Live Long and Prosper?

Boldly Going into the Fourth-Age!

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Rising life expectancies and an ageing global workforce present organisations with unprecedented challenges and untapped opportunities. Average global life expectancy has rocketed from 53 years in 1960 to 72 years in 2015[1], and it is still climbing, with life expectancy projected to grow by 1.5 years per decade[2]. Longevity, combined with falling birth rates, is dramatically increasing the share of older people in populations worldwide[3]. Looking ahead, the ratio of retirees per worker globally is expected to change from 8:1 (12.5%) today to 4:1 (25%) in 2050[4].

Population ageing poses a workforce dilemma for both economies and organisations. Thirteen countries are expected to have 'super-aged' populations, where more than one in five people is 65 or older, by 2020: an increase from just three in 2014[5]. These include major economies such as the United States, the United Kingdom, Japan, Germany, France, and South Korea. China's 65-and-older population is projected to more than triple from approximately 100 million in 2005 to over 329 million in 2050[6] ; meaning that 60% of the world's population of over 65s will live in Asia by 2030[7].

While the increasing number of people continuing in employment beyond traditional retirement age, and ensuing implications for organisations as well as for the individual have attracted interesting discussion of late[8,9], significant challenges remain. Gone are the days where people ceased working and then filled their lives with hobbies, travelling, undertaking

activities of choice, and then realise they have no purpose in life. Now, people have expectations of living into their 90s; and for much of that time, they are going to be economically active. This may be in traditional, workplace-based pursuits but also, increasingly, through the adoption of alternative or novel platforms: eBay and Airbnb landlords being prime examples. The rise too of 'maturepreneurs'[10] is a major area of interest. For example, recent studies found the average founder of the fastest growing tech start-ups in the USA was about 45-years-old, with 50-year-old entrepreneurs about twice as likely to succeed as their 30-year-old counterparts[11,12].

This mirrored findings by the Institute of Directors in the UK[13]. The Australian Government has embraced the maturepreneur, making a strong investment in Australia's future through the 'More Choices for a Longer Life package'[14].

While most developed countries have increasing life expectancy (Japan averages 87 years, with the UK and Australia at about 82 years)[7], there are increasing concerns around the wellbeing of individuals living in post-employment – and often reliant upon welfare-social-infrastructure support. While the third-age (3rd-age) is associated with the golden years, the span of time between retirement and the beginning of age-health-imposed physical, emotional, and cognitive limitations, it is the fourth-age (4th-age)that we now must devote greater attention. And we are not referring to one of the divisions of history in J R R Tolkien's fictional world of Middle-earth, but rather those seniors who are no longer in paid employment and often with mobility issues or house-bound, requiring regular nursing service or other healthcare support. So, what does the future hold for those living in the 4th-age? Such seniors, albeit often with physical limitations, are often tech-savvy, yet lack purposefulness in their lives. Research has identified that living in this 4th-age, however, can in fact embrace commercial opportunities, independence and meaningful life-style changes. What, then, does living in the 4th-age look like for this increasing demographic?

Economic considerations

The story for Australia and Britain is similar: ageing of the population will contribute to substantial pressure on governments' spending over the next 40 years. The cost is projected to increase to about 28% of GDP by 2049/50[8]. Around two-thirds of the projected increase in spending is expected to be on clinical aged-healthcare (particularly funding of new technologies and support services). Moreover, with healthier lifestyles, higher incomes and better education all contributing to boosting life expectancy, growth in costs of age-related pensions, adds further economic pressure.

With increasing life expectancy, however, comes greater morbidity – particularly from dementia and diseases associated with ageing. Mobility, likewise, gets increasingly reduced – with the De Morten Mobility Index (0 = no mobility, 16 and above indicating full mobility and balance) often used to indicate the degree of healthcare that is needed. Spending on aged-health related services in The Organization for Economic Cooperation and Development (OECD) was on average, about $4000 per person (the United States spends almost $10,000 per person). Aged-health related services is currently on average some 9% of GDP in the OECD: ranging from 4.3% in Turkey to 17.2% in the United States. The greatest economic pressure results from increased prevalence of dementia, and long-term clinical care. Spending on long-term care has increased more than any other type of care, but spending varies considerably across countries (see Figure 1.).

However, economic considerations are not the sole preserve of the public sector; indeed there may be a significant symbiotic benefit for both the private and public sectors. Much research exists that a mature talent pool may offer companies a competitive advantage. As talent markets grow more competitive, organisations often find it valuable to keep older workers on the job rather than replace them with younger

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ones. The rise in importance of the 'gig economy' in Europe and Australia has also meant that the greater flexibility afforded by retirement allows more mature workers to participate[15]. As discussed in our previous article, the use of tax incentivisation in Singapore has shown substantial benefits[9]. The scope of Special Employment Credit (SEC) was increased on 1 January this year as a direct result not only of its efficacy in stemming the decrease of the already under pressure workforce and skills drain, but also from the health benefits and consequent positive impact on social care costs.

