Understanding Barriers to Wider Telehealth Adoption in the Home Environment of Older People: An Exploratory Study in the Irish Context

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Abstract—Emerging evidence has demonstrated the potential for Telehealth systems to reduce unnecessary hospital admission and lower costs of care by assisting patients and healthcare professionals to manage chronic conditions more efficiently. Nonetheless, due to a complex interplay of different barriers, Telehealth has not yet been widely adopted in any country. Understanding barriers to wider Telehealth adoption is vital to enable its embracement by many older people who could greatly benefit from the technology. The aim of this exploratory study was to identify barriers to wider Telehealth adoption in the homes of older people, in the Republic of Ireland. Objectives included identifying barriers from the perspective of five groups of stakeholders, determining the most pressing barriers and suggesting possible approaches to addressing such issues. Fifteen semi-structured interviews were conducted. Findings were analysed against existing literature, current technology adoption trends and successful initiatives implemented in different countries. This study suggests that the lack of incentive to healthcare professionals to embrace Telehealth, technology usability issues, implementation costs and lack of organisational willingness to change are the most pressing barriers to wider Telehealth adoption. Possible approaches to address healthcare professional incentive barriers have been suggested and include government mandates, the establishment of reimbursement schemes and the use of government financial incentives. The provision of Telehealth through devices that people are familiar with such as mobile phones, laptops and computer tablets, and the involvement of end-users during Telehealth technology development stages are also supported by this study as strategies to overcome Telehealth usability challenges.

Keywords–older people; chronic disease management; telehealth; barriers to adoption; acceptability; incentive

I. INTRODUCTION

The original version of this paper has been presented at the eTELEMED 2012 Conference, in Valencia, Spain [1]. This extended version includes more detailed data across all sections of the paper.

In line with European demographic trends, the proportion of older people in the Republic of Ireland is expected to double in the coming decades [2], [3]. As a consequence of population ageing, Ireland is expected to experience a significant increase in the prevalence of chronic conditions. By 2020 the number of people experiencing cardiovascular disease (CVD) events is expected to rise by 50%, while the number of those diagnosed with diabetes and hypertension is likely to increase by 62% and 40%, respectively [4].

The impact of such trends on the demand and financing of healthcare services has become central in international agendas [5]. At present, chronic conditions account for three quarters of the total healthcare expenditure in Ireland. Approximately 80% of general practitioner (GP) consultations and two thirds of all emergency medical admissions to hospitals are related to chronic diseases [6]. Projections indicate that the demand for such healthcare services will continue to grow as a consequence of population ageing, representing a significant burden to the Irish public finances. The development of cost-effective and sustainable services, capable of meeting the needs of this growing population, has become essential [7].

The importance of shifting the focus of healthcare services from curative to preventative strategies, where patients are empowered to take active control over their health, is being recognised as the key to control costs and increase efficiency in healthcare [6]. It is amid this context that Telehealth technologies emerge as a relevant alternative to address these issues. Telehealth is here defined as the use of information and communication technology (ICT) based systems to assist the diagnosis, monitoring, management and empowerment of patients with chronic conditions [8]. Remote vital signs monitoring systems are a common example described in the literature [6]. In this context, Telehealth solutions allow patients to collect health measures on a regular basis, from their own homes. This information feeds into an Electronic Health Record (EHR) and is shared with a designated healthcare professional (e.g., doctor, community nurse, Telehealth triage centre) using an Internet connection. Significant changes detected in the patients' health status are brought to the attention of the healthcare provider, who may then contact the patient and intervene as necessary [9]. Telehealth features often include the use of video consultations to support remote contact between patients and healthcare professionals (ibid.). Moreover, Telehealth platforms may be also used to deliver educational content to support patient self-care [10].

Emerging evidence has demonstrated the potential for Telehealth systems to reduce unnecessary hospital admission [11], [12], decrease mortality rates [8], [13], lower costs of care per patient and increase satisfaction among users [14]. Examples of chronic conditions that may be positively supported by Telehealth include chronic heart failure – CHF [15]-[18], diabetes [19], [20] and chronic obstructive

pulmonary disease – COPD [21]-[23]. A well known example of successful Telehealth implementation is the Veterans Health Administration (VHA) Care Coordination / Home Telehealth (CCHT) scheme, in the United States. The main purpose of this programme was to coordinate the care of over 30,000 veteran patients suffering from chronic conditions (diabetes, hypertension, heart failure, COPD and depression) through the use of at-home monitoring devices, self-care tools and video consultations. Four years after its introduction, positive results have been identified including 25% reduction in number of hospital bed days used, 19% reduction in the number of hospital admissions, significantly lower costs of care per patient and a high satisfaction among users [14].

Despite all such positive factors, Telehealth has not yet been widely adopted in any country, in the sense that all relevant healthcare providers include such services within their repertoire [12], [24]. No significant trials have taken place in the Republic of Ireland and there is currently no national policy focusing on Telehealth, indicating that such systems are still far from reaching the homes of Irish older people [12]. A complex interplay of barriers has been identified in the literature and some of those have so far proven difficult to overcome [12], [24]. Poor ICT skills [12], [24], confidentiality concerns [11], [12], [25] and lack of awareness of the available technology and its potential benefits [8], [12], [24], [26], [27] were associated with lower Telehealth acceptability among both older people and healthcare professionals. Technology issues involving usability problems [8], [27], poor system stability and reliability [12], [24] have been associated with low Telehealth up-take post pilot programmes. Moreover, limited access to broadband connections [11], [12] and lack of interoperability between various Telehealth solutions have been highlighted as significant barriers to effective information sharing amongst patients and healthcare professionals [8], [10], [12], [25], [27].

The fragmentation within the healthcare sector [8], [12], [28], absence of service 'champions' capable of promoting the recognition of Telehealth as part of core healthcare services [11], [24] and overall lack of willingness to innovate [8], [11], [12], [24] have been pointed as organisational obstacles to the embracement of Telehealth in the healthcare sector. The absence of clear guidelines defining roles and responsibilities of the different stakeholders involved [11], [12], [24], [29], lack of technical quality standards [11], [24] and unclear data protection legislation are also believed to hamper Telehealth adoption amid healthcare professionals. Additionally, the lack of robust evidence supporting the role of Telehealth in chronic condition management and unclear evidence for return on investment are perceived as significant barriers to its wider adoption among the medical community [11], [12], [27].

