

Technological solutions to Japanese elderly care?

This paper is based on the conference proceeding of the 3rd Transforming Care Conference, Polytechnic of Milan, Italy, 26-28, June, 2017

Nobu Ishiguro, Osaka University

ishiguro@lang.osaka-u.ac.jp

1. Introduction

In many countries, technology is considered to be a solution for the challenges faced by a steadily ageing society. Modern technological development means that more advanced technological devices and robots will enter the care sector, thus potentially greatly affecting care work. Japan has both the world's largest share of industrial robots and a strong robot culture, including robot-influenced narratives, such as manga, animation films and comics, and robot research (Wagner, 2010). A cross-cultural study shows Japanese people have a relatively positive image towards robots and believe more strongly that robots can play a role in social services than people in other cultures (Broadbend, 2009). The use of robotic devices in elderly care has been discussed in Japan for several years, as has been in many other developed countries.

Despite the Japanese government's enthusiasm, robotic devices are infrequently used in elderly care; even non-robotic assistive technology is not substantially utilized. The manual care work culture (i.e., care by human hands) observed in care workplaces represents a strong contrast to other aspects of Japanese people's lives, which are often filled with advanced technological products.

First, I will examine how technology might improve care work drawing on the perception of cold care by technology versus warm care by humans. Then, I will analyse the Japanese governmental policies to examine how political factors affect the use of technology in care. Moreover, I will present the results of focus group interviews conducted with Japanese care workers to investigate the country-specific cultural values embedded in the limited use of care robots, given that cultural values and ideas restrict the spectrum of possible policies and affect the behaviours of individuals and social groups (Pfau-Effinger, 2005). Lastly, I will argue for the potential of care technology in light of cultural values.

2. Is machine care cold?

Introducing robots in care is often controversial and generates anxiety concerning future elderly care. While most medical and health tools and technologies have been widely accepted and are relatively uncontroversial, robots and other automation care technologies are considered exceptions (Coeckelbergh, 2015). Modern technological development means more advanced technologies will continue to enter the care sector, thus potentially greatly affecting care work. Industrial robots have long been used in manufacturing, such as automobile manufacturing and electronic assembly, and have achieved rationalization via labour savings measures and automation. Robots have also freed workers from many tough and unsafe tasks, and have contributed to the stabilization of product quality (New Energy and Industrial Technology Development Organization (NEDO), 2014: 21). However, care work is completely different from

manufacturing. Although care robots might perform physical tasks, care also includes emotional and relational aspects, of which robots are incapable. Care is embedded in a set of social relations integral to wellbeing (Daly, 2001). It consists of two aspects: ‘caring for’ and ‘caring about.’ The first involves catering directly to another person’s physical and emotional needs; the second involves activity that is motivated by others’ wellbeing. Good care will not be successfully delivered unless the person being cared for believes the carer is motivated by genuine concern for his or her wellbeing (Himmelweit, 1999). Therefore, robots seem incapable of fulfilling some aspects of care, which generates distrust of using technology in care. A contrast between ‘cold care by technology’ and ‘warm care by humans’ might create frictions in care work and result in subsequent resistance to technology among some care workers.

However, there are, in fact, a number of successful examples of technology in care. E-care (telecare) is one good example; it has been implemented successfully in many places. For example, the experiences from the municipality of Västerås in Sweden have shown that e-care – especially in the form of a ‘night camera’ – is a great success. By putting a camera in users’ home, home care staff can monitor their wellbeing without disturbing a good night’s sleep. Traditional night visits by care staff might not only wake up the elderly individual, but might also disturb their family, by making noises when the care staff parks the car or opens the door (Hälsans nya verktyg, 2016; Sveriges Kommuner och Landsting, 2016). The use of a shower toilet in care has also been implemented successfully in places such as Denmark, where users are now satisfied because they are no longer depend on care staff to assist with personal hygiene tasks; moreover, it has relieved care staff’s burdens as well (Socialstyrelsen, 2012). In addition, robotic eating aids can also contribute to better care situations. For example, the results of a case study of a man with cerebral palsy found that the use of a robotic eating aid helped create a more private eating situation since the man was able to have a meal with his wife without having an assistant present and without his wife having to feed him (Nylander et al., 2012). Of note, given that the robotic eating aid assists only in eating activities, it cannot fully replace the user’s assistant. However, it can nonetheless create a more private and independent eating situation for users.

These examples show that technological devices have the possibility to introduce positive elements in care. I am not claiming that all devices are unproblematic but, rather, arguing that discussing the benefits and disadvantages of each specific care robot/assistive technology is necessary in order to find out the potential of technology in care. Existing robots are not autonomous entities capable of multiple tasks that can replace care staff; rather, they perform only specialized tasks (Nylander et al., 2012: 801; Yamauchi, 2015), with each device having different implications.

