/or sensors installed in the senior's house. We did not focus on more intrusive techniques such as cameras. Overall, we received 213 questionnaires back (34.9%). Considering the profile of the respondents, we were very positively surprised by the high number of respondents. As far as gender is concerned, it was divided with 27.8% male and 72.2% female. The average age of the respondents was 82.10. Finally, 64.9% were living alone, 22.8% with their husband or wife, and 12.3% did not answer if they live alone or not.

3.3 Data analysis method

Structural equation modeling (SEM) was adopted to test the hypotheses due to the fact that the model contains several latent variables. SmartPLS 2.0 was used for the analysis. We employed a bootstrapping method (200 sub-samples) to test the significant level of regression path coefficients (Hair *et al.*, 2011). We used the blindfolding approach (cross-validated communality and redundancy).

4. Results

4.1 Reliability and validity of measures

All latent variables have a composite reliability higher than 0.7, confirming that the scale reliabilities have adequate and stable measurement properties. Convergent and discriminant validity are components of a larger measurement concept known as construct validity (Straub *et al.*, 2004). Convergent validity is shown when each measurement item is strongly correlated with its construct. It is usually satisfied by retaining variables whose loadings are high, indicating that they share sufficient variance with their related construct. Discriminant validity is satisfied when each measurement item is weakly correlated with all other constructs except with the one with which it is theoretically associated (Gefen and Straub, 2005). With PLS, convergent and discriminant validities are confirmed if each construct AVE is larger than its correlation with other constructs. Moreover, each item should load more highly on its assigned construct than on the other constructs (Gefen *et al*., 2000; Straub *et al*., 2004). The diagonal of this matrix represents the square root of the average variance extracted. For adequate discriminant validity, the diagonal elements should be significantly larger than the correlation of the specific construct with any of the other constructs and should be at least 0.5 (Fornell and Larcker, 1981). In our case, one can claim that discriminant validity is confirmed and sufficient to support the model.

4.2 Results and discussion

Figure 1 presents the results of the PLS analysis and the values of different path coefficients. One can observe that the social presence through CHTs impacts significantly empathy ($\gamma = 0.213$) and tangibles ($\gamma = 0.320$). Hence *H1d* and *H1e* are accepted. Trust in CHTs impacts significantly almost all the dimensions of our extended SERVQUAL. Indeed, it impacts reliability ($\gamma = 0.474$), responsiveness ($\gamma = 0.397$), assurance ($\gamma = 0.477$), empathy ($\gamma = 0.271$), and communication ($\gamma = 0.303$). Hence, *H2a, H2b, H2c, H2d, and H2f* are all accepted. We see that CHTs can impact the quality of service delivered in this context. Moreover, we observe that there is a complementarity of the social presence and trust in these technologies. The impact of trust is higher than the impact of social presence.