The absence of reimbursement arrangements to incentivise healthcare providers to embrace Telehealth is perceived as a fundamental barrier to its mainstream adoption [8], [24], [26]-[28]. Additionally, it has been pointed that existent payment systems in fact discourage healthcare providers to embrace Telehealth [12], [26], [27],

[30]-[32]. This is because most systems remunerate professionals per in-person contact with patients and remote contact supported by Telehealth (e.g., remote vital signs monitoring, e-mails, video-consultation) is not currently covered under most reimbursement systems.

Although much has been debated about the barriers to Telehealth adoption, little research has been done to investigate the extent to which such obstacles apply to the Irish context [12]. Moreover, few studies have attempted to explore barriers to Telehealth adoption from the perspectives of different stakeholders [29]. Therefore, the aim of the present exploratory study was to answer the following question: "what are the main barriers to the wider adoption of Telehealth in the homes of older people, in the Irish context?" Research objectives included: 1) to identify barriers to wider Telehealth adoption from the perspective of five groups of stakeholders: Potential Consumers, Healthcare Professionals, Service Providers, Technology Providers and Irish Context Experts; 2) to determine the most pressing barriers; and 3) to suggest possible approaches to address such issues.

The remainder of this paper is structured as follows: Section II explores the study methods, while Section III presents a summary of the main barriers to Telehealth adoption indentified by interviewees. Potential solutions suggested by participants are also described in this section. In Section IV findings are critically analysed against the literature, the most pressing barriers are identified and potential solutions are discussed. Study conclusion is presented in Section V, while Section VI offers a reflection upon study limitations and opportunities for further research.

II. METHODOLOGY

This study was approved by the King's College London Ethics Committee (ref KCL/10-11_379) and conducted between February and May 2011 as part of an MSc dissertation project. A maximum of fifteen semi-structured interviewees was considered feasible given the scope of the study. Potential participants were approached through convenience sampling strategy and interviewees were selected based on the assumption that they had the necessary experience to help investigating the research question.

A. Sampling and Recruitment

Based on an initial literature review, five groups of stakeholders have been defined as the subjects of this study: Consumers, Healthcare Professionals, Service Providers, Technology Providers and the Government. Since there was no provision of Telehealth services to older people in the Republic of Ireland when this study was conducted, it was not possible to verify barriers from existing consumers' point of view. For this reason, this group was replaced Potential Consumers. Additionally, despite multiple attempts, it was not possible to conduct any interviews with Irish Government representatives. In order to strengthen the analysis of barriers to wider Telehealth adoption in the Irish context, a new group was included, named Irish Context Experts. Table 1 summarizes the number of individuals invited and interviews conducted per stakeholder group.

TABLE I.   NUMBER OF INDIVIDUALS INVITED AND NUMBER OF INTERVIEWS CONDUCTED PER STAKEHOLDER GROUP

Stakeholder	Number of individuals invited	Number of interviews conducted
Potential Consumers (PCs)	60*	5
Healthcare Professionals (HCPs)	4	4
Service Providers (SPs)	2	1
Technology Providers (TPs)	5	3
Irish Context Experts (ICEs)	2	2
Total		15

* Number of invitation letters made available to potential participants

To verify barriers to Telehealth adoption from the Potential Consumer (PC) point of view, relatives (sons, daughters, nephews or nieces) of older people currently receiving long-term care were approached. The rationale for selecting this group was that 1) their generations are more likely to benefit from the use of Telehealth by the time they reach old age, in comparison with their older relatives and 2) they were expected to have reasonable understanding of older peoples' needs due to their experience with relatives who require long-term care. It was assumed that this group could shed light on the research topic both from a potential user point of view and a family member / caregiver perspective. To access this group, two nursing homes in Dublin, Ireland were approached. In order to allow involvement of participants from different socio-economical backgrounds, the nursing homes chosen were located in areas that are historically known for their contrasting socio-economical differences (Nursing Home 1 was located in a less privileged area, while Nursing Home 2 situated in a more affluent region of Dublin). Invitation letters were made available at the reception desk. In order to maximise response rate, invitation was extended to visitors and staff members, who met the main inclusion criteria (sons, daughters, nephews or nieces of older people who require long-term care or suffer from chronic conditions). In total, five (n=5) PCs were recruited. Face-to-face interviews were conducted in a suitable area in the nursing homes (e.g., visitors' room).

To explore the views of Healthcare Professionals (HCPs), GPs who regularly visit residents in the same nursing homes above mentioned were approached. The reason for choosing GPs was the assumption that they 1) have relevant experience working with older patients who require chronic condition management and 2) could potentially benefit from having access to Telehealth data. An invitation letter was made available to potential participants in one of their visits to the nursing homes. In total four (n=4) HCPs were recruited. Face-to-face interviews were conducted in a suitable area in the nursing home or, alternatively, in the participant's private practice facility.

Service Providers (SPs) were defined in this study, as organisations concerned with the supply of Telecare / Telehealth products and services. Two SPs have been identified in Ireland. An invitation email introducing the study was sent to both companies. One of them (n=1) agreed to take part and a telephone interview was arranged.

Technology Providers (TPs) were defined as companies that develop Telehealth systems and have headquarters in Ireland. Five organisations have been identified and contacted through the same approach used with SPs. Three subjects (n=3) agreed to participate. Although in the case of two companies the appointed interviewee was not based in Ireland, this was considered acceptable since both individuals had the desired experience to contribute to the study. Depending on interviewees' location a face-to-face or telephone interview was arranged. Face-to-face interviews took place in a suitable area of the respondents' workplace.

Finally, Irish Context Experts (ICEs) were defined in this study as individuals who have significant knowledge of the Irish health and social care systems and are familiar with Telehealth systems. Two potential interviewees with this profile were identified through snowballing strategy (i.e., through the indication of other interviewees) and were approached via email, as described above. Both agreed to take part (n=2) and face-to-face interviews took place in a suitable area of their workplaces.

B. Data Collection and Analysis

All participants received a study information sheet and gave informed consent prior to interview. Topic guides have been used to support the semi-structured interviews and different questions have been included to suit the different stakeholders' backgrounds (available upon request from the author). A diagram created by the author illustrating possible Telehealth configurations has been used to frame discussions about barriers to Telehealth adoption (Fig. 1). The diagram displayed technologies commonly described in the literature including remote vital signs monitors, video-consultation and EHR systems. Considering the likelihood that most PCs and HCPs would not be familiar with Telehealth technologies, two videos were shown to further support the interviews. Video 1 described the use of a Telehealth remote monitoring system to support patients with chronic pulmonary disease (http://www.intel.com/corporate/healthcare/emea/eng/health guide/LothianCaseStudy.htm). Video 2 explained the functions of a personal EHR that allows patients to organize, store, and share health information online (http://www.youtube.com/watch?v=g9hLT2bMfbY). Both videos were freely accessible on the Internet at the time the interviews were conducted and have been used for illustration purposes only. This method was considered beneficial, since interviewees expressed greater understanding of the Telehealth concept after watching the videos. Moreover, an Apple iPad device was used to display the videos. This was considered useful should interviewees be unfamiliar with touch screen interfaces, a common feature in Telehealth devices.