3. Use of technology in physically demanding tasks – in the case of Japan

Care work includes heavy person-handling tasks related to increased occupational injuries, such as helping persons with bathing and transferring them from bed to chair. Lifts and other assistive devices can help reduce injury risks (Hignett et al., 2003; Occupational Safety and Health Administration, 2001; 2003; Ronald et al., 2002). In Japan, care work is considered to be one of Japan’s ‘3K jobs’ – unsafe (*kiken*), unclean (*kitanai*), and tough (*kitsui*) jobs.

Nevertheless, assistive devices are not often used in Japanese care workplaces, resulting in musculoskeletal disorders among workers. According to our 2012 survey of Japanese care workers (Saito & Ishiguro 2012)¹, 69.5% of care

¹ NORDCARE research, financed by the Swedish Council for Working Life and Social Research, is a multinational

workers almost always or often felt physically tired after a workday, and back pain was almost always or often a problem for 49.9% of care workers. The arduous conditions of work could be one of the reasons behind the high turnover rate; 48.8% of care workers responded that they considered quitting their job during the previous year. It is thus not surprising that Japan is projected to suffer a serious care labour shortage in the near future. Although there are several reasons for the heavy physical burden associated with care work, one of them involves the lack of technical devices in the workplace. Most (69.6%) care workers responded they did not have access to adequate equipment for physically demanding tasks.

In other industries, occupational health has improved greatly over the last few decades, as most physically demanding tasks have been mechanized. While back pain among other occupational groups has decreased, back pain among care workers has increased greatly (MHLW, 2013). The Ministry of Health, Labour, and Welfare revised the *Guidelines for Back Pain Prevention in the Workplace* in 2013. According to the guidelines, care workers must not lift persons without technical devices, although manual lifts by human hands are still frequently conducted for several reasons. For example, only 5.1% of care workers utilize transfer lifts at their workplace (Hori et al., 2017: 38). Japanese residential homes also often do not offer enough space for the transfer lifts to operate. Furthermore, it takes longer to use transfer lifts, and structural conditions are insufficient for promoting the use of technical devices (e.g., no subsidy system exists for purchasing technical devices). As for residential homes, they must themselves finance the purchase of assistive technologies, including robots, which are often extremely expensive. As for home care, there is a list of assistive devices that older people can rent by paying 10% of the cost using the Long-Term Care Insurance (LTCI) scheme. However, the list mainly includes non-robotic assistive devices, like wheelchairs and transfer lifts, and few robotic devices are currently covered by LTCI. Sufficient information and knowledge about robotic devices are not provided to residential homes and care workers, nor are they included in care workers' education. Moreover, few staff members have the knowledge to instruct and properly operate them. According to a survey, only 0.3% of care workers have used robotic devices, and 15.9% do not know what robotic assistive devices are (NCCU, 2015).

Arguably, the lack of effective measures to support the use of assistive technology reflects values and ideas that machines cannot successfully provide accommodations because they are unable to provide warm care.

A strong belief exists in Japan that 'human hands' should undertake care (Motegi et al., 2012: 82; Tomioka et al., 2007: 113). The emphasis on 'care by human hands' (*hitode no kaigo*) can often be found in public discourses. 'Care by human hands' is thought to be warm, while care by machines is considered cold, and this perception may be a consequence of the holistic nature of care. Care robots might perform physical tasks, but care also includes emotional and relational aspects, of which robots are incapable.

survey-based research project on the working situation in care services, which was implemented in 2005 by Marta Szebehely of Stockholm University. The study aimed to elucidate the international differences in care structures, content of work, and care workers' environments. The Japanese part of the study, supported by the Japan Society for the Promotion of Science, was conducted in 2012 by Yayoi Saito and Nobu Ishiguro of Osaka University using the same questionnaire. The Japanese Trade Union Confederation (*rengo*) cooperated with the team and selected care facilities and home help providers nationwide through the All-Japan Prefectural and Municipal Workers Union (*jichiro*) and UA Zensen (former UI Zensen Alliance). A total of 2,440 questionnaires were distributed to care facilities and home help providers, and the response rate was 43.4%. In Nordic countries, the same survey was conducted again in 2015.