Paradigm shift for living in the 4th-age

We know that aged-care seniors in nursing homes and residential centres are more likely to experience mental health issues including social isolation, loss of independence, and loneliness. Our own research and collaboration with specialised architects and health providers has highlighted interesting results. We are seeing an evolution, with government support, of a better quality of life that underpins purposefulness, and economic independence. As examples:

- Shared-housing is one option[16]. Interior layouts need to be as varied as the needs of the residents; but benefits include greater companionship, living costs reduced, remaining in familiar communities, and supporting one another. The current market response to living in the 4th-age lacks in-place living, preferring retirement villages and intensive-care nursing homes. On a larger scale, share-housing can provide a more efficient use of housing resources. Similarly, co-housing, when designed well, can provide multi-generational support. While share-housing and co-housing might not be the answer for everyone, finding the right living arrangements needs to be appropriate and flexible.

- Specialist urban planners and architects who focus on living in the 4th-age, working collaboratively with healthcare providers, researchers, and civil engineers, supply such appropriate and flexible living dependent upon the person's current lifecycle (see for example

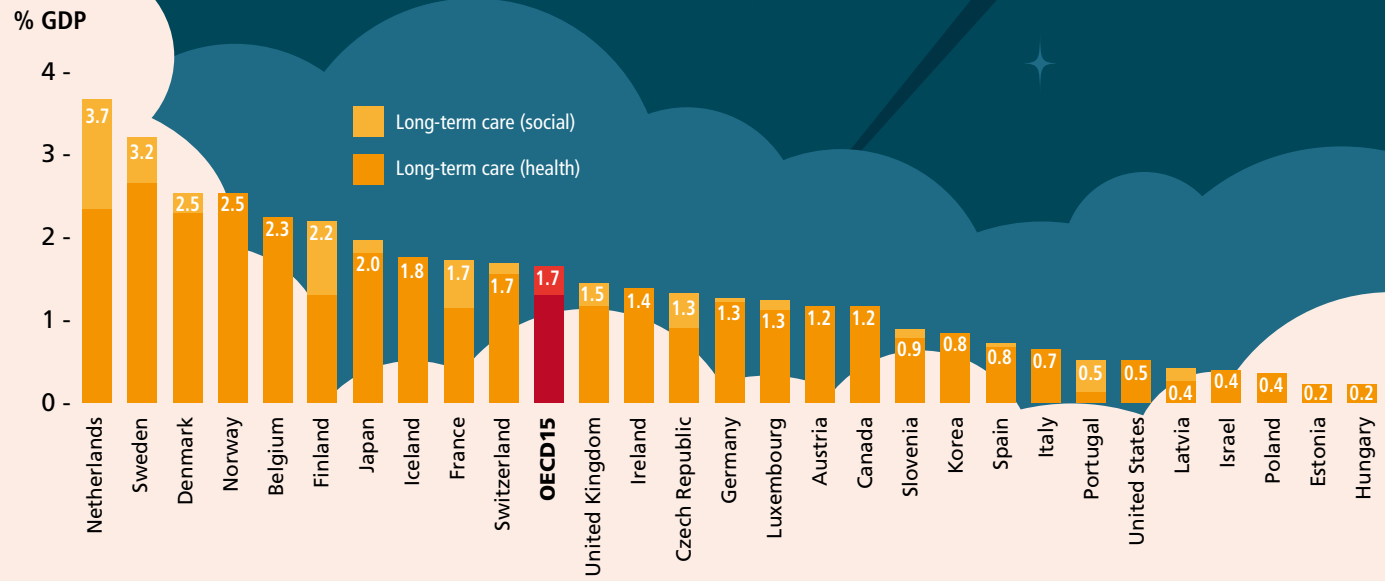

Figure 1: Long-term care public expenditure (health and social components), as share of GDP, 2015 (or nearest year). (Adapted from www.Health at a Glance 2017).

www.hammond.com.au). The next generation of non-working seniors with decades of high-quality life ahead, will want more than the conventional retirement village. In particular, those who are regular users of technology (most likely gained from their occupation) will embrace technology-assisted lifestyles. Our research has investigated the current technology, that which is in final development, and proof-of-concept innovation. Examples of 'smart-living' can be found universally; here, we describe that with which we are associated.

Integrated technological living

Modular homes, to align with life-cycle needs, can be recognised by their impressive levels of technology and, yet, simplicity of living. High-rise apartments in urban centres, as well as those located on the fringes of towns, are either completely devoted to 4th-age living or a hybrid with a mixture of 3rd-age. Living is fully integrated with 'smart logic,' artificial intelligence (AI) and electromyography (EMG). Voice activation controls are standard.