Interviews with SPs, TPs, and ICEs followed a similar structure. Participants were initially asked to briefly describe their background and experience in the field of Telehealth. Afterwards, the same diagram was presented to frame the
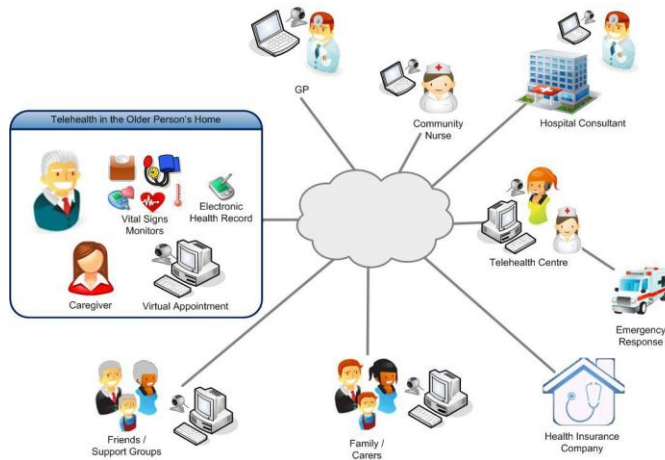
Figure 1. Diagram representing possible Telehealth configurations (larger version available upon request from the author)

discussion about the current state of Telehealth industry and existing barriers to wider implementation. Interviewees were asked to comment on whether they agreed or not with the barriers identified through the literature review. Any new barriers suggested were documented and used to frame the discussion with subsequent interviewees. At the end participants were asked to suggest solutions to overcome the barriers raised.

Interviews with PCs and HCPs were largely similar. Participants were initially asked about their familiarity with ICT solutions, as well as experience dealing with older people and chronic conditions. Figure 1 was used to illustrate possible Telehealth configurations and Videos 1 and 2 were played. Interviewees were then asked to comment on perceived advantages offered by Telehealth technologies and then potential barriers to its wider adoption in the homes of older people. Finally, participants were asked to suggest potential solutions to the barriers discussed.

Interviews were audio recorded and manually transcribed. Based on interview transcripts, a thematic content analysis was carried out. The use of the qualitative analysis software NVivo 9 (www.qsrinternational.com/ products_nvivo.aspx) greatly facilitated this process.

Barriers raised by interviewees have been classified according to the categorization model described on Table 2. Categorizing the barriers for wider Telehealth adoption is important to allow for critical analysis of common aspects. Categories are also essential to identify relative criticality and therefore determine specific areas for focus and action. The classification of barriers used in this study derives from the theoretical model suggested by Broens, Veldw et al. [24]. In that model, authors classified determinants for successful Telehealth implementation under five main domains: 1) Acceptance; 2) Technology; 3) Organization; 4) Policy and Legislation and 5) Financial. In the present study, some of these categories have been subsequently broken down in order to better explore issues of greater complexity. Category 1) Acceptance in Broens, Veldw et al. model [24] has been broken down into categories A) Acceptance Barriers and E) Evidence Base Barriers. This has been done in line with other studies that identify evidence base issues not

TABLE II.   BARRIER CATEGORIZATION

	Broens, Veldw et al. (2007)		Present study
1	Acceptance	A	Acceptance Barriers
2	Technology	B	Technology Barriers
3	Organisation	C	Organisational Barriers
4	Policy and Legislation	D	Policy and Legislation Barriers
		E	Evidence Base Barriers
5	Financial	F	Financial Barriers
		G	Healthcare Professional Incentive Barriers

necessarily related to acceptance [12]. Moreover, one additional category has been added to the model: G) Healthcare Professional Incentive Barriers. This has been added because different studies point to a significant number of issues that have lack of incentive to healthcare professionals as its root cause [27], [31], [32], [33].

In order to determine the most pressing barriers to Telehealth adoption in the Irish context, findings were critically analysed and compared to the literature. Current technology adoption trends and successful initiatives implemented in different countries have been also considered in this analysis.

III. RESEARCH FINDINGS

The most significant barriers identified by interviewees are explored below. Participants also suggested possible strategies to promote Telehealth adoption, and these can be found at the end of this section.

A. Acceptance Barriers

1) Poor ICT skills: PCs, SP1, TPs and ICEs suggested that at present the lack of technology skills is a barrier to Telehealth adoption among older people. Nevertheless, these participants acknowledged that this should not be a barrier to Telehealth adoption in the near future. PCs believed that their generations will be more familiar with electronic devices by the time they reach old age and will have greater understanding of the advantages the technology can offer.

"My aunt had a panic button but she never wore it. I think she was afraid of the technology. I don't think older people adapt well to change. (...) I would think now we are more open, I'm only 70, I would be more open than she was. She was probably 90 when she got it. I think as the time goes on people will be more receptive to these things." (PC5)

HCPs were less optimistic than the other groups. The group pointed out that older patients often demonstrate decreased ability to learn new skills, posing an important barrier to wider Telehealth adoption. Two HCPs also believed that this will continue to be an issue for future generations of older people.

2) Lack of face-to-face contact: HCPs suggested that the lack of face-to-face contact with patients may represent an

important barrier to Telehealth adoption among medical professionals. It was pointed out that remote contact could negatively impact doctors' decision making capacity, since relying on hard data, without clinical observation, could potentially increase the risk of medical errors.

"I think baseline details like blood pressure, fine, but when you go into more details like breathlessness, wheeze, chest tightness, you can't actually see "are they cyanosed?", "what is their chest actually like?". You know, would you be able to rely on the data that much?"(HCP2)

TPs agreed that the lack of face-to-face contact may increase liability concerns among medical professionals. SP1 added that remote contact with patients may also raise fears of decreased business among physicians.

"[Doctors'] biggest drive for business is the repeated visits they receive from this demographic. So I find they are absolutely reluctant to engage with anything that may possibly reduce the amount of visits, which will happen, in their practice. That is a huge obstacle to overcome." (SP1)

On the other hand, lack of face-to-face contact has not been seen as an issue to any PCs interviewed in this study. PC1 expressed that she would rather have a video consultation with her doctor, if that would mean not having to spend time in waiting rooms before medical appointments.