4. Japanese governmental strategy for robotic technology in elderly care

4.1. Overview of the strategy

Since the turn of the 21st century, when the robot industry stagnated, the Japanese government has encouraged innovation by combining it with the challenges of an ageing society, expecting the promotion of robots in elderly care to contribute to economic growth. The state initiative related to care robots began in earnest in 2010, when the government presented its vision for the promotion of the development and implementation of care robots as part of the New Growth Strategy (*Shinseichosenryaku*). The Committee on Care/Welfare Robot Dissemination was established, and a discussion concerning how to best promote care robot use was generated thereafter. In 2013, the Japan Revitalization Strategy (*Nihon saikosenryaku*) and the 5-year Plan for the Development of Care Robots were presented. The Ministry of Economy, Trade, and Industry (METI) and the Ministry of Health, Labour, and Welfare cooperated in creating large-scale funding systems to support care robot projects nationwide. Furthermore, the funding scheme for care robots to relieve the burden of care workers (*kaigojushisha no futankeigennishisuru kaigorobotto donyu sokushin jigyo*) was established in 2014 in order to assist the relevant projects. In 2015, Japan's Robot Strategy (*Robotto shinsenryaku*) was presented, and the use of robots in the care and health sector was one of the five focus areas. The supplementary budget for the 2015 fiscal year, which was adopted by the government in February 2016, incorporated financial support involving as much as 5.2 billion yen for the promotion of care robots.

The main approach taken by the government in promoting care robot use is to support manufacturers in developing care robots that match their focus areas and to support the experiments carried out in care facilities so that suppliers and users collaborate in improving care robots. However, the reality is that care robots are not yet utilized to a great extent, and existing technology is not sufficient to be integrated into care work. Arguably, this underutilization is caused by a lack of insight into care work and inappropriate governance in the practical project process. It is partly reflected in the government's motivations to promote care robots, which I will discuss later.

Below are the eight main types of care robots promoted by the Japanese government (Robotic Care Devices Portal, 2016).

(1) Wearable transfer devices

Worn by the caregiver, these use robot technologies to provide powered assistance to reduce caregiver back load during transfer assistance (e.g., from bed to wheelchair or toilet).

(2) Non-wearable transfer aids

Using robot technologies, these provide powered assistance to the caregiver in performing lifting motions, such as when transferring an individual from bed to wheelchair. These devices are operated by one person.

(3) Outdoor mobility aids

These include mobile support equipment and motorized walking support devices (excluding rideable devices) that provide mobility and luggage assistance to the elderly outside their homes, are capable of stable motion over uneven ground, and are easy to carry.

(4) Indoor mobility aids

These help elderly people stand, sit, and move around their homes. The devices use robot technologies and are specifically designed to assist individuals in sitting on and standing up from a toilet.

(5) Toileting aids

These should be movable and can be placed anywhere in a room. They should also maximize robot technologies for effective waste treatment.

(6) Bathing aids

These use robot technologies to support elderly people in a series of motions required for getting in and out of bathtubs, and are usable by a single person with or without the help of an assistant.

(7) Monitoring systems for nursing care homes

These include equipment and platforms that use sensors and external communication functions to support the monitoring of the elderly in long-term care facilities.

(8) Monitoring systems for private homes

These are devices and platforms that use robot technologies with sensors and external communication functions to monitor the elderly and others in private homes. They can simultaneously monitor multiple rooms, including bathrooms.

These devices need humans to be present to operate them; they are not autonomous robots making independent decisions. Some devices are similar to assistive technology already in use. For example, outdoor mobility aids are like rollators (i.e., walking frames equipped with wheels). They just have additional motors that enable older people to move more easily along a sloping road. It is highly probable that many other types of robots will be developed for and introduced into care work. Therefore, we must examine how all these technologies will affect care work.

4.2. The government's incentives for introducing care robots

In Japanese government documents, four motivations can be identified from care robot discourses. First is the 'workload discourse,' which suggests that care robots can reduce the physical and mental burden of care work, and can lessen care worker turnover. Government documents note that 70% of care workers experience backaches that can be alleviated by lightening their workloads using care robots (METI, 2013b; The Headquarters for Japan's Economic Revitalization (The Headquarters), 2015).

Second, the 'quality discourse' indicates that robots will help older people to live more independently, thereby maintaining their dignity and enhancing their quality of life. The government's goal is to ensure that 'older people with care needs will continue living an independent life in the community' (The Headquarters, 2015: 64). The government also stresses 'care by human hands' – care that only 'human hands' can perform – and the continuance of this 'basic principle' of care is indicated (The Headquarters, 2015: 63-64).

The third discourse is the 'robot industry discourse.' The Japanese government wants to enhance the care robot industry and expects an overall growth in the domestic robot industry. Given that the Japanese care robot market size was 16.7 billion yen (GBP 119 million) in 2012 and is projected to be 404.3 billion yen (GBP 29 billion) in 2035 (METI, 2013a), the government expects a resulting huge economic growth. This discourse presupposes an increase in the production of *Japanese robots* for use in the care sector.

Fourth, the 'cost-saving discourse' suggests that efficiency and productivity should be enhanced to achieve cost containment. Care work is very labour intensive and is often afflicted with a 'cost disease' (Donath, 2000; Razavi, 2015).

