

Global Initiatives for managing threat of ageing societies through new technologies, relevant policies and programs

People today are living longer and generally healthier lives, thanks to advancements in public health, medicine, and economic development. The number of older people globally is expected to double by 2050, reaching two billion- more than one-fifth of the global population. And by 2050 there will be more people aged over 60 than children under 15. Population ageing is happening fastest in developing countries where people are more at risk from natural and man-made disasters and have fewer resources to prepare for and recover from them.

Greater longevity is a triumph of development, but this global phenomenon brings with it new challenges. Furthermore, an ageing society combined with a low fertility rate will lead to massive shrinkage of the working-age population and labor supply. It also shall lead to increase in pension, social insurance, health, and long-term care costs associated with an aging population. Gross domestic product growth rates are projected to fall in the absence of policy changes. The loss of health and life worldwide will be greater from non-communicable or chronic diseases (e.g., cardiovascular disease, dementia and Alzheimer's disease, cancer, arthritis, and diabetes) than from infectious diseases, childhood diseases, and accidents.

Population ageing may pose a threat to the security of the population in different ways. The functioning of the security system may be threatened due to decreasing workforce. Population ageing may undercut resources for military budgets. Young recruits represent an important part of military forces and the latter are competing in the labour market with more attractive occupations. Especially ensuring the stability of the personnel needed for securing crisis situations would be a significant problem of near future.

Haas's argument, which he calls the "geriatric peace", is that as spending on welfare for elderly people skyrockets, Beijing, which has spent trillions of dollars to build itself into a military powerhouse, will be forced to slash its defence budget. One likely result of this, the political scientist wagers, is that as China grows older it will become less able and therefore less likely to attempt any military challenge to the US. "[This is good], assuming people like peace," Mark Haas, a political scientist from Pennsylvania's Duquesne University said.

Fujitsu is currently undertaking the Kiduku research initiative in Ireland on smart houses and independent living for senior citizens and patients. By placing sensors around the house it becomes possible to monitor patients' movements along with their physiological and physical state. This allows for 24/7 healthcare, since collected data can be analysed and sent directly to doctors and help them instantly identify if a patient is ill (or about to be).

Wearable technology also enriches and enables a more useable experience, meaning that when outside the smart house sensors still constantly collect and feed information back to the hospital or carer allowing the delivery of intelligent care

solutions. Last year Google secured a patent for the development of a smart contact lens to monitor glucose levels for diabetics. The role of connected devices in healthcare is truly showing the transformative nature of technology in our changing, evolving world.

Global project developing ICT for independent ageing

USC's Professor of Disruptive Technologies Stuart Smith and Associate Professor of Neuropsychology and Mental Health Mathew Summers secured a \$496,000 National Health and Medical Research Council grant to participate in the multi-million-dollar European Commission Horizon 2020 project "My-AHA: My Active and Healthy Ageing" with 15 other institutions across Europe, Korea and Japan.

The multidisciplinary global project, which involves academic and industry partners, aims to develop a commercially viable, home-based, smart computer system to diagnose and rehabilitate people with frailty. "We will use the technology to monitor participants' health and generate tailored interventions that aim to reduce the physical, social, cognitive and psychological effects of frailty, including factors such falls, depression, social isolation and memory problems," Dr Summers said.

"We're interested in getting to the point where an older person's home can be kitted out with unobtrusive familiar technologies that we can add some value to and measure various states of health, particularly in the frailty state of an older person," Professor Smith told Technology Review.

“We are interested in finding out whether we get a snapshot of where they are at on a regular basis by getting them to engage in the types of technologies they are familiar with, such as their mobile phones, their tablet PCs, maybe their smart TVs and potentially even game consoles using gamified technology,” as reported by Natasha Egan

Telehealth and Telemedicine

One of the most important improvements is the use of information and communications technology to support medical interventions and processes, a discipline named as eHealth. In this context, Google Glass (Google Inc., Mountain View, CA, USA) is a device that can be very useful in medical applications, as it allows the presentation of information in a simple and ergonomic way, in real-time to the user. Google Glass has been applied in many fields of medicine and public health. Among the most widespread applications are surgery, ophthalmology, cardiology, emergency and bedside.

Telemedicine-based care provides remote health and social care to maintain people's autonomy and increase their quality of life. Telecare solutions give a new opportunity for diagnosis, treatment, education, and rehabilitation, and make it possible to monitor patients with a number of chronic diseases.