3) Confidentiality concerns: PCs were interested in who would have access to their EHR. They acknowledged that different people would have different perceptions of privacy issues. While all participants would like to share their EHR with a GP and most would trust the data to a public health nurse (PHN) or competent Telehealth triage centre, there were mixed opinions about sharing Telehealth data with family members and insurance companies.

"I would be happy that my GP, my family or the nurse would be aware if I suddenly became unwell. (...) Although some people are afraid, I mean, my husband is afraid of the world and his wife knowing about his illnesses. He would feel that confidentiality might be an issue. But I think this is all to the advantage of the patient rather than the disadvantage. The advantages would certainly outweigh the disadvantages." (PC3)

Two PCs demonstrated apprehension about their health information travelling online. This was not a concern for the remainder PCs who acknowledged that, at some extent, most people already securely share sensitive information electronically (e.g., bank transactions).

Confidentiality concerns were perceived as a barrier to Telehealth implementation among HCPs. Interviewees were suspicious about how to ensure that only authorized professionals have access to EHRs and who would be ultimately liable for maintaining patient data protection.

"There are huge safety issues with having all that information accessible, and who will have access to it. Because it could just get into the wrong hands, and suddenly you are in major trouble for not protecting your patient's information. (...) At present GPs own the information to a certain extent, so if you share that with the community nurse, who owns that? And who is ultimately responsible for that if it is used inappropriately?" (HCP3)

SP1, TPs and ICEs did not believe confidentiality concerns are a significant barrier to Telehealth adoption. These groups shared the perception that this issue may be easily solved through adequate regulation and awareness raising.

4) Lack of familiarity with Telehealth and its benefits: SP1, TP1, TP2 and ICE1 agreed that the overall lack of awareness among healthcare professionals and patients about Telehealth existence and benefits is an important barrier to its wider adoption in Ireland.

"The big difficulty here in Ireland (...) in terms of the healthcare professionals is (...) the ignorance of what is the actual equipment that is out there. (...) Predominantly, they will go with what they know works, and it can be a real challenge to break that down sometimes. Telecare is much more readily accepted because the vast majority of health professionals (...) have all pretty much seen this pendant alarm so they are all pretty much familiar with that. But Telehealth is a total new department." (SP1)

B. Technology Barriers

1) Technology usability: All PCs expressed that touch screen devices, as displayed in Video 1, looked easy to use. They suggested that this may facilitate the interaction of older people with the technology, increasing the chances of adoption of Telehealth solutions. However, when asked if they would like to have a device to cater specifically for their health needs most PCs expressed that they would prefer if this could be done through the devices they already have at home, such as laptops and mobile phones. The reasons supporting these views included privacy concerns and practical issues such appliance size, mobility, ease to use and level of disruption to users' lifestyle.

"I wouldn't like to have a specific health device at home. (...) I think it is the whole thing about privacy, you know, you can have as many people on the computer and they've got their own password so it remains private." (PC2)

"I would rather have something small like that (pointing to an iPhone). Something like that would be easier to use, easier to store and you could have beside the bed, and carry around if you go out (...) I wouldn't like to have another device in the house. People don't have space for all these stuff, do they?" (PC5)

"I would like to have something in my pocket, which could do it more or less automatically. Personally I don't think people are prepared to sit down and enter information on the computer, well, I wouldn't do that. People get tired; you don't have the same drive all the time. I think if it was automatic, that would be better." (PC3)

SP1, TPs and ICEs acknowledged that existent Telehealth systems are still in early stages of development

and many issues around technology usability must be further explored. ICEs added that the frequent lack of gerontological expertise among Telehealth designers is an issue that must be addressed.

"Design challenges are huge because you are dealing with unwell people and older people. So it is much easier to get a bunch of young engineers to go crazy over the iPhone and do all kinds of this jazzy stuff (...). Somebody who is sick with COPD just needs to press the button and make it work. That is all they want to know. (...) But yet, there are innovative ways of doing that." (ICE1)

"What is missing is gerontological expertise and awareness in the technology providers. (...) They need corporate gerontologists. I think a big issue is that they are not gerontologically aware, they kind of imagine what older people are going to be." (ICE2)

Usability issues have also been identified as a barrier to Telehealth embracement by healthcare professionals. TPs suggested that the views of healthcare providers may not be sufficiently considered by technology designers, resulting in systems that are not in tune with providers' workflow.

"A lot of the technology providers in this space have already developed stuff and are trying to sell it as hard as they can (...) but what they misunderstand is that all of these things are only useful in providing data once you decided what you are trying to measure. (...) It is not about making the best possible device, it is about having the right design so the whole thing is easy to use. And it has to be clinically useful." (TP2)

HCPs also demonstrated concerns about how realistic it would be to incorporate Telehealth into their usual practice, as they may not have time to interpret the additional information generated. HCP3 and HCP4 suggested that, in order to get doctors involved, the data would have to be presented in a very simple manner, as they feel that healthcare professionals will not have the time to spend in extensive data analysis.

"I had a patient today who brought me a reading of his diabetes in a graph, so it makes it much easier to review. (...) But it can be quite time consuming, that consultation took over 30mins (...) sometimes it is just too much information, you know?"(HCP4)

"I think it would depend on the quality of the information coming through, and how user friendly it is to look at the information. (...) If you are going to be presented with pages of graphs or diagrams you are just not going to... all you want to know is 'are they getting sick or not', 'do I need to see them or not'. (HCP3)

PCs also expressed disbelief that doctors would have the time to analyse large amounts of data generated by Telehealth and suggested that many doctors may choose not to consider it when making patient-related decisions.

2) Limited access to broadband: SP1, TPs and ICEs agreed that lack of access to broadband is an important obstacle to reach older people in Ireland.

"Lack of broadband to me is probably one of the number one issues in Ireland (...). Free public broadband for older people would fix a lot of problems (...) social connectivity would increase dramatically and we could get healthcare into the homes." (TP1)

3) Device Incompatibility: TPs pointed that, at present, Telehealth devices are often not compatible with each other, what may also hamper widespread adoption. Nevertheless, it has been acknowledged that there is a significant movement pushing towards equipment compatibility, through the Continua Health Alliance (www.continuaalliance.com).

*4) Lack of interoperability amongst EHR systems:*TP3 stressed that even where the end user has the required infrastructure to run a Telehealth system at home, this is of little use if the data cannot be shared with healthcare professionals. He explained that, at present, electronic systems used by hospitals and medical practices are not technically configured to allow such data flow. Even if users were able to start collecting and recording their vital signs, unless their healthcare professional used a compatible system in their practice, they would not be able to easily share the information collected, hindering potential Telehealth capabilities. TPs and ICEs acknowledged that the industry is still very elementary, and therefore far from relying on interoperable information sharing platforms.