The Ministry of Health, Labour, and Welfare (2012) emphasizes that elderly care expenditures will rise from 8.4 trillion yen (GBP 60 billion) in 2012 to 19.8 trillion yen (GBP 141 billion) in 2025, and the number of care workers needed to meet the growing demands will increase from 1.49 million in 2012 to 2.49 million in 2025, indicating a need to control costs with the help of care robots. There is always tension between providing good care and cost containment pressures, and attempting to raise productivity in care work by increasing the number of people cared for at any one time quickly increases the risk of reduced care quality (Donath, 2000; Razavi, 2015).

The cold image of care robots I previously mentioned reflects, among other things, the government's pursuit of cost containment achievement and care robot industry promotion. Given that 'warm care by human hands' concerning the care of older people is a strong value and identity embedded in Japanese care work culture, the introduction of care robots to alleviate the care work burden or to increase older people's independence might enhance the cold perception of technology.

5. Empirical studies on technology in Japanese care work

5.1. Methods

Central to this section are the focus groups I carried out related to care workers' perceptions of and experiences with technology, particularly with regard to transfer lifts in care work. Although the transfer lift is neither a new technology nor a robot, it is a good example in this context, as it is the technology most Japanese care workers have either experiences with or knowledge about. Therefore, it is relevant to investigate in these interviews how workers perceive and understand it based on their own experiences. Moreover, while lifts are widely used in many countries – Europe, for example – they are infrequently used in Japanese elderly care, despite official statements concerning their ability to lighten care workers' physical burdens. Examining the attitudes behind this phenomenon might help us ascertain why technology is unpopular in Japanese care work.

To gain insight into care workers' subjective perceptions of and work experiences with technology, particularly with regard to transfer lifts, I conducted three focus group interviews in April 2016. The respondents were staff at three elderly care facilities. Respondents in two groups (four care workers in each group) worked for two different residential homes using assistive technologies, and respondents in one group (four care workers) worked for a residential home that did not use such technology. All sessions were transcribed, and the data were entered into a database. The researcher discussed the ethical considerations and confidential handling of the data with the respondents. These interviews are part of an on-going project on technology in care conducted by a multidisciplinary research team, and interviews with care recipients have not yet been conducted because of the difficulty in finding residential homes that will allow us to interview their residents.

5.2. Study results

In this section, I present the findings from the focus groups on attitudes regarding the use of technology in care among care workers with and without this experience. Later, I discuss these findings in relation to the behaviours and feelings of elderly Japanese people and professional care workers, and how this may affect the introduction and experience of technology in care work.

In the focus group interviews, I tried to investigate how care workers perceive the concrete care situations in which technology can be used. Care workers in the residential home not using transfer lifts responded as follows:

Researcher: Are you reluctant to use a transfer lift?

A: Yes. I do not want to use it, and I do not want it to be used for my parents [for example] ... It is like being lifted by a crane truck like an object ... I don't like it, because it is not like treating a person.

B: I don't like it because it is like [treating] an object.

C: I don't like it either, and I don't want to get used to that....

B: It must be a strange sight [to see a care recipient transferred using a lift].

Here, the lift is perceived as treating people like an object; therefore, respondents might associate lifts with industrial robots. They were also reluctant to use special bathtub technology. Although this is relatively widespread in Japanese residential homes, it was not used in the daily care provided by the residential home in which they worked. Care workers said:

A: I feel really strange using machines to take a bath ... It is not a real bath—not real bathing.

C: I will never choose to take a bath in that way myself.

A: Because you have to get naked and lie down on the board, and it will automatically sink down into the water in the bathtub.

B: And the shower will come from the side.

A: The water will come, and you are bound by a belt at the waist...

C: Scary. One would not be able to do anything in that situation, you know.

B: You are helpless.

A: Yes, like you are naked and in the machine.

D: It's like an object being washed.

They think that providing care with the help of a lift or special bath technology is like treating older people as an object, and using machines is strange and unnatural. The care workers assume older people are placed in a passive role when care is provided with the help of technologies:

Researcher: Do you mean older people cannot do anything in that situation while being moved by others?

C: It seems the elderly's wishes are not taken into consideration ... It's like you are being told 'you cannot do anything.'

B: Right. Like, 'I am incapable.'

Researcher: Is it humiliating for older people? Do you think?

A: I think so.

B: It's like they accept it because they have given up.

D: I imagine it would not feel comfortable.

C: Even if it is a lift, if they can operate it themselves and feel they can transfer themselves, then it is okay, I think, but it's not so good if somebody else is operating.

A: It would be better if they choose to use a device in order to be independent, but it is not so good if somebody is telling you, 'you cannot do it yourself, so we will use this.'

