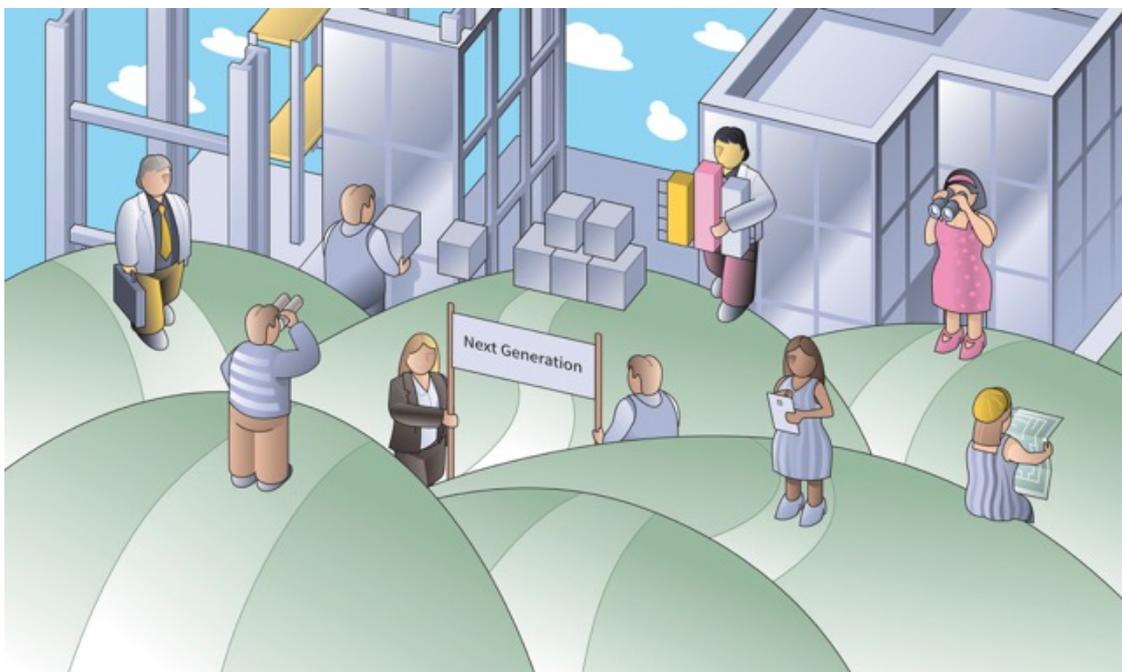


## Views from Generation Y



### **How Can Technology Help Make Longevity a Sustainable Achievement?**

Author: Leon Maximilian Marburger

## How Can Technology Help Make Longevity a Sustainable Achievement?

### 1. Introduction

The world is facing a situation without precedent: in 2019, for the first time, there were more people aged 65 and over than children aged 4 and under (United Nations, 2019). The social, economic, and healthcare consequences will determine public policy in the coming decades and will have an enormous bearing on consumer lifestyles and purchasing decisions. In this context, the social integration of older persons has emerged as a topic of both scientific and public concern. Not only is it empirically proven that older people interact with fewer people, but they also increasingly struggle to cope with the emergence and rapid change of technologies (Vaupel et al., 1998). This paper will critically examine technology's role in making longevity a sustainable achievement.

Within the last half-century, all Western countries have experienced a substantial increase in their older populations. While this increase is more common in developed countries, it can now also be seen in the developing world. Between 2000 and 2050, the share of the world's population that is aged over 60 years will double from 11% to 22% (*The Lancet*, 2014). While it has taken France more than 100 years to increase the number of older adults (those above 65) from 7% to 14%, it will take countries like Brazil or China less than 25 years to experience a similar increase (United Nations, 2015). In general, the growth of ageing populations is fueled by three factors – first, by the increasing life expectancy of the population. Despite the prominence of life expectancy in empirical research, it is surprisingly difficult to find a simple description of what it means, or how it can be measured. In general, life expectancy can be described as the average number of years a person can expect to live, as estimated at birth. At present, life expectancy in Switzerland is among the highest in the world, mainly due to the large increase during the 20th century. Nevertheless, this increase has flattened recently. In the last two decades, life expectancy for males in Switzerland has increased from 76.3 in 1998 to 81.7 years today. Second, fertility rates are continuously decreasing across developed countries. The end of the baby boom led to a striking decline in the number of children per woman. Since 1964, the fertility rate has dropped from 2.7 children to 1.5 children per