C. Organisational Barriers

1) Lack of integration within the healthcare sector: ICEs suggested that the actual configuration of the Irish healthcare system and lack of professionals specialised in care management could hinder Telehealth implementation in Ireland. ICE1 explained that system configurations that include care managers may allow smoother incorporation of Telehealth, thus increasing the chances of success.

"A care manager is somebody that works on behalf of the patient, and liaises with the nursing system, GP system, welfare system and admission and discharge to hospital. Most countries who have adopted Telehealth have adopted care management (...) Telehealth links different parts of the health system together. And in order to do that you need someone managing that linkage. This is one of the key issues in Ireland, we don't have that system in place." (ICE1)

2) Low levels of trust among stakeholders: PC4, SP1 and TPs suggested that low levels of trust from medical professionals in their patient's ability to measure their readings appropriately, as well as in the accuracy of devices and security of connections used may pose obstacles to wider Telehealth implementation. TP3 challenged this argument since data collected by patients should be considered as trustworthy as subjective information reported by them during medical appointments.

"What you see a lot is that the professionals can't really trust the data that is coming from the patient. I don't think that sort of barrier holds much weight. Because ultimately, when the patient walks into a doctor's office and tells them about their condition, that is no more or

less trustworthy than the patient recording it and sending. (...) I think [this attitude] is making it harder for this type of data emigration to penetrate in the industry, but I think it will go away at some point." (TP3)

As shown above, HCPs demonstrated concerns about older peoples' capacity to collect trustworthy data at home. Nevertheless, HCP3 recognized that the use of electronic devices could in fact increase data reliability, when compared to manually collected data.

"No more than the diabetic who would come back to you filled in their 'allegedly' last month glucometre readings, when you know well that they sat last night and filled them out (laughs). Whereas if it would have been done electronically, whereby there was a computer day, time and reading, which can't be altered, definitely, that would help." (HCP3)

SP1 argued that he perceives considerable reluctance from medical professionals to trust technology and service providers. He explained that Telehealth is often perceived as an invasion of the medical domain, and medical professionals are reluctant to accept that other professionals may be suggesting better ways of doing their job.

3) Increased professional responsibility and lack of organisational willingness to change: SP1, TPs and ICEs acknowledged that wider adoption of Telehealth requires healthcare professionals to significantly adapt their professional practice. Interviewees explained that, for example, Telehealth enables professionals to look after a much larger number of patients and to provide more continuous care than they would through traditional methods. It was suggested that an overall lack of willingness to embrace such changes may be a significant barrier to Telehealth implementation. TP2 explored this issue, explaining that the Telemedicine concept, for example, was more accepted because it did not fundamentally interfere in the medical practice.

"In Telemedicine (...) you are basically taking account of the fact that you have an specialist who cannot be everywhere at once, and you are using this separational distance in order to provide more use of that very scarce resource to patients, wherever they happen to be. So it fits in very well with the model of practicing medicine. As soon as you go into Telehealth it is a different matter, (...) because today's practice of medicine means that the doctor doesn't have to pay special attention to you until you are in a consultation with him. (...) If the patient is at home generating health information continuously, (...) this is a different way of practicing care, which isn't what they have been trained instinctively to do." (TP2)

Among HCPs, one interviewee clearly expressed he would not be willing to change his usual practice in order to adopt Telehealth.

"This my own perspective, I've studied medicine to deal with people, I didn't study medicine to look at their computer printouts, or blood pressure going up and down. (...) that might work, but that wouldn't be for me. I mean,

it would wreck my head now if I would spend half of my day looking at printouts, or people emailing me stuff about it, I just don't do that, you know?" (HCP1)

Based on their experience dealing with medical professionals, SP1 and ICE1 argued that incongruent training is often used as a reason for not engaging with Telehealth.

"My perception is that there is almost a level of condescension, that (...) 'I am trained to be a doctor, not to look at computers, look at graphs'. And I am like, wait for a second here, this is public money that should be spent a hell of a lot smarter." (SP1)

4) Lack of 'champions' in the healthcare system: SP1, TPs and ICEs suggest that the lack of strong 'champions' in the healthcare system may be one of the reasons for the virtually inexistent movement towards Telehealth adoption in the Irish context.

D. Policy and Legislation Barriers

SP1 and ICEs argued that it is still largely unclear how data protection legislation applies to Telehealth. They suggested that this issue is an obstacle to different stakeholders to become involved with Telehealth.

Most HCPs suggested that Telehealth would not achieve wider adoption in Ireland without a clear Government led strategy. They believed that this would be necessary to address data protection concerns.

"I think [data protection legislation] would have to be determined by the government, there would have to be policies in place in terms of safety, informed consent (...) because if it is just done through the private companies I think it will be perceived as too ad-hoc or that there is something in it for the individual company." (HCP3)

E. Evidence Base Barriers

TPs and ICE1 acknowledged that despite a significant number of successful pilots, Telehealth still lacks robust studies, such as large randomized controlled trials (RCTs), to support its efficacy and cost-efficiency. Participants explained that a high proportion of Telehealth trials used small sample sizes or carefully selected participants, which greatly hinders the generalisation of results.

Nevertheless, such interviewees also pointed that the lack of RCTs may be also used as a reason for non adoption among medical professionals. It was suggested that Telehealth may instead require different scientific evaluation methods to demonstrate its value.

"(...) you can argue that [careful patient selection] is exactly what you have to do with Telehealth, that there is no point in randomly selecting people in the same way that you won't randomly give people drugs to treat their conditions. (...) I think quite often, evidence is used as an excuse for inaction rather than being the real reason why they won't invest. There are lots of other things happening in medicine that doesn't have evidence base." (TP2)

F. Financial Barriers

1) Costs of establishing the required infrastructure:

TPs and ICEs acknowledged that the high costs of establishing the necessary infrastructure, staff training, processes reconfiguration, etc., may be a major barrier to the adoption of Telehealth by healthcare systems that are already under financial strain, which is the case of the HSE, the national healthcare agency in Ireland. It was pointed, however, that this would largely depend on the level of government involvement in the implementation process.

"High costs of establishing infrastructure [is a barrier] only if the Government decides to do it. There is already lots of infrastructure out there for other reasons, we can piggyback on existing mobile networks or smart meters, and other things that are happening around us." (TP2)

HCPs also pointed out that the costs of system implementation could prevent small GP practices to engage in Telehealth. Interviewees demonstrated disbelief that wider adoption would be achieved without government financial incentive.

