Technology options for aged care in Japan

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Chapter 10

Conclusion

10.1 Introduction

A major aim of this research was to provide a framework for policy makers and interested parties by conceptualising and assessing technology options for aged care in Japan. In so doing, this thesis provides a convenient approach for appraising technology in designing aged care policies. The rationale for the research was to address the pressing need for more aged care in Japan as it heads towards becoming a nation where one in four people are over the age of 65. Because other advanced countries are also facing the consequences of the increasing proportion of aged people in their population, the thesis may provide insight beyond Japan for examining strategies to utilise technologies for provision of aged care.

This research into investigating the background to Japanese problem-solving techniques associated with technology has confirmed that in Japan a technological fix is widely considered to be a feasible option for solving economic and social problems, including those associated with the growing aged population. It has also examined various types of technology being developed for aged care in Japan, which were grouped into three technology
options. In the previous chapter, these options were analysed in light of their consequences for different groups in Japanese society.

Early chapters outlined why aged care is viewed as becoming increasingly problematic in Japan and established the significance of this issue. The problem was analysed both from the demographic point of view and from consequences related to social changes. In this thesis, the aims of aged care include promoting dignity and respect for the elderly without creating an unbearable burden to the rest of society.

Promoting purposeful lives, *ikigai*, and providing a 'safety net' to ensure the well-being of elderly people are also stressed as an important aspect of Japanese policies for aged care according to the *White Paper on the Aged 1998* (Miura: 1998). This view is supported by the principles of dignity and care with independence, participation and self-fulfilment that form part of the *United Nations Principles for Older Persons* (1991). Such principles to empower the aged are not disputed but when attempting to provide the necessary resources to meet the growing needs in caring for the aged, there is a problem affecting all people in Japan. Possible non-technological solutions to this problem were considered in the introductory chapter; the development and implications of technological solutions were further discussed and analysed in the main body of the thesis.

This chapter (in Section 10.2) outlines the process by which this thesis developed a framework within which technology options for aged care could be considered. It also summarises the technology options and the
possible consequences for different sectors of the Japanese community in order to highlight the contributions of the thesis. In light of the limitations of this research, outlined in Chapter 1, suggestions for future research are made in section 10.3. Concluding comments are contained in section 10.4.

10.2 Process and contribution of the thesis

Each of the three technology options for aged care in Japan that were conceptualised and analysed in this thesis is a type of technological fix and each has ramifications for different sectors of the community. The previous chapter examined the possible social consequences of each option on the aged (recipients of care), care-givers (both family and professional), government, industries, and researchers and concluded that all options are feasible, but contain different merits and disadvantages and affect various sectors of the community differently. Therefore, the thesis argues that it is important to have a practical framework by which technology for aged care can be examined to strategically plan towards a society for all ages, including the elderly.

In the process of conceptualising three technology options for aged care in Japan, the different groups in society that are directly affected by these options were identified. This section firstly summarises the relationship these groups have with the technology options and the implications of the options in order to highlight the contributions of the thesis.
Because of changing demographic and social conditions in Japan, the aged are less able to totally rely on family support for adequate aged care. For generations, the strategy of the aged being totally cared for by families was endorsed by government and commonly accepted as socially appropriate in Japan. However, the elderly population will increasingly be required to take responsibility for the provision of their own care as changes in demographic and social trends are making it less and less feasible to totally depend on family members for all their care needs. Many of the ‘baby boomers’ who will begin entering their retirement in this decade are, therefore, seeking ways to maintain their independence in their old age. Maintaining independence in old age will be a deliberate choice for some and a necessity for others. As the average life expectancy continues to rise, people are aware that it is probable that there will be many years of life after retirement and this further stirs interest in devices that can both enhance their independence and the quality of their lives in old age.

For professional and volunteer care-givers, utilising technologies for devices to lighten the burden of caring is welcomed; however, it is important that care-givers be informed and educated about these technologies in order to maximise their usefulness. Professional care-givers may object to devices that have the potential to replace them or are too difficult or expensive to use. Care-givers may also reject devices that may make their tasks easier but deprive the aged of human contact. An important issue for the care-givers is working out priorities and guidelines for appropriate technology implementation, particularly if human social interaction is a priority for aged care. On the other hand, if a high proportion
of younger workers move towards welfare type occupations in response to the increasing demand for aged care, there may be a danger that industrial productivity will be held back.