Figure 1: Results of the PLS analysis
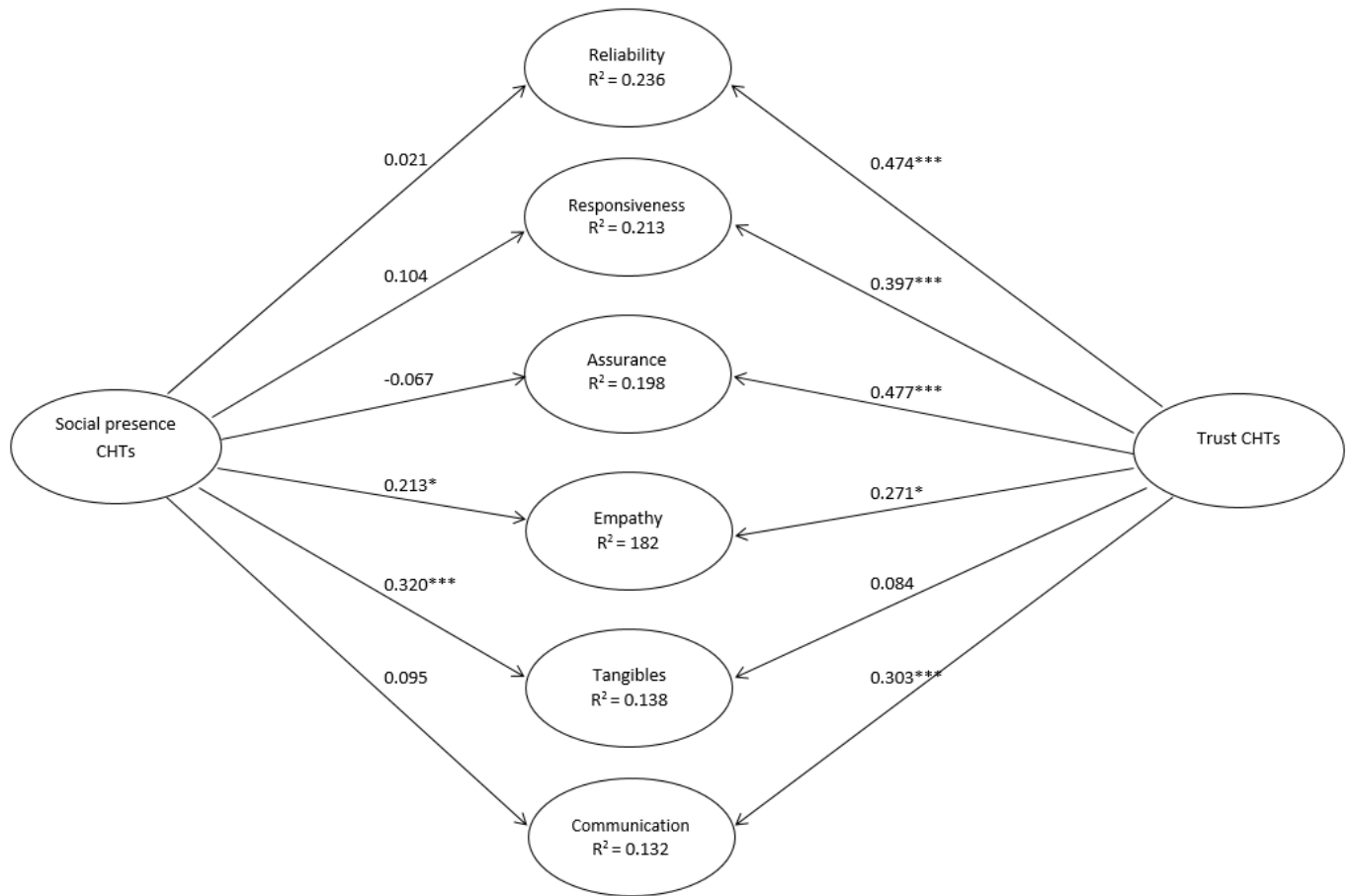
Notes:

*   Significant at 0.05 level

**   Significant at 0.01 level

***   Significant at 0.001 level

5. Conclusion

The aim of the study was to bring hospitality inside seniors' homes and to get a better understanding of how our seniors perceive CHTs focusing on the feeling of social presence (the perception that there is personal human contact) with these connected technologies and the degree of trust of elderly people using these systems. The positive influences of the feeling of social presence and trust on the quality of service perceived, show us that the use of CHTs can impact the overall perception of the service quality. We also found that people who are living alone are more willing to accept the use of CHTs compared to people who are living with their husband or wife. These results are particularly relevant to companies in their quest to improve their products/services and communication strategies. Indeed, a better understanding of the relation that the elderly have with CHTs is an essential prerequisite to supporting the development of new solutions capable of satisfying the specific needs of our seniors.

Our study has several limitations. First, our sample covers a population benefiting from similar CHTs. It was difficult to distinguish and interpret the added value of each technology separately. It would be interesting to identify which sets of connected technologies contribute the most to a positive feeling of social presence or trust. Our study is also limited to a population with a similar culture. Further research is needed to understand if the perception of CHTs differs according to cultural and psychological characteristics of seniors.

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