2) Telehealth affordability by older people: ICE1, HCPs and two PCs expressed that many older people may not have the resources to afford Telehealth if this is provided through out of pocket purchasing, therefore, hindering wider adoption.

"I just don't see it becoming a big thing if it is done privately (...) it wouldn't be standardised enough. There would be only certain people that would be able to avail of that service then." (HCP2)

"I'm sure these things are very costly, and after this recession I'm sure this is the last thing in peoples' minds, that they want to spend on things like this." (PC5)

This view was not shared by the other PCs, who would expect Telehealth services to have similar costs to Telecare or broadband services, which they judged reasonable considering the advantages offered.

All PCs would expect at least partial out of pocket financing of Telehealth. Participants expressed they would appreciate government subsidy, however they did not believe this would be realistic given the HSE financial situation.

G. Lack of Incentive to Healthcare Professional

According to SP1, TPs and ICEs the lack of clear incentives to healthcare professionals to embrace Telehealth may be one of the most significant barriers to its uptake. Interviewees suggested that, even if other obstacles are addressed, Telehealth will struggle to be widely adopted if healthcare professionals do not perceive clear advantages over traditional practice.

1) Absence of reimbursement arrangements: The fact that Telehealth is not currently covered by reimbursement arrangements was seen by HCPs, SP1, TPs and ICEs as a significant disincentive to the involvement of healthcare professionals. They argued that even though Telehealth may represent cost-savings to the wider healthcare system, healthcare professionals will be reluctant to engage unless reimbursement systems are created.

"You have to look at what incentives does a GP have to offer vital signs monitoring to his or her patients? Not much, because they are not under reimbursement systems, it doesn't exist in the HSE so it would be up to the GPs to do it privately. So they don't really have a huge incentive to do it."(ICE1)

Two HCPs also acknowledged that under the current reimbursement system in Ireland, GPs would not be compensated for monitoring Telehealth data. Both agreed that professionals would probably not engage without payment.

"I think there would have to be some sort of payment, because, say you have private patients that would be paid for the appointment, or with the medical card we would get a global fee. But the fee would have to be looked at because there is a lot more time [being spent]."(HCP4)

2) Disincentives caused by existent payment system: TPs and ICEs pointed out that, different than other technologies that have successfully penetrated in the healthcare industry, Telehealth does not fit into the existent procedure-driven model. Interviewees argued that technology diagnostic solutions, for example, clearly allowed professionals to increase their income streams, what is not the case of Telehealth. There was a common perception that unless the focus of reimbursement arrangements shifts from procedures to health outcomes, Telehealth will hardly penetrate in the healthcare system.

"The reasons why radiology was adopted so fast are quite simple. On the one hand it allowed you to generate more income, because you could get more patients through the radiology department more quickly. It also didn't interfere with the status quo and the workflow in the hospital in a fundamental way (...). So if the doctor gets paid to see you, but doesn't get paid to look after you when you are out of the room, why would they invest in it and pay attention to it? (...) I guess a lot of doctors will not like this because they prefer the system whereby you are paid by the appointment, because they can see an obvious way to increase their income, by increasing number of appointments." (TP2)

"The answer to that is really simple. Our healthcare system is based on a model that incentivises poor health. (...) Nothing will change until we change that model." (TP3)

H. Suggested Actions for Wider Adoption of Telehealth

PCs suggested that in order to achieve wider adoption, Telehealth technologies must be flexible enough to match different user's lifestyles and preferences. Participants added that devices should be small, portable and easy to use, what could be more easily addressed if Telehealth systems could run in devices people already own, such as mobile phones.

TPs and ICEs agreed that in the future technology developers should focus on the design of Telehealth software applications, as oppose to hardware. Overall, they highlighted that the input of gerontologists and healthcare

professionals is critical to successful Telehealth technology design.

PCs suggested different strategies to promote awareness among older people and family members. This included mass media advertisement (television, newspapers, Internet), availability of information leaflets in medical practices and the creation of a government approved website, with "neutral" and up-to-date information that could facilitate informed consumers' choice.

Most interviewees indicated that government-led Telehealth implementation could address several of the barriers discussed. Government legislation could, for example, address data protection and medical liability issues. National policies were seen as necessary to endorse a standardised adoption of Telehealth across the country and to promote educational support through undergraduate training and continuous professional development. Interviewees in all groups indicated that State provision would be important to ensure that older people with lower incomes have access to Telehealth. TPs also pointed that government initiatives could stimulate the establishment of the required infrastructure to allow Telehealth data sharing. This could include the subsidy of broadband for older people and financial incentives for the adoption of interoperable EHR systems by healthcare providers and organisations.

Considering the current Irish healthcare system configuration, ICE1 suggested that it may be easier to start the implementation of Telehealth through the secondary sector. She explained that chronic disease support teams are currently based in hospitals and Telehealth could offer cost-saving advantages for such departments.

"Actually most of the chronic disease management in Ireland is coming from the hospital, not from primary care. So that is why the hospital has a load of incentive, they are saying 'we are sending a load of these heart failure and COPD teams out to all these people, and that is expensive, it is time consuming, and they are still not able to catch people before they have an exacerbation. So if we have the infrastructure, the building, the team, why not put Telehealth into the hospital?'. So there you are, that is an incentive." (ICE1)

The establishment of reimbursement schemes has been the most suggested measure to incentivise Telehealth adoption among healthcare professionals. Considering the fact that Ireland has a public health system in place, reimbursement policies were also expected to be determined by government policies.

Finally, in order to avoid barriers associated with healthcare professional reluctance to embrace Telehealth, TPs and ICEs suggested that a possible strategy to achieve wider adoption of Telehealth in the homes of older people would be focusing on the development of Telehealth solutions that do not necessarily require healthcare professional involvement. Interviewees indicated that the platform created by Telehealth devices could be used to promote education, motivation and social support to patients and caregivers. As well as being a channel for accurate information and advice, Telehealth systems could promote treatment compliance among users through clear goal setting and feedback tools. Moreover, interviewees suggested that future developments should explore the capacity of Telehealth technologies to connect older people in equivalent disease stages and caregivers in similar situations. Participants argued that this approach could promote knowledge sharing and tackle social isolation, a frequent problem among chronic disease patients and caregivers. Additionally, this could address some of the business model and reimbursement issues previously mentioned, since Telehealth would be no longer seen as a medical device that is prescribed by a doctor, but a consumer device, which older people and family members could be interested in purchasing privately.