Health-technology is allowing people to stay in their homes longer; while on-going monitoring is carried out discretely and unobtrusively. In addition to voice recognition, current technology allows controlling equipment using facial movements. Systems using electromyography (EMG) and AI can learn and then detect a specific pulse from the brain to activate, say, light switches, doors, phones, etc. Controlling devices is via mental telepathy. Recently built homes incorporate systems that go beyond the offerings of Google Home, Amazon Echo, and Apple HomeKit. Control bionics give new functionality to those who are physically challenged. A person's neuroelectrics (nerve signals) control home systems 'intuitively.' Assisted Technology Living (ATL) has literally opened new doors for 4th-age living at home. While, of course, cyber security will continue to be a ubiquitous issue.

eHealth services

Discussion about the impact on society, in general, and 4th-age, in particular, of artificial intelligence (AI) e-health-automation, alternates between the euphoric and the somewhat sanguine. But, there are few areas where the impact of robotics is currently more profound than clinical healthcare, medicine and surgery. There is nothing futuristic about e-health-automation and robotics – as numerous examples pay witness to. Assistance in diagnosis (particularly supported by Big Data analytics, machine learning, and AI), surgery, aftercare, bespoke healthy-lifestyle plans, are all examples.

- Abdominal surgery robotics are commonplace – and is the fastest growing area of e-health. Minimally-invasive procedures (see daVinci Surgical Systems) undertakes procedures – that can, if required, be controlled by surgeons – for prostrate removals, cardiac valve repairs, and gynaecological procedures, including hysterectomies. The robot was approved for use by the US Food and Drug Administration almost 25 years ago.
- Arguably, robots provide greater accuracy and precision than surgeons. For example, in corrective eye surgery, automated systems undertake small incisions into the patient's cornea that a human hand would find extremely difficult if not impossible. Likewise, knee replacement surgery has semi-autonomous robots doing work that specialists are unable to do.

- For those in the 4th-age, there are smart-implantable drug technologies using miniaturised robotic surgical devices and edible robots – underpinned by AI system logic. One such ingestible robot (see Rani Therapeutics) delivers medication to designated locations of the body in, say, the intestinal tract. Ingestible endoscopes, a kind of micro-bot, can pass through the human gut while undertaking a fine-needle biopsy (see Max Planck Robotics).

Such technologies add new opportunities and a prolonged healthier life to those living in the 4th-age. Clearly, many current and future changes to healthcare and e-health technologies may bring what Toffler might describe as a 'future shock.' Consequently, present society and policymakers need to look with fresh eyes at what living in the 4th-age will become; and identify what benefits this increasing demographic can contribute and bring to the wider society.

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Economic independence

Given a paradigm shift in society's attitude and perception of the 4th-age, in particular no longer regarding it as an economic encumbrance but rather a net contributor to GDP, numerous revenue generating opportunities are possible. As a linked community (say, via a portal: www.4thAge.com), the wisdom of the crowd would represent a powerful entrepreneurial force. Moreover, social isolation is decreased through friendships forged in digital communities. Given unprejudiced employers, numerous service delivery offerings can be offered, such as: telemarketing, call-centre consultancy, consumer relationship analytics, employment services, security monitoring, final 1000 metres delivery service, medical administration, book keeping, graphic design, web developing, etc. Such examples are just a few paid activities that are currently being delivered via a joined-up network of 4th-age seniors (see www.vantagemobility.com and www.anglicaresq.or.au). Overall, there is compelling evidence for a 'longevity dividend'.

- House and property ownership offers additional revenue opportunities, for example, having a third party selling service using platforms such as eBay; and apps such as Kerb brings revenue from paid parking on house driveways. Home delivery of goods purchased online by neighbours (who are out at work) is delivered with electric mobility vehicles (soon to be driverless).

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- Agriculture, horticulture, keeping livestock, professional apiarists and arboriculture, are examples of revenue generating activities derived from land ownership; with the support of a collaborative network (see www.homegardeningsupportnetwork.com).

Society's attitude must change

History has never before experienced such an increase in life expectancy; that will result in the need for society to cope with unprecedented growth in the number of those in the 4th-age. Unless a new way of thinking is adopted to handle the situation, economists expect that overall standards of living will decline. Unless the economic model changes, the tax base will shrink while government spending on aged-healthcare will expand substantially; and a dwindling number of younger workers will have to carry the financial burden of supporting the much older generations.