When technology is involved, workers perceive older people are being treated as objects, regardless of whether older people accept the treatment. Older people are seen as powerless, dependent, and passive because being cared for by technology is a symbol of dependence and passivity. Therefore, they believe that the elderly should be cared for by affectionate, warm, and caring human hands. 'Cold' technology is thought to be incapable of handling vulnerability.

A 'protective' attitude exists in Japan, whereby care workers protect frail, vulnerable older people. Bishu (2013) argues that Japanese care work, unlike that of Nordic countries, for example, is characterized by this 'protective' attitude. In other words, Japanese workers express a paternalistic attitude, as they make decisions about what is best for frail older people in good faith on their behalf. Care workers speculate older people prefer being lifted manually by warm human hands instead of by the use of transfer lifts.

In determining whether care robots will be introduced or what kinds of technologies will be applied, care workers and recipients should be given opportunities to speak and be heard (Parks, 2010: 109). However, this democratic communication process can be challenging for Japanese care recipients and workers because of cultural values and attitudes. People in need often do not ask for help but prefer to wait until someone comes to assist them, partly because they feel apologetic, and partly because they expect someone to notice it. In this culture, frail elderly people are often passive care recipients who have difficulty expressing their wishes and asking for help (Ohashi, 2013: 4). Therefore, care workers often take a paternalistic approach and presume that older people prefer human hands to assistive technology for their sake, based on the notion of 'caring about.'

However, some research has shown that lifts provide better care to recipients, since manual lifts by hands can feel uncomfortable and sometimes even painful (Tomioka et al., 2007: 120).

Interviews were also conducted with groups of care workers at the residential homes using transfer lifts. Some anticipated transfer lift use might feel cold before it had been utilized, but these perceptions changed afterwards:

...And we tried being lifted by a transfer lift ourselves, so now we know how it feels for older people. And they say it is comfortable, and therefore it is very good ... There are some people with muscle contractures who feel pain when they are transferred manually by human hands. Using a transfer lift, we have actually been able to avoid that pain.

Another care worker agreed:

When we transferred them manually, their faces were distorted with pain. But when we use a transfer lift, they smile and say, 'I'm okay.'

6. Cultural values and technology in care

6.1. The Japanese public's attitude to care robots

Some studies show that Japanese people are generally willing to use care robots. A Cabinet Office (2013) survey¹ asked Japanese people over 20 years of age the question, 'if you are in need of care, would you like a caretaker to use care robots?', to which 65.1% responded, 'yes.' In response to the question 'what is good about care robots?', 63.9% responded 'caretaker's physical/mental burden will be relieved,' followed by 'you do not have to "*ki wo tsukau*" for caretakers' (41.5%) and 'one can perform more tasks by oneself' (35.8%). '*Ki wo tsukau*' is a Japanese expression that is difficult to translate into other languages. It literally means to 'use "*ki*" (mind) toward someone,' implying one needs to be careful, attentive, and sensitive to someone so as not to cause him or her trouble. This is a specific Japanese concept requiring explanation.

6.2. Behaviours and feelings between elderly Japanese people and care workers

Takeo Doi is a leading Japanese psychiatrist who explored Japanese behaviour and developed the concept of '*amae*,' which is defined as 'in the first place, the craving of a newborn child for close contact with its mother and, in the broader sense, the desire to deny the fact of separation that is an inevitable part of human existence, and to obliterate the pain that this separation involves' (Doi, 1971: 167). Doi argues that *amae* is an emotion strongly experienced by Japanese people and, to some extent, among non-Japanese people as well. According to Doi, '*ki wo tsukau*' implies a constant feeling of '*enryo*' (consideration) toward the other person as a result of apprehension lest he or she fails to accept his or her own '*amae*' as unreservedly as desired. The fear is that, unless one holds back, one will be thought impertinent and disliked (Doi, 1971: 30, 39). When receiving care, the recipient is grateful to the care worker, as well as apologetic or indebted, based on the assumption that the kind deed was burdensome to the care worker. Japanese individuals would like to avoid such feelings, which are often absent within their 'inner' circle (*uchi*), such as their immediate family, relatives, or other close relations. In the 'outer' circle (*soto*), they are present, and one has to '*ki wo tsukau*' (Doi, 1971: 40). Therefore, if one is cared for by one's own family, one does not need to '*ki wo tsukau*,' however, if one receives care from a care worker, one may feel apologetic or indebted.

In Japan, family has long been responsible for elderly care. However, more elderly people receive care today that is provided by non-family professional care workers, especially after the introduction of the LTCI scheme in 2000. Older people tend to feel apologetic for the trouble they cause others, as they know care work is arduous and can generate significant physical and mental burdens for care workers. The subjective wellbeing of Japanese individuals may depend on self-appraisals that they do not have shortcomings and have not caused trouble in the context of social relationships (Kitayama et al., 1997). In this regard, care robots have strong possibilities. The alleviation of burdens through the use of robots will be appreciated not only by care workers, but also by elderly people. Care workers' preconceptions about care robots may also be changed when technology is actually used.