By implementing technology to relieve the demand for care-givers, some of them can be re-directed to other productive work. Alternatively, if technology can produce devices to increase productivity and/or assist aged people to care for other aged people, society will carry a lighter economic burden. The challenge is to incorporate technological practice that embodies quality of life ahead of efficiency per se. These are some issues to consider in trying to balance aged care and economic productivity that affect care-givers.

The government recognises that it is in its interest to encourage independence in old age. However, to promote this trend, the government faces the need for infrastructure and devices to assist the aged in everyday living when bodily and mental functions deteriorate. The government is therefore interested in technology that provides some solutions to these needs and is playing a role in promoting aged care technology. For instance, government policy makers are hoping to encourage elderly people to remain independent for as long as possible by offering degrees of various assistance in their own homes through the recently implemented Long Term Care Insurance (April 2000).

Industries and the business sector have a wide range of opportunities to expand their markets for aged care goods and services as the proportion of
the aged continues to grow in Japan. Industries are likely to concentrate on promoting different types of goods and services depending on the option but there are ample business opportunities for all options.

Researchers view technology from a different angle to government and to end-users. This does not imply that researchers and developers of technology do not strive for their end results to be effectively utilised. However, the long term social consequences of new technologies are rarely foreseeable earlier in their development phase or even at their initial stages of implementation. Industrial researchers, in particular, are paid to concentrate on producing outcomes that enhance profits. For academic researchers, too, the social and economic relevance of their research may be important but such sentiments are sometimes secondary to their quest to produce cutting-edge research. At present, there are many possible areas of research into the development of high-level technology for aged care; selected examples, mainly in Japan, were discussed in Chapters 5 and 6. Option Two is to concentrate resources in the research and development of such high-level technology for aged care in Japan whereas in Option Three the emphasis is to research, develop and promote smaller-scale technology. The role of smaller-scale technology in providing aged care devices and services were discussed in Chapters 7 and 8, also with selected examples.

The thesis also examined each option and its implication for Japanese society. A disadvantage of Option One is the possibility of stifling technological advancement in Japan. Furthermore, potential avenues for commercial and economic growth may also be blocked without domestic
efforts in developing new technologies in this area. For those anticipating
 technological fixes, limiting technology development possibly holds back
 solutions or potential improvement in aged care. On the other hand, positive
 implications for choosing Option One include the saving on resources that
 can be redirected to strengthen human resources available for aged care or
to improve technology for economic productivity, and so forth.

In Japan, technology has become ingrained in people's everyday life;
whether the social problem is related to health, education, housing,
employment, shopping, banking, transport or whatever, technology is
expected to play some role in addressing the problem. Hence, there is a
sense of responsibility in taking a lead in developing technology for aged
care. Interviews with academics and people working in the area of aged care
in MITI and the Ministry of Health and Welfare revealed that seeking to
develop technological assistance to address the needs of aged care is as
natural as seeking medical assistance to cure physical ailments.

This expectation, however, does not rule out importing certain technology
because there are some areas of aged care, such as wheelchairs, where
importing technological devices is commonly accepted. Although there are
various domestic projects currently developed for wheelchairs, imports have
rapidly increased from 576,000 wheelchairs in 1993 to 3,212,000 in 1999
(JETRO: 2000, 23).

As indicated earlier (Chapter 4), the process of modernisation and post-War
reconstruction taught the Japanese the importance of technology in building
and maintaining a strong nation. Especially in light of the present trend of measuring a nation’s strength by economic figures, there is pressure to develop technologies that will increase economic growth. However, having reached economic maturity with exceptional speed after the Second World War, it has become increasingly difficult for Japan to maintain its present level of gross domestic product. The Japanese gross domestic product in 1998 was equivalent to US $3,783 billion which ranked second in the world after the USA (Bank of Japan Comparative Economic and Financial statistics, 1999 cited in Foreign Press Center: 2000, 31). Slow or negative growth also threatens the Japanese who believe that economic growth will shoulder the burden of the increasing social needs of aged care. Innovative strategies, including a ‘technofix’, have become even more important as a means of solving aged care problems. Therefore, whilst Option One is objectively a reasonable option to pursue, the urgency of the aged care problem and the Japanese government’s view of technology are disincentives to merely ‘waiting’ to adapt technologies developed in other countries.