"I think this is the tip of the iceberg, because what we see in the market is, we have gone from 'this is a medical device and you have to comply with it every day' to 'this is your health coach, if you are dear to what it is advising you to do, your health outcomes will be better' and moving there onto 'this is actually your gateway into a support community', so it is not you and your device anymore, it is you and a community of other people, and you are sharing knowledge and experience, about what works for you. And these things instead of being isolating technologies, they actually reduce social isolation, because now you are connected. You can bring in Skype, video-conferencing with your doctor, your nurse, your family. And this is where it is getting interesting, because it is seen as no longer a thing that you have to do, but your support system. And something that you might be willing to pay for too, which is the other key factor here." (TP2)

IV. DISCUSSION

Study findings were analysed in order to determine the most pressing barriers to Telehealth adoption. Table 4 presents the barriers as identified in the introduction section of this paper and its significance assessment by each interviewee, representing a summary of interview findings. A heat map scheme has been used, where darker shades of grey indicate important issues and lighter shades point to trivial obstacles or issues that were not perceived as a barrier (Table 3). Barriers perceived as more significant are situated near the top of the table.

TABLE III.   HEAT MAP COLOUR CODING

	Very important barrier
	Important barrier
	Trivial barrier
	Not a barrier
	Not mentioned

TABLE IV.   BARRIERS TO WIDER TELEHEALTH ADOPTION HEAT MAP – SUMMARY OF INTERVIEW FINDINGS

Barriers	PC1	PC2	PC3	PC4	PC5	HCP1	HCP2	HCP3	HCP4	SP1	TP1	TP2	TP3	ICE1	ICE2
Lack of clear incentives to healthcare professionals															
Technology usability															
Absence of reimbursement arrangements															
Lack of organisational willingness to change															
Costs of establishing the required infrastructure															
Poor ICT skills															
Change in roles and levels of trust among stakeholders															
Confidentiality concerns															
Disincentives caused by existent payment system models															
Unclear data protection regulation															
Increased liability exposure															
Increased professional responsibility															
Lack of familiarity with Telehealth and its benefits															
Limited access to broadband															
Lack of champions in the healthcare system															
Telehealth affordability by older people															
Lack of interoperability amongst EHR systems															
Lack of established financial structure															
Fear of reduced business															
Lack of integration within the healthcare sector															
Reduced face to face contact															
Lack of standards ensuring technical quality and interoperability															
Lack of robust evidence for Telehealth effectiveness															
Inadequate evaluation methods															
Device incompatibility															
Lack of guidelines clearly defining roles and responsibilities															
Unclear cost saving evidence															
Technology stability and reliability															

In line with international literature, interviewees in this study suggested that the lack of clear incentives for healthcare professionals to engage in Telehealth is one of the most pressing barriers to its wider adoption [12], [27], [32], [33]. It has been acknowledged that the absence of reimbursement arrangements significantly discourages healthcare professionals to offer this service [8], [24], [26]-[28]. Moreover, the fact that Telehealth does not fit into the existent procedure-driven healthcare model was seen as another barrier to its penetration in the healthcare sector [12],

[26], [27], [30]-[32]. Past experiences in healthcare show that the introduction of new technologies is not an issue when its adoption model is aligned with existing incentive schemes. The rapid adoption of computed tomography and magnetic resonance imaging scanners in the healthcare sector in many countries is an example [34].

Although these barriers have so far proven more difficult to overcome, several countries have been successfully employing strategies to stimulate Telehealth adoption amongst healthcare professionals. Many countries use government mandates to achieve broad ICT adoption in the health sector. In Denmark and Norway, for example, high rates of electronic prescriptions have been achieved since the Governments made this practice mandatory for primary care providers [35].

The establishment of reimbursement structures is also considered vital to incentivise Telehealth adoption among healthcare professionals. Studies show that the reimbursement structure adopted will vary depending on the country's healthcare financing model and governments play a key role in defining this [12], [35]. In Sweden and the UK the existing (small scale) provision of Telehealth has been publicly funded. In Germany, regulatory changes have enabled Telehealth reimbursement through health insurers. In the Netherlands phone and e-mail consultations are reimbursed via fixed prices by the health insurance companies [12].

Innovative reimbursement frameworks, such as pay-for-performance schemes, are also being introduced in different countries in an attempt to shift away from procedure-driven models. In the UK around 15% of GPs' salaries is based on their performance against a set of quality measures [36].

Finally, government financial incentives have been used in Australia, Denmark, the Netherlands and the UK as effective policy tools to incentivise technology adoption among healthcare professionals [12], [35]. In the US the Medicare and Medicaid EHR Incentive Program offers financial stimulus of up to $44,000 / $63,750 to physicians and hospitals that demonstrate meaningful use of EHR systems certified by the Government. Since its implementation in January 2011, the scheme has registered over 326,000 eligible professionals and hospitals [37]. This is particularly significant considering that the fragmentation of the US American health sector is usually pointed as a barrier to the implementation of any measures in large scale [25].

Technology usability issues have been highlighted by virtually all interviewees, in agreement with several studies [8], [24], [27], [28]. It has been pointed by interviewees that devices specifically designed to cater for healthcare needs may not be well accepted by users. Leveraging devices that people already have, such as mobile phones or laptops, was pointed as a better strategy for Telehealth adoption, since people are already familiar with such devices and these fit more readily into their lifestyles. Participants added that this could make Telehealth more affordable and readily accessible to the public. This perception is in large agreement with trends towards the use of mobile platforms for Telehealth provision (e.g., smartphones, computer tablets). Projections indicate that smartphone applications will enable the mobile health industry to reach 500 million users in 2015 [38].

In line with interviewees' suggestions, other studies have also pointed that involving end-users during Telehealth technology development stages is key to solve usability problems [8], [27]. The input of gerontologists and healthcare professionals is critical to successful Telehealth technology design and will address many concerns related to life style and workflow disruption.

The lack of organisational willingness to conform to changes is considered a pressing barrier to wider Telehealth implementation [8], [11], [12], [24]. While the role of 'champions' in promoting change in the healthcare system has been acknowledged by interviewees and the literature [11], [24] achieving wider adoption of Telehealth will require more than individual leadership. May et al. [29] argue that in order to overcome intra-organisational inertia, coherent policies promoting an organisational vision are needed. According to Castro [25] strong national-level leadership has been essential to countries like Denmark, Finland, and Sweden to successfully drive and coordinate wider adoption of ICT in the health sector. The idea that comprehensive national strategies are required to address this and other pressing barriers to wider adoption of Telehealth is in line with perceptions from several interviewees.

