Ageing and Digital Technology
We are all aware of the rapidly changing demographics in most countries where a combination of improved health care, changes in birth rate and improvements in infrastructure for housing, water and energy have led to an increasing number of older people in their populations. These changes bring significant challenges to our societies and our governments. Too often, political debate has focussed on population ageing as a negative issue, a burden to be managed. The prejudice expressed by employers through rejection of people over 55–60 reflects a deeper community prejudice against older people, namely that they are inevitably slow, resistant to change and prone to serious health problems. All these generalisations persist, but they are wrong.

Increasing life expectancy is an economic good. Longevity makes a major contribution to the national economy. Older people are both contributors and consumers of products and service, adding to economic growth. In Australia, the over-55s represent just 26% of the population, but hold more than 50% of the economic assets. Through voluntary work, care of the old and disabled and provision of child care, they contribute billions of dollars to the economy (Butler, 2015).

Surveys in various countries show that the majority of older people want to live independently in their own homes for as long as possible. In Australia, only 7% live in aged care residential facilities, but these have dominated policy decisions. The emphasis has to be on Ageing-in-Place. Rapid changes in technology, particularly those driven by information and communication technologies, offer a multitude of opportunities to support this approach.

As a materials scientist and engineer who has worked in academia as a researcher and educator, in industry and Government as a research administrator and advisor on policy on science and technology, I am acutely aware of the need to ensure that technology developments meet the needs of society. Thus in recent years, I have been active in addressing the opportunities offered by the convergence of nanotechnology, biotechnology, information and communication technology and cognitive science in developing assistive technologies for older adults and people with disabilities.
Three critical areas for support are security and safety, diagnosis and treatment, and mobility (Tegart, 2014). Aspects of these are discussed in various contributions to the present volume, for instance, through virtual reality (Chaps. 10 and 14), digital gaming (Chaps. 6 and 15) and assistive technologies (Chaps. 13 and 16). Underlying all of these is the need for communication and social interaction, as noted in Chap. 5 by Waycott and colleagues. Hence, social technologies are central to this collection (see, in particular, Chaps. 3, 17 and 18). In addition, an enormous variety of assistive technologies and devices continue to be developed and marketed, and increasingly we are learning how they can be a friend to older people and improve their quality of life as shown throughout the book.

Thus, for security and safety, we can design and build or retrofit elderly friendly housing, incorporating sensors to monitor activity and to avoid falls and hospitalisation, while companion robots and virtual reality can improve quality of life for older people with disabilities. Unobtrusive monitoring devices can assist people with dementia, although important ethical issues have also to be considered, as discussed in Chap. 13 by Gibson and colleagues. Suitably designed mobile devices can provide easy communication with family and carers, and empower older people to facilitate community connections and societal engagement (see Chaps. 3, 5, 11 and 13).

For diagnosis and treatment, telehealth systems have been deployed to support Ageing-in-Place by monitoring vital signs and medications at home and transmitting data to carers who can take action to avoid hospitalisation. In remote areas and even in cities where travel can be difficult for older people, videoconferencing enables specialist consultations without travel. However, these systems are rapidly being superseded by mHealth, the widespread use of smart mobile phones and wearable monitors for a range of vital parameters.

Linkage to suitable apps enables people to check their health anywhere. Ageing-in-Place is becoming Ageing-Anywhere!

In mobility, the increasing use of mobile scooters by older people has resulted in a rise in accident issues. These will be substantially reduced by the development of autonomous electric vehicles which will revolutionise transport in both cities and rural areas. Car-sharing services are already established in many cities, and these could be expanded with new generation vehicles resulting in a better quality of life for older people.

However, the acceptance and use of such assistive technologies depend on the perception and attitudes of the potential customers. Too often, the younger technologists developing these technologies and associated devices neglect to consult with older adults and, as a result, their products are market failures.

The issues in adoption and use of new technologies by older adults are complex and are explored as a major theme throughout this book. There is a wide diversity amongst older people which needs to be recognised. It is essential to know more about the contributions, capacities, needs and aspirations of older people. This collection addresses this gap by focusing on that missing knowledge in a comprehensive and multidisciplinary way. For instance, several chapters discuss critical
theoretical, methodological and ethical issues to ensure we reach that goal (e.g. Chaps. 2–4, 7–9 and 11–13).

Thus the needs, capabilities and interests of those in their 60s are different from those in their 80s. In many countries, variations in ethnicity and language bring different challenges of inclusion and ability to access aged support services. Further, there are significant socio-economic differences and regional variations which need to be recognised. Urbanisation is growing and the needs of older people must be recognised in appropriate housing and infrastructure. In large countries like Australia, there are special needs for rural areas and for indigenous communities with transport, health care and social communication. Collaboration and co-operation with older people across their spectrum of interests and experiences can offer the opportunities for new approaches to assistive technologies, as shown, for example, through digital games (Chaps. 6 and 15) and virtual reality (Chaps. 10 and 14).

However, for new enterprises in assistive technologies to be created as a positive contribution to the economy, four supporting factors have been identified in addition to social needs and opportunities (Tegart et al., 2016). These are as follows: a market focus is critical, expert champions are required, long-term business models are crucial, and new interdisciplinary players must be involved.

This book makes a significant contribution to the development and application of assistive and social technologies for older people by bringing together an international team of sociologists, gerontologists, computer scientists, engineers and architects to explore their design, implementation and evaluation. It offers an innovative, critical and comprehensive approach to technological and social issues in this rapidly changing field. I am delighted to be invited to write this foreword and I highly commend this book to the readers.

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