- Extending longevity may seem to be a positive product of an advanced society. But will those living in the 4th-age be emotionally fulfilled, and could they support themselves economically? By reframing society's perception of the value of the aged-senior, much can be achieved; a shift from being a burden to becoming an asset. An attitudinal change is needed bring about a new stage to the 4th human life-cycle The 4th-age is becoming evidenced by the wave of pre-Baby Boomers. They are identified as a new type of retiree, very different from previous generations by the way that they conceive their life after retirement and by their contribution to economy and society. They see themselves as being cognitively-astute, psychologically and physically active, and accepting of a new round of life. Given the opportunity, they can create niche business, provide employment for others and constitute a new huge market for products and services for improving the quality of life in the 4th-age. Instead of a burden to society, they are generating economic growth.
- This stage of the life-cycle has been referred to as the Wisdom Period of Life[17], and is only recently starting to be recognised. Society's understanding of its full meaning is still forming, and governments do not yet know how to exploit the opportunities. This stage in our life for achieving improved personal growth, an enhanced society, and an improved economy, can only be fully realised through research, process building, and inter-generational relationships.

Business too must step up and face the reality of the paradigm shift. To drive sustainable value companies will need to embrace a new workforce ecosystem. Organisations will need to understand how to appeal to and engage with tomorrow's workforce. Already, alternative work arrangements have become more common in the broader, often gig, economy. Business leaders and entrepreneurs are rapidly trying to plan and optimise their own workforce ecosystems, pressured by the need to improve service, move faster, and find new skills. Not all workers in this ecosystem have traditional views of what an employer/worker relationship should look like. The aspirations of millennials and Generation Z are far different from the 'norm'. A recent study found that 75% of workers in these generations plan to start their own business[18]; more than 70% want their work to support their personal interests; and only 12% believe that an invention they create should belong to their employer[19].

The transition from a stepped, progressive workforce profile; where you work your way to retirement over a 40 year period, to a more 'open ended portfolio experience' model does and will continue to present challenges. Older workers may have specialised workplace needs and can attract resentment from younger colleagues. They may attract higher salaries, or conversely, be seen to be undercutting and disadvantaging or impeding younger staff who do not have access to savings or pension income. Companies may face the need to design more flexible rewards systems, and train young leaders to manage people across generations.

Pensions are another area where longevity has both societal and commercial impacts. The World Economic Forum estimates that there is currently a $70 trillion global retirement savings gap: the difference between retirement needs and actual retirement income. This gap is projected to grow to

$400 trillion by 2050. Helping older adults to work longer and manage their retirement savings, (and also taking an interest in their total workforce's financial well-being) will be a vital need for companies in order to avoid the negative productivity effects of financial stress. Many organisations are unprepared to deal with the ageing of global workforces. Age discrimination is already a mainstream diversity issue and contingent liability concern[20]. Left unaddressed, perceptions that a company's culture and employment practices suffer from age bias could damage its brand and social capital.

Conclusions

A plethora of factors will impact on our perceptions and experience of living in the 4th-age. It is, and will continue to be, an evolving picture. Our focus is on useful, actionable research and, with that in mind, our conclusions are as follows:

From a technological standpoint, increased longevity has the potential to be accompanied by increased quality of life. Mobility restrictions, health-limiting concerns, and social constraints traditionally associated with our perception living in the 4th-age, are becoming eroded and are no longer limiting opportunities for senior citizens. Individual experience will, however, be subject to affordability.

The scourge of loneliness highlighted by many as a curse of old age (eg UK NHS and AGE UK) could be impacted positively by technologies such as Skype, video-conferencing and augmented reality. Medical consultations via for example, telemedicine and robotics could underpin a longer, happier life expectancy. Personalised medicine thanks to the big drop in the cost of sequencing a person's DNA, allows for medical care to be tailored to unique genetic makeup, offering individual strategies for disease prevention, early detection and treatment. Living in the 4th-age, assisted by advanced technologies, is yet another phase in our ever changing lifecycle.

Social Security in the UK can no longer be the sole source of retirement income; by about 2050 the trust that helps fund benefits for retirees will be nearly depleted. Income from payroll deductions will only cover about 70% of monthly benefits.

A fundamental shift in how we view those currently defined as senior citizens will need to happen; both at the societal and business levels. On the one hand this should be easier than in the past: Baby Boomers are, after all, the generation who proclaimed '60 is the new 40!' On the other hand, the evolution and consequent dichotomy of societal values between them and subsequent generations may cause impediments. From a commercial perspective; staying competitive in a world of unprecedented longevity, demands that business adopts new strategies to engage with more mature talent.

Traditional assumptions regarding careers and retirement are no longer accurate or sustainable. Rethinking workforce strategies across multiple generations to account for longer lives will require open minds and fresh approaches. The challenges related to engaging and managing the older workforce will be manifest, however, companies that ignore or resist the impetus to change may not only incur reputational damage and possible liabilities, but also risk falling behind those organisations that succeed in turning longevity into a competitive advantage.

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