However, one must be cautious not to assume that older people want to avoid social contact because they do not want to bother others; rather, it reflects their willingness to maintain relationships, as interpreted from Doi's (1971) perspective.

¹ The survey by the Cabinet Office was conducted in 2013 to investigate the public's attitude toward care robots. It drew a random sample of individuals from the Japanese population who were over 20 years of age, and the survey was conducted using face-to-face interviews. A total of 3,000 individuals were recruited, and 1,842 responses were collected (response rate = 61.4%).

Furthermore, a Japanese social work researcher, Kuga (2014), has put forth a social work theory based on Japanese cultural values, wherein he argues the need for heeding Japanese people's tendencies to avoid causing trouble for others. The paternalistic approach is sometimes needed, since appropriate paternalism can mean respecting older people's autonomy (Freudenreich, 2007: 228).

7. Concluding remarks

The study indicates that technology has the potential to contribute to good care practice, although a discussion regarding each specific form of technology is needed in addition to a general discussion of technology as a whole. Nonetheless, technology can function as part of the interactions between care workers and care recipients. Humans can pursue care provisions in a caring, engaging, and attentive way and use robots in care without expecting them to be caring in the same way. The robots that the Japanese government wants to promote do not act autonomously or replace humans. How humans use technology to provide better care is important (Coeckelbergh, 2015), which is well illustrated by the transfer lift example. The experiences of care workers within the residential homes showed that when a care worker conducts a manual lift using their own hands, they hold the care recipient in their arms and cannot see the recipient's face over their shoulder. Such practice is not attentive care, as the care worker cannot see if the recipient is uncomfortable. When a transfer lift is used, the care worker can see the recipient's face from the front and can thereby provide more attentive care. Thus, technology has the potential to enhance the caring situation. In this way, how we care for older people – with or without technology – matters, and the use of technology in and of itself is not necessarily an issue.

This study also shows that taking perspectives of cultural values in each society is useful in examining how technology can fit into care work and what consequences it will bring. However, culture is not unchangeable across time. In this age of globalization, the global environment has a huge influence. Namely, top-down processing can take place from the macro (global to national) level to the meso (organisation to group) level, and then to the micro (individual) level. A bottom-up process can also occur. We should be aware that culture is a dynamic entity (Erez and Gati, 2004), and generational differences may occur as a result.

There is another worry regarding care robots in that they may reduce care worker-recipient interaction hours. While the transfer lift and special bathtub technology we discussed above are not currently taking away interaction time, some technologies will reduce the time care workers would otherwise spend with the recipients. Even handing over household tasks, such as cleaning, to robots can be detrimental. In Denmark, for example, some municipalities have introduced robot vacuum cleaners as replacements for home care worker cleaning services, thus reducing human contact for those older people (Greve, 2011: 5). Denmark has been debating whether it is fair to reduce the human contact needed by older people. This reduction in human contact might be a global issue necessary to consider when we discuss care robot use, as care is embedded in social relationships, regardless of culture. Wærness (1984) presented the concept of 'rationality of caring,' which provides us with direction when considering the essence of care. 'Rationality of caring' suggests that personal knowledge, certain abilities, and understanding the specifics of each situation in which help is required are essential prerequisites for providing good care (Wærness, 1984; 2005). It also implies care can only occur when freedom exists to develop it through dialogue (Christensen, 2008). Providing good care will be problematic if there is insufficient time for care worker-recipient interactions.