Option Two, investing heavily on high-level technology such as robotics for aged care, was also analysed. As discussed in Chapter 5, industrial robots played a vital role in enabling Japan to strengthen its balance of trade. Although the demand for industrial robots has declined in recent years, there is mounting interest in robotics utilisation outside industry. Unlike industrial robotics, robots that would assist with aged care are likely to come into close contact with human beings and directly affect their well-being. Whilst there is a cultural sense of familiarity with robots in Japan, as discussed in
Chapter 5, most people imagine robots carrying out tasks to make everyday life easier rather than 'interacting' with robots in any personal way. 'A technocratic spokesman claims that the goal of Japanese exact science and technology is the creation of a society in which people are able to enjoy a carefree, leisurely lifestyle, liberated from every kind of precision work which can be left, instead, to robots and computers' (Nakayama: 1991, 234). A development of this nature brings its own set of concerns for society. As this thesis assumes that human beings are precious, a frightening outcome would be if human beings became so dependent on robots that they turned out to be virtual slaves of robots rather than utilising robots to enhance the quality of life for self-directed human beings. Without due care, implementing robots might reduce the significance of what humanness means or, worse still, cause physical injury or even death.

Pushing the boundaries of the unknown, however, is a characteristic of academic research, with a hope that the results might benefit society in the long run. Robotics researchers advocate the virtues of technology development and argue that robots have the potential to be usefully integrated to serve society and that it is the responsibility of policy makers and society in general to ensure appropriate management of technologies using stringent guidelines. Despite the dangers of automobile, for instance, laws have been developed to manage this technology that is taken for granted in Japan, to protect people so that the benefits can outweigh any disadvantages to society.

Pushing the boundaries of the unknown is a constant in contemporary
society because research efforts result in new technologies. Nakayama argues that, 'New technology is the source of major social change in contemporary society' (1991, 162). In the present climate of rapid technology developments and changes, ordinary people cannot easily comprehend the social consequences of new technologies. Nevertheless, the fact is that, 'there are vital choices in most fields of human endeavour, between different technology options with contrasting primary and secondary impacts' (Willoughby: 1990, xi). Moreover, 'the technological world we will inhibit in the years to come will be a product of public activity to a great extent (Feenberg: 1999, ix). The technology option of heavily investing in robotics technology for aged care can also affect various groups of people in society differently. However, full appreciation and assessment of the impact of integrating robotics in aged care may be complex, even for policy makers, and require relatively long term and slow stages of diffusion.

Although care of the aged is an issue demanding action, in the diverse area of concern there are needs for which robotics technology may be appropriate and other needs where it will be inappropriate. Those with innovational skills and talented researchers will push to raise the level of the research frontier of high-level technology. The commercial sector is also constantly seeking initiatives in utilising the latest technology to create markets and increase profit margins. This, in turn, financially benefits the economy.

The question of how the elderly population and their care-givers will be
affected by the high-level technology option for aged care (Option Two) was discussed in the previous chapter. Case studies in Chapter 5 and 6 demonstrated how high-level technology might be intimidating for the average person and even more so for those who are elderly. It is not solely the disparity of information but the higher levels of understanding which hinder elderly people from extending their comfort zone in adopting new technology. Furthermore, the high speed of technological change in the last decade has exacerbated difficulties in keeping up with technological developments. Many people will have experienced this first hand when elderly friends and family members were initially confronted with new technologies, such as ATMs, videos, computers and other new household gadgets. Therefore, introducing robotics in close contact with the elderly and their care-givers can be a cause for much anxiety and will require careful integration. The merits of utilising robotics for selected functions in aged care as an option can only be viable if it is accompanied by a sound educational process.