The strategies above explored indicate that a high level of government involvement may be necessary to transform healthcare provision and allow wider adoption of Telehealth. Interviewees in this study point, however, that the high initial costs of establishing the infrastructure and incentivising healthcare professionals is an important barrier to government led Telehealth implementation in Ireland. Financial challenges have also been acknowledged by different studies [10], [24], [25], [27], [35] and partnerships between public and private sectors have been suggested as a way of overcoming such issues.

Barriers involving poor ICT literacy among older people pointed by previous studies [12], [24] were perceived by most interviewees as a trivial barrier. Recent evidence show that the interest of older people in technology has grown at a fast pace in the last decade [39], [40]. In Ireland, the percentage of people aged between 65 and 74 years accessing the Internet at least once a week has increased more than five times between 2003 and 2010 [41]. The use of the Internet for health purposes has also increased among the older population [39] indicating that this barrier may gradually become insignificant.

Other acceptance barriers mentioned in the literature such as lack of face-to-face contact [11] and confidentiality concerns [11], [12], [25] have also been cited by interviewees. However, it is possible to suggest that these issues are not significant barriers to Telehealth adoption for several reasons. According to Darkins et al. [14] patient satisfaction was significantly high among older participants in the VHA Telehealth programme and lack of face-to-face contact with healthcare professionals has not been observed as a barrier to Telehealth adoption. This may indicate that the benefits offered by the technology may outweigh such

concerns. Similarly, Castro [25] suggests that confidentiality concerns should not be a barrier to ICT penetration in the healthcare industry, considering that technical controls (e.g., encryption, electronic identification, audit logs) are available to ensure personal health data security. In Denmark, for example, health data is securely shared through an official e-health portal. In this context patients have access to this website and can easily control privacy functions, including monitoring who has accessed or modified their personal medical records. In Ireland the recently implemented National HealthLink Project (http://www.healthlink.ie/) is another example of how patient data can be securely shared over the Internet. At present this service allows hospitals and general practitioners to exchange patient information, such as laboratory results and discharge summaries. Patients, however, do not have access to this service.

Interviewees in this study challenged several authors [11], [12], [27] suggesting that lack of RCTs is not a significant barrier to Telehealth adoption. Participants argued that careful patient selection is desired to achieve Telehealth benefits, thus alternative study designs should be used to evaluate Telehealth value. This has been previously observed by other authors [24], [26]. The MAST is an example of a new model for Telehealth evaluation, which has been developed to support decision making in European countries [42]. There are indications, therefore, that evidence base barriers should not be of major significance.

Interviews supported the main findings of the literature in relation to certain technology barriers including limited access to broadband connections by older people [11], [12] and lack of integration between various Telehealth technological solutions [8], [10], [12], [25], [27]. It is important to acknowledge, however, that several initiatives are being undertaken and such barriers may not be significant in the long-term. The Irish government has implemented a national scheme, which aims to achieve extensive broadband coverage by the end of 2012 [43]. Moreover, with the increasingly fast adoption of smartphones, the native broadband Internet connection capabilities of those devices may in practice address the connectivity infrastructure requirements for Telehealth, as opposed to government-led, residence-based broadband connection programmes [44]. Similarly, interoperability issues are being tackled by both private and public sectors. Through the Continua Health Alliance, over 240 healthcare and technology companies worldwide are working together to set quality and interoperability standards for Telehealth solutions [45]. Studies by Anderson [12] and Castro [25] indicate that in the UK and Denmark government agencies are setting such standards.

V. CONCLUSION

The aim of this exploratory study was to determine the main barriers to the wider adoption of Telehealth in the homes of older people, in the Irish context. Research findings point to a number of direct and indirect obstacles, which largely correspond to those discussed in the international literature. Issues involving evidence base, technology interoperability and broadband access were not considered to be of major significance, given that important initiatives are already addressing these barriers. Similarly, based on interviewees' perceptions and technology adoption trends, older people's acceptance is not believed to be a pressing barrier to wider Telehealth implementation in the medium term.

The findings indicate that technology usability issues may significantly hinder Telehealth adoption. The use of devices that people are familiar with such as mobile phones, laptops and computer tablets, and the involvement of end-users during Telehealth technology development stages are supported by this study as strategies to overcome Telehealth usability challenges. Another important barrier is the lack of organisational willingness to change, currently perceived in the healthcare sector. While implementation costs were seen as a challenge to government action in Ireland, strong national-level leadership is considered essential.

Finally, the lack of incentive to healthcare professionals to embrace Telehealth is considered a pressing barrier to its wider adoption. The absence of arrangements to reimburse healthcare providers and the incongruence with the present procedure-driven healthcare model are believed to significantly discourage professionals to offer this service. Possible approaches to address healthcare professional incentive barriers have been suggested and include government mandates, the establishment of reimbursement schemes and the use of government financial incentives.

The imminent population ageing and epidemiologic trends indicate that new forms of healthcare provision are urgently needed. Shifting away from the current disease-centric healthcare model towards a health-centric system is not only an economic necessity but also a moral obligation. The adoption of Telehealth technologies is believed to contribute towards these issues by allowing more efficient service provision in a patient-driven model. However, the disruption to traditional healthcare practices caused by the introduction of Telehealth represents a major challenge, one that requires the support from all stakeholders involved. Governments around the world are gradually implementing strategies to promote a new vision in the healthcare sector and significant changes are envisaged in the long-term.

Meanwhile, technology adoption and the use of the Internet for health purposes are growing among all age groups, including the older population. Concomitantly, projections suggest a significant growth in the mobile health industry in coming years, which may enable Telehealth diffusion through a consumer market. Should these trends continue and become reflected in people's expectations around healthcare provision it is possible that, in the short-term, technological disruption in the healthcare sector will be a demand raised by patients themselves.

VI. STUDY LIMITATIONS AND AREAS FOR FUTURE RESEARCH

Even though interview findings indicate large agreement with the literature, the small scope of this study and its non-probability sampling strategy do not allow for the generalisation of these results. It is possible to suggest, however, that the comprehensive literature review and

adequate methodology employed may provide a useful framework for future research projects.

This study would have greatly benefited from the participation of representatives of the Irish Government, as initially intended. It is also important to acknowledge the possibility of biased results, since the views of those participants who volunteered to take part in this study may differ from others [46]. Additionally, the fact that Potential Consumers and Healthcare Professionals interviewed in this study did not have personal experience with Telehealth technologies indicate that one has to cautiously consider their contributions.

While identifying barriers to wider Telehealth adoption is an important starting point to promote its implementation, future research should focus on clear and practical strategies to increase Telehealth adoption in the homes of older people. Investigating innovative ways of incentivising healthcare professionals and organisations to embrace Telehealth in their usual practices seems to be one of the most needed areas for research.

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