References

- Aida, Y. (1972) *Nihonjin no ishiki kozo* [*Structures of Japanese consciousness*]. Kodansha.
- Bishu, N. (2013) Hokuo kea to wagakuni no koreisha kea no hikaku [Comparative study on Nordic and Japanese elder care]. In Hamauzu, S. (eds.), *Ima hokuo kea wo kangaeru*. Osaka University, pp. 117–126.
- Cabinet Office (2013) *Kaigo robotto ni kansuru tokubetsu yoron chosa no gaiyo* [*Overview of the results from the special survey on care robots*]. Cabinet Office.
- Christensen, K. (2008). Social capital in public home care services. In Wrede, S., Henriksson, L., Høst, H., Johansson, S., and Dybbroe, B. (eds.), *Care work in crisis*. Studentlitteratur, pp. 249–271.
- Coeckelbergh, M. (2013) E-care as craftsmanship: Virtuous work, skilled engagement, and information technology in health care, *Medical Health Care and Philosophy* 16: 807–816.
- Coeckelbergh, M. (2015) Good healthcare is in the ‘how’: The quality of care, the role of machines, and the need for new skills. In van Rysewyk, S. P. and Pontier, M. (eds.), *Machine Medical Ethics*, 1st ed., Springer, pp. 33–47.
- Daly, M. (2001). Care policies in Western Europe. In Daly, M. (ed.), *Care work: The quest for security*. Geneva: International Labour Office, pp. 33–55.
- Doi, T. (1971) *The anatomy of dependence*. Kodansha International.
- Donath, S. (2000) The other economy: A suggestion for a distinctively feminist economics. *Feminist Economics* 6(1), 115–123.
- Erez, M. & Gati, E. (2004) A dynamic, multi-level model of culture: From the micro level of the individual to the macro level of a global culture. *Applied Psychology* 53(4): 583-598.
- Freudenreich, O. (2007) *Psychotic disorders: A practical guide*. Lippincott Williams & Wilkins.
- Fukuda, M. (2009) Kango ni okeru kyokan to kanjo komyunikeshon [Empathy and feeling communication in nursing]. *The Journal of the Nursing Society of University of Toyama* 9(1): 1–13.
- Greve, B. (2011) Velfærdsteknologi: Buzzword eller løsningsmulighed? [Welfare technology: Buzzword or solution?] *Social Politik* 2011(1): 5–9.
- Herbig, P., and Laurence, J. (1996) Creative problem-solving styles in the USA and Japan. *International Marketing Review* 13(2): 63–71.
- Hignett, S., Crumpton, E., Ruzsala, S., Alexander, P., Fray, M., and Fletcher, B. (2003) Evidence-based patient handling: Systematic review. *Nursing Standard* 17(33): 33–36.
- Himmelweit, S. (1999) Caring labor. *The Annals of the American Academy* 561: 27–38.
- Holroyd, C. and Coates, K. (2007) Robotics in Japan. In Holroyd, C. and Coates, K. (eds.) *Innovation nation: Science and technology in 21st century Japan*. Palgrave Macmillan. pp. 105–125.
- Hori, Y., Kamiya, S., Sung, K., Doi, S., Koimizu, J., Kato, K., Ogura, K., Sakakibara, H., and Mizuno, M. (2017) The mind-gap between governmental IT and nursing care robot implementing policies and welfare-care workers. *Journal of medicine, life and ethics, society*. 14: 29-44.
- Hälsans nya verktyg. (2016) *E-hemtjänst – ökad trygghet och stopp för kostnadsökningar*.
- Kanagawa Welfare Service Association (2012) *Heisei 23 nendo kaigo iryo bunya robotto fukyuusuishinmoderu jigyo hokokusho* [*Report on project of promotion of robots in care and health 2011*]. Kanagawa Welfare Service Association.
- Kanagawa Welfare Service Association (2014) *Heisei 24 nendo 25 nendo kaigo robotto fukyuusuishin jigyo hokokusho*