Australia's National Broadband has already carried trials on telemedicine applications where physicians can directly assess patients and measure blood pressure, gait, and cognitive status- via a TV or computer screen. Apps and websites now exist to monitor medication intake, track exercise and activity, store health records, and schedule hospital visits.

Bio-medical technologies that compensate for the impairments brought about through the ageing process are being developed. Genetic manipulations are allowing the enhanced length and/or quality of life, as well as the role of stem cells in preventing adverse age-related changes due to loss of specific cell types.

Various countries are meeting ageing challenges through new technologies, relevant policies and programs.

Germany aging fastest in Europe

Germany's population is shrinking and aging at one of the fastest rates in Western Europe, with ominous consequences for pensions, health care and future economic growth and there are also possible geopolitical consequences. By some estimates, Britain is on course to eclipse Germany as Europe's biggest economy by 2030, thanks in part to its large numbers of young, energetic immigrants.

Some consider the wave of migrants now streaming into Germany could be exactly what Europe's largest economy needs to rejuvenate its graying workforce. Half of the migrants arriving in 2015 through July were younger than 25, according to the Federal Office for Migration and Refugees.

Current technological developments include safety monitoring, smart houses, robotics and wearable computing. Germany's Intelligent House Duisburg Innovation Center – "inHaus" are among the current projects under development.

Japan: The oldest country

More than a quarter of Japan's citizens are at least 65, making it the world's fastest aging country. This is one of the reasons of its sluggish growth. Japan's GDP has grown at an average rate of 1.3 per cent for the past 25 years, according to the World Bank, dropping from averages of more than five per cent annual growth in earlier decades.

Japanese leaders have made radical changes to the way health care is delivered in recent decades, most notably with the introduction of long-term-care insurance in 2000. To meet the coming demographic challenge without jeopardizing welfare levels, people will have to work longer. Japan has a mandatory retirement age of 61, the minimum age at which someone qualifies for a pension. That retirement age will increase by four months every year until it hits age 65 in 2025. It's hoped that will encourage people to stay in the workforce longer and reduce public pension costs. Japan has offered incentives to encourage women to work, who are traditionally expected to stay home and care for aging relatives.

There is an emphasis on new medical technologies, including experimental regenerative medicine and cell therapy. The hope is that with two new acts governing regenerative medicine to help commercialize technologies more quickly, the Japanese government can save money on future health care costs while spurring the creation of a valuable new industry.

The Robotics industry in Japan has responded actively to the demographic shift by developing innovations such as the

Matsushita Electric – Robot Bear Companion and the Hybrid Assistive Limb (HAL) Robotic Suit. Other examples are “partner robots (Toyota)” that will be able to do household chores, “brain controlled robotic legs (Cyberdyne)”, battery-powered doll with audio, light and motion sensors(Pip) that talks and interacts with its owner to keep them company and robot programmed to gently wash the graying hairs of people who find it difficult to lift their arms(Panasonic).

Toyota Motor Corp. is testing in homes its “human support robot,” a videophone/remote-controlled android that allows family and friends to perform tasks for distant elderly people as if they were in the same home. Over the next two decades, experts forecast that the market for “care service” robots will climb to \$3.7 billion from presently estimated size at a mere \$155 million

Panasonic (PCRFY) is also developing a bed that transforms into a wheelchair. The bed splits in half, with one half folding into a chair and removing the need to lift someone out of a bed and into a wheelchair. Brain Age, a brain training video game developed by Japanese software maker Nintendo, has proved extremely popular with baby boomers who desire to have fun and remain cognitively fit through intellectual stimulation.

China has world's biggest aged population

China now has the world's biggest yet most rapidly ageing population. By 2050, China will have nearly 440 million over-60s, according to UN estimates. This demographic trend

could have implications for China's manufacturing sector because it reduces the number of laborers available, said Michael Yoshikami, chief investment officer of YCMNET Advisor.

Cheng said it could also have military implications because China will have fewer people who will be of military age in by 2020. Also, given the importance of children (especially if a couple only has one child) in supporting their parents and grandparents, substantial casualties from wars or natural disasters could generate significant social tension, if no outright instability.