woman in Switzerland (Bundesamt für Statistik, 2019). The third and final factor is the increase in global migration from 2.8% in 2000 to 3.2% in 2013. Population growth fueled by migration comes along with an increase in the share of elderly, since the percentage among international migrants of individuals aged 65 and over is substantial (Zaiceva, 2014).

### 2. Social integration

Social integration is a process of building values, relations, and institutions that ensure that all individuals, regardless of their race, ethnicity, sex, or age, can fully participate in society on an equal basis. Older people are integrated into society in many different ways. They are part of social networks of friends and families; they are active in associations; they work voluntarily or are employed. Older people, however, are also less likely to be fully integrated into society. This is mainly due to the fact that older people are more inclined to experience disability, such as problems with hearing or mobility. For the following analysis, we will define loneliness in congruence with Gerson and Perlman (1979) as a response to a discrepancy between actual and desired relationships. For the reasons mentioned above, age and loneliness are positively correlated. In one study, almost 40% of all British older adults reported experiencing loneliness (Victor, Scambler, Bowling, & Bond, 2005). Human beings are social creatures, and hence it is not surprising that loneliness has detrimental effects on health (figure 1).

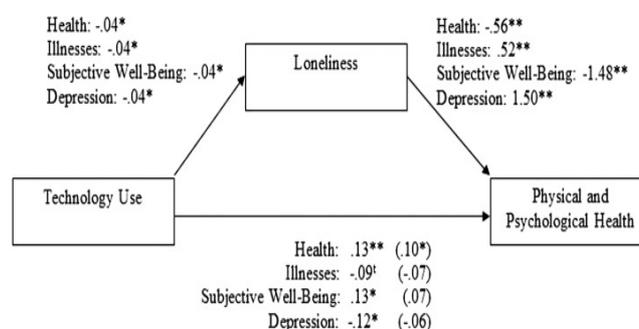


Figure 1: Unstandardized regression representing the relationship between technology use, loneliness, and subjective health (from Chopik, 2016)

According to the National Science and Technology Council of the United States of America, there are six core capabilities that are essential for older people to maintain an independent life,

and in which technology can play a positive role (the six capabilities being: independent living, cognition, communication and social connectivity, personal mobility, transportation, and access to healthcare). This brief paper will mainly focus on communication and social connectivity. Communication between older members of society involves the physiological ability to communicate, the ability to understand one another, and the technological ability to communicate. The technical ability to communicate is so important since social isolation and loneliness are linked to depressive symptoms. Loneliness is worse for health than obesity or inactivity.

While it is crucial in this domain to design products and services that address the need for social connectedness among older adults, the human–computer interaction will become increasingly important based on the demographic changes described above.

## 2.1. Human-computer interaction

Policymakers, business leaders, and non-governmental institutions have already recognized that an ageing population can be a powerful tool for economic growth. There is already a term – age-tech – that accurately describes the intersection of longevity and technology. The principle of age-tech is to design products and services that are valued by all groups but can be easily used by older people as well. One striking example is the recent acquisition of CTRL-Labs by Facebook. Facebook announced that it would pay between \$500 million and \$1 billion to acquire CTRL-Labs, a technology start-up from New York City that helps people control devices only using their thoughts (Murphy & McGee, 2019). The aim of all human–computer interaction activities is ultimately to develop interactive systems that are easy to use and offer task-appropriate functionality (usability) and, also, provide an emotionally appealing user experience. Eventually, physically disabled people will be able to use and leverage technology in ways that transcend their current physical capabilities. While businesses have already identified the elderly population as a large, untapped market, the importance of enabling the elderly's use of technology as a means to facilitate social integration cannot be underestimated.