Research showed that professional care-givers, such as physiotherapists, were reluctant to have their professional duties taken over by robots, like the Aid-1 (see Section 5.5). Examination showed that there was a natural fear of being replaced by a machine or even losing control over their professional duties. Provision of information through seminars and workshops has slowly led to a gaining of confidence among some physiotherapists. This was just one example of a common reaction to robots from professional care-givers. Additionally, accommodating large machinery like robots was not easy even in the larger institutions in a country where space is at a
premium, and therefore administrators need to feel confident and comfortable that adopting robotics in their institutions is a sound choice. The relatively high cost and complex maintenance issues are other factors that determine whether people will be swayed to introduce robotics in aged care. Most importantly, the possible positive consequences of utilising high-level technology for aged care need to be weighed against potential dangers to the aged as well as to their care-givers.

In contrast to high-level technology, the analysis of investing heavily in smaller-scale technology, such as barrier-free technology, for aged care (Option Three) demonstrated that generally this technology is not physically or financially as daunting as investing in robotics. Chapters 7 and 8 discussed the development and assumptions of barrier-free technology. The decision making process, normally initiated by an actual need or problem of the end-user, continually focuses on solving the problem throughout the process of developing an appropriate barrier-free technology. The solution directly benefits all people suffering from that particular problem. Additionally, by developing a technology to solve a problem experienced by the aged, barrier-free technology is simultaneously aimed, where possible, at making living easier for all members of society regardless of their age. Some of the cases presented in the barrier-free technology chapter demonstrated that the end products to assist the aged or disabled have proven to make life easier for a wider group opting to use these products. Also referred to as universal goods and kyoyo-hin, the devices are normally easy to understand as they are aimed to be user-friendly.
There have been time lags between the development of innovations and the public becoming aware of new barrier-free goods. Much of this is due to barrier-free goods being developed in small organisations that heavily rely on volunteers. Recently, the Japanese government has begun to acknowledge the positive social influences of barrier-free and universal design goods. By setting up advisers and providing subsidies for barrier-free technology development for aged care, the government is indicating its recognition and support of social benefits that are derived relatively quickly and cheaply from utilising smaller-scale technology. Chapter 7 also described the growing numbers of government assisted organisations that are established to promote small to medium-scale technology to address the problems of the aged and physically disabled.

For the aged and their care-givers, simple and relatively inexpensive tools to enhance daily activities can have a profound positive impact on the way they cope and enjoy life. Moreover, there is potentially a big market for these products. Therefore, the commercial sector has much to gain by developing and utilising barrier-free technology innovatively. As all advanced nations face the ‘problems’ of ageing societies, the demand for products produced as barrier-free technology (which are mainly need driven by those experiencing physical decline) is likely to expand internationally. The opportunities for the commercial sector are considerable and the growing government support can be seen as a tool to aid the aged and the disabled as well as to stimulate the Japanese economy.

The approach that barrier-free technology developers have taken to be
responsive to actual needs of the aged and the disabled by designing or modifying products and devices within the Japanese social context is different from the approach of researchers of high-level technology such as robotics. The approach for robotics research tends to be a ‘top-down’ research to cut into new technology. The application, however, of new technology can be ‘bottom-up’ even for high-level technology, as discussed in Chapter 5.

Large private enterprises in Japan are well known for financing their own research centres to develop technology for future profit making. Whilst the areas of commercial research tended to concentrate in areas such as electronics, future markets may well be in the area of technology to support life for the aged. Companies and the government alike seek to enhance their financial positions and by developing technologies for this purpose, they offer the justification that society, on the whole, stands to gain a higher living standard. Barrier-free technology is an area that would sit comfortably with the above aims of both the commercial and government sectors. Moreover, public support for governments and companies is enhanced when people perceive that they are using their resources for the well-being of society.