The University of the Aged is on the frontline in a fight against one of the most dramatic and potentially destabilising problems facing modern China: a looming demographic crisis that experts believe will have major implications for everything from the wellbeing of hundreds of millions of citizens, to the Communist party's ability to hold on to power, and even the prospects for world peace. The university, a government-funded centre offers the region's 570 elderly citizens classes in everything from Latin dance steps and literature to how to use smartphones.

Nestlé Skin Health, has launched its new Skin Health Investigation, Education and Longevity Development (SHIELD) Center in Shanghai. The Shanghai SHIELD center will foster breakthroughs and collaboration in skin health through medical investigation, education and applications related to the convergence of technologies and bio-informatics. Each year, there are more and more cases of skin cancer, pruritus and other skin diseases in the elderly population, and they are often associated with a considerable amount of physical and emotional burden

Singapore

Singapore, another country with life expectancy of 84 and with over 25% of its population above the age of 65 years old, is also providing thrust to Robotics. Robots are being developed for lifting/carrying the elderly down staircases, and corridors; robots that fold laundry and perform heavy-duty cleaning; and autonomous personal transportation robots capable of moving safely through busy intersections.

Telecare Programme under the National Healthcare Group Polyclinics has brought healthcare services closer to Singaporeans so that they do not need to travel and queue at the clinics. Under the programme, elders can monitor their blood pressure at home on a regular basis, submit readings through an online portal and have a tele-consultation with a Care Manager on the management of their condition.

Nanyang Technological University (NTU) and Delta Electronics has set up a S\$45 million joint laboratory to develop smart technologies that will enhance lives, enable better learning and improve manufacturing processes. The Laboratory for Cyber-Physical Systems will come up with innovations in four key research areas: Smart manufacturing, smart learning, smart living and smart commercialisation. was unveiled on Thursday.

“For example, the ageing society is going to be very dependent on these kind of technologies. There’s a lot of technology we have to implement in homes, in order for old people to stay at home and live a high-quality life,” Professor Bertil said.

US

The latest U.S. Census data shows that more than 13 percent of the population, or 41.4 million people, is over 65 years old. By 2060, that percentage will climb to almost 20 percent. Social interaction tools like Skype, Facebook. U-tube can help them get over from depression, often the result of isolation and loneliness. Pair of shoes with GPS (Aetrex) to tack elderly with memory loss and dementia. Local communities have programs for helping seniors to lean new technology, Senior-oriented online sites (SeniorNet.org).

Smart home systems allow older adults to live in the environment of their choice while gives the elderly person a feeling of reassurance and safety.

Hierarchy of Quality ageing needs

Joseph F. Coughlin of Massachusetts Institute of Technology, identified both the range of needs for aged and the target opportunities for policy and market innovations. The base of the hierarchy represents the most basic health needs, including fundamental needs such as physical wellness, nutrition, shelter and clothing. The vulnerable older people have specific health needs, such as reduced mobility and vision, treatment for non-communicable diseases, and nutritional needs.

Also a fundamental need, safety is an important concern for older adults as well as their caregivers. Older adults also treasure connectivity to their families, friends and to society. Innovations in communications and transportation can

enable them to age-in-place freely and independently while remaining socially connected.

Contribution needs reflect the desire of older adults to maintain or improve their self-esteem and confidence. Both the capacity to contribute and the means to contribute are equally important. Legacy is the capacity of the older person to use their personal talents developed over a lifetime. The apex of the needs hierarchy represents the older person's desire for means to construct one's legacy, to attain self-fulfillment and realize one's full potential.

An ageing economy also has its brighter side. The new ageing population is well-traveled, internet-savvy, and more responsive to changes; they can contribute to better families, and peaceful communities and societies while remaining productive far longer through technology. On a national level, policy makers are beginning to look to technology as a strategy for transforming the liabilities of the demographic shift into competitive advantages.

References and Resources also include:

- <http://www.channelnewsasia.com/news/singapore/ntu-delta-electronics-set/2877242.html>
- <http://www.theglobeandmail.com/globe-investor/retirement/retire-planning/how-japan-is-coping-with-a-rapidly-aging-population/article27259703/>
- <http://blog.uk.fujitsu.com/reshaping-business/how-technology-is-transforming-an-ageing-population/#.WNdrjPmGM2w>
- <https://www.theguardian.com/world/2017/feb/24/grey-wall-china-rudong-town-frontline-looming-ageing-crisis>