In contrast to popular belief, older people enjoy emailing and using online social networks to

communicate with their friends and loved ones. While mobile phones and other communication technologies offer the opportunity for social integration through communication today (Stroetmann, Hüsing, Kubitsche, & Stroetmann, 2002), collaborative robotics might be the next big thing. Devices and services that facilitate – and in some instances replace – human contact are attracting attention as tools for combatting loneliness.

## 2.2. Artificial intelligence

Artificial intelligence (AI) will play an essential role in aiding the elderly to combat feelings of loneliness and social isolation. AI enables machines to learn from experience, adapt to new incoming information, and accomplish tasks that require human-like thinking. Most common examples of AI today – from chess-playing computers to self-driving cars – are mainly based on deep learning and natural language processing. With these technologies, computers can be trained for specific tasks by processing large amounts of data and recognizing patterns in that data. And computers can help combat loneliness. Two recent examples in this field underline the tremendous benefits of technology. At the beginning of 2019, Accenture Interactive launched an artificial intelligence solution called Memory Lane, which works with Google Voice Assistant. Memory Lane uses intelligence to capture stories from the elderly for future generations. Based on the correlation of the information provided by the user, Memory Lane can then ask questions and enable a real conversation. In one demonstration, we can see the 101-year-old woman Ingegerd Bruswitz talking with Memory Lane about her choice of profession, and about growing up in the 1920s.

Artificial intelligence is on the rise. Over the past few months, a small group of older adults in San Francisco has been learning to engage with a talking device called ElliQ, created by Intuition Robotics. ElliQ talks, but also moves, lights up, and leans towards the person it is interacting with. ElliQ uses verbal and non-verbal communication to engage with older persons regularly. By leveraging robotics to overcome social exclusion, ElliQ helps the elderly to stay active.

Already today, shortages of personnel and high demand in the care sector invite the application of emotional robotics. It is no longer just a matter

of performing tasks efficiently, but also of creating a pleasant interaction experience for people with robots and establishing a relationship of trust with the robot. ElliQ and Memory Lane differ from real service robots in that they emulate behaviours during the execution of services that are oriented towards interpersonal communication. A socially interacting lifting aid, for example, would not only move a person but would also, for instance, compassionately ask whether the person is now lying comfortably.

### 2.3. Future outlook

76% of interviewed German citizens already believe that robots will play an essential role in the future not only in their role in industry but also in our personal everyday life as service robots. While there is already societal support for the use of social robots, the implementation will still take time. Given the unprecedented demographic change, with an increasing share of older people in both developed and developing countries, social robots will help the elderly to stay connected and will substantially increase their well-being. For now, emotional robots do not act as a substitute for human interaction. Still, they can already take on essential parts of human behaviour that increase the well-being of the elderly. In the future, more and more focus will be put on emotional robotics. Yet the widespread implementation is hindered by various factors, such as the lack of adaptation by the robot. So far, robots can only perform very limited tasks. Even though technological advancement will solve that problem in the future, it is still uncertain how expensive such high-performing robots would be. Another topic of concern is data protection. As stated before, private companies are trying to enter this market as soon as possible. However, this is a security risk and it is yet to be established what should happen to our personal data. Considering the technological advancement of the robot, more and more private information will be shared. It is the government's responsibility to develop new rules and regulations that protect our data in a rapidly changing environment.

### 3. Conclusion

The major demographic changes we face today offer both opportunity and risk. Opportunity because it is a largely untapped market that will be served with innovative products and services from the private sector. Risk because old age is

positively related to loneliness and detrimental health effects, and policymakers need to adapt to rapidly changing technologies. In this paper, we have identified technology as a means to combatting loneliness. We have shown that businesses tackle this problem with solutions that interact with older people to engage with them and provide social companionship. While the high rates of support for technology, and robots in particular, already underline the fact that technology can make longevity a sustainable achievement, it must go hand in hand with changes in policies. The high initial costs of robots, as well as the uncertain regulatory environment, pose significant barriers to a widespread roll-out of robots. Last but not least, it is still uncertain if emotional robots will ever be able to display irrational behaviour similar to human beings. Nevertheless, this question is beyond the scope of this paper.

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