Comparing industrial sector research with that of the academic sector, Nakayama argues that:

Basic science and innovation, as conceived by the private sector, aims for the creation of the seeds for future commercialisation, namely ‘mission-orientated basic research’, which differs considerably from basic science in the academic sector. Therefore, ‘creativity’ in academic science and that in private science are two entirely different things (Nakayama: 1991, 205).
Academic research tends to attract new technology and projects that take relatively longer to develop than in the case of barrier-free type technology. It is not that academics do not possess the desire to contribute to the well-being of society through their research but they are more likely to be attracted by cutting-edge technology. Their work will also result in new technologies that can, in the long term, be utilised by companies and government to address needs in society. The contribution from academic research into new technology is likely to take longer to be realised than the contribution of those creating barrier-free technology.

The analyses of the three technology options for aged care developed in this thesis provide an overall picture of how very different approaches to technology can be conceptualised and assessed. Moreover, by clarifying technology options in aged care, this thesis has provided a framework for government, researchers, consumers and other interested groups to assist their making choices regarding technology in aged care. By spelling out the assumptions behind each of the technology options, the thesis further enables people to understand the values associated with different policies for technological development. By listing summaries of collected literature on both robotics technology and barrier-free technology for aged care, it also provides a tool for further understanding recent developments in these areas. Its development of suggestions for points of consideration in adopting robotics for aged care enhances a movement towards creating robots that will truly provide safe care with dignity and nurture the well-being of society on the whole.
10.3 Suggestions for future research

With technology being continually researched and constantly advancing, there are many possibilities to further the research to give a clearer understanding of how to manage and direct technology development for optimal aged care in Japan and in other advanced countries. Some suggestions for further research are:

In the area of demography, sociology and aged care:

* Investigate the implication for society when aged people increasingly live independently rather than with extended families.
* Examine the impact of people resigning from their occupation in order to care for their aged parents.
* Analyse the trend for social changes in light of the increasing aged population.
* Investigate the option of importing aged care-givers.
* Investigate the option of permanent residency outside Japan for retirement.

In the area of technology for aged care:

* Explore ways to diminish the gap between those with expert knowledge and the end-users by creating ‘technology intermediaries’.
* Examine in detail specific robots functioning to care for the aged or to assist the care-givers as a comparison to similar aged care tasks carried out without robots.
* Investigate technology for newer areas of aged care, such as
divergent therapy, an area important to maintain a purpose for living for the aged.

* Investigate technology for dementia care and other mental care, plus associated assumptions and consequences.

* Follow the ongoing development of barrier-free technology to assess its effect on society.

* Analyse the cost effectiveness of implementing different technological options for aged care.

* Examine the technologies being developed and adopted in medical equipment, sports medicine, and pharmaceutical.

Other areas:

* Make international comparisons for aged care related issues, such as those listed above.

10.4 Concluding comments

This research has demonstrated how technology can address some of the problems of aged care brought on by ageing population and social changes in Japan. ‘Demography does not determine destiny’ (Fine: 1999, 84). There are indeed very different options in addressing the aged care problems. In respect to technology options, the philosophy of care needs to be determined and established so that technology compatible with the philosophy is developed to meet the needs of all stakeholders. The analysis of technology options in this thesis clarified different approaches that can be pursued in
addressing aged care. The discussion on the effects of the three proposed technology options will help to stimulate thinking about policy choices. These policy choices will profoundly affect individuals and the community at large as aged care continues to dominate the social concerns of advanced nations undergoing demographic transitions.

Throughout the research, the aim of analysing and discussing technology options for aged care has been to contribute towards finding a way to enhance the quality of life not only the aged but for their care-givers whilst being mindful of economic constraints. Fuse (1996, 78) argues for an ideal environment for the elderly where 'the elderly will have economic security, housing suitable for the physically handicapped, a medical system which will make it easy to receive hospital care, assurance of care for the bedridden, and rich human relationships'. Although ideal conditions such as these are not easily attainable, Hironaka (1993) argues the need for Japan to concentrate more on social aspects that concern the welfare of its citizens instead of concentrating on global economic expansion, as having lots of money does not mean 'real wealth'.

The reality is that the unprecedented population ageing across the world that is most evident in Japan affects social and economic development. Because advances in technology will almost certainly continue, the research in this thesis will provide valuable information and guidelines for interdisciplinary approaches to the policy making process—a process where there is a holistic approach to aged care that values dignity and human care.