Appendix 1

Technology for Age Friendly Places

1. Digital technologies will be used in Age Friendly Places for a number of purposes:
   1. **Health monitoring**  
      These services can be provided by health and care professionals including the NHS, local authorities’ social care departments and private health. It will include devices in the home and on the body plus remote facilities where data is collected, analysed and the results transmitted to appropriate health professionals and responsible family carers. It can include monitoring of heart, blood sugar etc, recording the consumption of prescription medicines and alarms for falls etc. Artificial Intelligence and Machine Learning are the two key differentiating technologies which can at least partially automate remote monitoring. They use sophisticted algorithms and large comparative data sets to analyse patient data, alerting practitioners when there is an event or situation of potential concern. Both are areas of strength for Scotland, particularly in academia.
   2. **Supporting wellbeing**   
      There are a growing number of devices and applications intended to encourage exercise and healthy eating. These can be very useful for older people but few specifically address their needs so this is an underserved market. Specialised applications which understand the varied capabilities, needs and preferences of older people will be required. Even seated exercise can be therapeutic and enjoyable, particularly if there is a social element.
   3. **Security and Safety**  
      Older people can be vulnerable to criminals and con men. Entry systems which could recognise authorised staff e.g. NHS smart-ID tags, plus video monitoring of doors etc could help people feel more secure in their own homes. Older people can be forgetful: smart appliances e.g. electric hobs, could switch themselves off, or smart meters with data analytics could detect potential irregularities with appliances.
   4. **Entertainment**  
      Retired people have a lot of free time and need stimulation beyond daytime TV. There is an opportunity for games targeted at the interests and capabilities of older people. The most useful would include some mental challenges, some physical movement and a social element, playing remotely with friends.
   5. **Communication and social networks**  
      Social isolation is a growing issue for the old but technology could help. Digital platforms could match older people of similar interests. Technological breakthroughs are not required, but rather tailoring of platforms and services towards the needs and preferences of a different demographic. Intelligent chatbots could also help with social isolation – they can have infinite patience to converse with people with dementia, for example, and can pull in topics of interest to the older person, such as events during their lifetime which they may remember better than what happened today.
   6. **Facilitating independent living**  
      Voice activated technology (e.g. Amazon echo) could be very useful for people with restricted movement, for controlling lights, entertainment systems, heating, entry to the house and making phone calls, or sending messages. It can also provide reminders (to take medication, for example) and answer questions. Assistance or companion robots are also developing fast - Frost and Sullivan report that:  
        
      *Personal robotics market comprised of home-care, telepresence, and rehabilitation robots will see a major boost in adoption and successive market growth as the current rapid increase of the ageing population (in countries like Japan) will see hospitals falling short of care workers. Moreover, the need to enhance performance and rehabilitation of elderly patients and will also lead to wider market traction.”[[1]](#footnote-1)*   
        
      These robots need docking stations or inductive loops in the home for charging. In addition, the home may need to be designed or adapted with robots in mind e.g. ramps instead of steps, high contrast flooring to aid machine vision etc.
2. Most of the technology for Age Friendly Places will inevitably come from outside Scotland. But much of the value will be in adapting it for specific applications. This can be done by local resellers who can package complete solutions, add customisation, install and maintain. For simpler technologies, social enterprises and volunteers could provide the assistance older people require to install and learn to use new technologies in the home.
3. There will be opportunities for technology companies in Scotland to create unique products which can be exported globally. This could be facilitated by CivTech type open innovation programmes which support the development of new concepts and provide environments where technology can be trialled by real clients and then improved prior to commercial launch. The key is finding the best partners to set the challenges and provide the communities and facilities for trials. These partners also need to be educated on the art of the possible by the technology community before setting the challenges. Partners could include social enterprises as well as public sector organisations.
4. Newbuild retirement housing could include intelligent building management systems which incorporate heating, lighting and security control. These could ensure homes are kept warm while managing costs by e.g. reducing heating in rooms rarely used at certain times of day. With IR or image sensors, they could also monitor movement in rooms which could also trigger alarms if there is none during periods where it is expected.
5. Housing does not need to be designed with new technologies embedded into the fabric. The increasing price/performance ratios of wireless technologies, batteries and energy harvesting devices mean that new devices can easily be retrofitted. There could be considerable economic activity involved in such retrofitting activities.
6. Robust and high performance connections to the communications backbone will be essential for reliable health monitoring as well as many other applications. So, broadband fibre access and local 4G basestations should be provided when planning age friendly developments.
7. It is increasingly affordable to fit a diverse array of sensors into the home, even going as far as smart toilets able to analyse urine/stools. With smart data analytics, it is likely that much information could be gathered enabling the early identification of health problems. However, there is also a question of privacy to be addressed. Innovation Centres, including DHI, CENSIS and The Data Lab could bring together solution providers in these areas to trial new approaches which would also look at acceptability and privacy issues in real contexts.
8. Barriers to adoption include the following:
   1. **Cost**  
      For privately purchased goods and services, the issue is affordability for poorer pensioners while for the better-off, value must be demonstrated which can be challenging for unfamiliar technologies. For NHS and social care, cost-benefit analyses can determine if there is a benefit to public finances, once large scale trials have taken place.
   2. **Unfamiliarity of new technologies**  
      While some older people have a strong interest in new technologies, most prefer to stick with the familiar. This can be addressed in two ways. First, others can take time to teach them how to use the new technology – probably other older people would do this most effectively as they approach new technology from the same set of expectations and are more likely to have the time and patience. Second, the user interfaces can be made more accessible to old people, from simple fixes like larger scripts to designing interfaces to mimic those that older people find familiar.
   3. **Concerns on privacy**  
      While young people seem happy to share all kinds of personal data without a second thought, older people tend to be more cautious and sceptical. A great deal of care must be taken on cyber security and other measures to reassure older people that their data will not fall into the wrong hands, or be used to sell them things.

1. Frost and Sullivan (2016) *Global Care Assistance and Automation Robots Market, Forecast to 2021* [↑](#footnote-ref-1)