- [*Report on project of promotion of care robots 2012/2013*]. Kanagawa Welfare Service Association.
- Kawabata, M. (1996) Ibunka rikai to ningenkankei [Cross-cultural understanding and human relationship] In Ishikawa, M. and Tanabe, M. (eds.) *Sasaeai tsunagariai wo ikiru [Living in mutual support and relations]*. Chuohoki Publishing, pp. 207–225.
- Kitayama, S., Markus, HR., Matsumoto, H. and Norasakkunkit, V. (1997) Individual and collective processes in the construction of the self: Self-enhancement in the United States and self-criticism in Japan, *Journal of Personality and Social Psychology* 72(6): 1245–1267.
- Kuga, H. (2014) *Sosharu waku niokeru seikatsuba moderu no kochiku* [Establishment of life field model in social work], Minerva.
- Lehoux, P. (2006) *The problem of health technology: Policy implications for modern health care systems*. Routledge.
- MHLW (Ministry of Health, Labour and Welfare) (2012) *Shakai hoshō ni kakaru hiyō no shorai suikei no kaiteinitsuite. [The revised estimates of social security expenditure]*, Ministry of Health, Labour and Welfare.
- MHLW (Ministry of Health, Labour and Welfare) (2013) *The 12th occupational safety and health program, February 2013*. Ministry of Health, Labour and Welfare.
- MHLW (Ministry of Health, Labour and Welfare) (2015a) *Heisei 26 nendō kaigo kyūfūhi jittai chōsa no gaiyō. [LTCI expenditure survey in 2014]*, Ministry of Health, Labour and Welfare.
- MHLW (Ministry of Health, Labour and Welfare) (2015b) *Heisei 27 nen chingin kōzō kihon tokui chōsa. [Basic survey of wage structure in 2014]*, Ministry of Health, Labour and Welfare.
- MHLW (Ministry of Health, Labour and Welfare) (2015c) *Heisei 26 nen kaigo sabisu shisetsu jigyōsho chōsa no gaikyo. [Survey of care service institutions and providers in 2014]*, Ministry of Health, Labour and Welfare.
- METI (Ministry of Economy, Trade and Industry) (2013a) *2012 nen robotto sangyō no shijō doko. [Market trend of robot industry in 2012]*. METI.
- METI (Ministry of Economy, Trade and Industry) (2013b) *Robotto kaigokiki kaihatsu donyū sokushin. [Promotion of introduction and development of care robots]*. METI.
- Motegi, N., Yasuda, S., and Misawa, T. (2012) Hojogu shiyō to kaigo dosa ni kansuru jikkenteki kenkyū. [Experimental study of assistant aids and a new nursing method in nursing care work], *Rodokagaku* 88(3): 81–93.
- NCCU (Nippon Careservice Craft Union) (2015) *Yotsu to kaigorobotto nitsuiteno anketo kekkahappyō. [The results of the survey about backpain and care robots]*.
- NEDO (New Energy and Industrial Technology Development Organization) (2014) *NEDO robotto hakusho. [White paper on robotization of industry, business and our life 2014]*. NEDO.
- Nylander, S., Ljungblad, S., and Villareal, J. J. (2012) A complementing approach for identifying ethical issues in care robotics: Grounding ethics in practical use. *2012 IEEE RO-MAN: The 21st IEEE International Symposium on Robot and Human Interactive Communication*. September 9–13, 2012. France.
- Occupational Safety & Health Administration (2003). *Guidelines for nursing homes: Ergonomics for the prevention of musculoskeletal disorders*. US Department of Labor.
- Occupational Safety & Health Administration (2001). *A back injury prevention guide for health care providers*. US Department of Labor.
- OECD (2015) *Health at a glance 2015*. (<http://www.oecd.org/health/health-systems/health-at-a-glance-19991312.htm>)
- Ohashi, K. (2013) *ICF no shiten ni motodoku kea manejimento to fukushiyōgu no katsuyō. [Care management by ICF code and assistive products for support of independent living]*. Association for Technical Aids.

- Pfau-Effinger, Birgit (2005) Culture and welfare state policies: Reflections on a complex interrelation, *Journal of Social Policy*, 34: 3-20.
- Razavi, S. (2015) Care and social reproduction: Some reflections on concepts, policies and politics from a development perspective. Baksh, R. and Harcourt, W. (eds.) *The Oxford Handbook of Transnational Feminist Movements*. Oxford University Press, pp. 422–445.
- Ronald, L. A., Yassi, A., Spiegel, J., Tate, R. B., Tait, D., and Mozel, M. R. (2002). Effectiveness of installing overhead ceiling lifts: Reducing musculoskeletal injuries in an extended care hospital unit, *American Association of Occupational Health Nurses* 50(3): 120–127.
- Robotic care devices portal. (http://robotcare.jp/?page_id=29&lang=en)
- Saito, Y., and Ishiguro, N. (2012) *NORDCARE Survey in Japan: The everyday realities of elder care – similarities and differences mirrored by care workers*. Osaka University.
- Shimizu, H. (2002) Introduction: Japanese cultural psychology and empathic understanding: Implications for academic and cultural psychology. In Shimizu, H. and LaVine, R.A. (eds.) *Japanese Frames of Mind: Cultural Perspectives on Human Development*. Cambridge University Press, pp. 1-28.
- Socialstyrelsen. (2012) *Demonstrationsprojekt Äldre- og handicapvenlige toiletter*.
- Sveriges Kommuner och Landsting. (2016) *Nattkameran som ger ökad trygghet*.
- Takeuchi, I. (2013) *Yappari mitame ga 9 wari [Appearance counts for 90 percent]* Shinchosha.
- The Headquarters for Japan's Economic Revitalization (2015) *New robot strategy: Japan's robot strategy – Vision, strategy, action plan*. The Headquarters for Japan's Economic Revitalization.
- Tomioka, K., Higuchi, Y., and Shindo, H. (2007) Fukushiyogu no yukosei ni kansuru kaigosagyo futan no hikakukenyu [A validation study of devices designed to reduce loads in provision of care], *Journal of Occupational Health* 49: 113–121.
- Wærness, K. (1984). The rationality of caring. *Economic and Industrial Democracy* 5: 185–211.
- Wærness, K. (2005). Social research, political theory and the ethics of care in a global perspective. In Dahl, H. M., and Eriksen, T. R. (eds.), *Dilemmas of care in the Nordic welfare state*, Ashgate, pp. 15–30.
- Wagner, C. (2010) The Japanese way of robotics: Interacting ‘naturally’ with robots as a national character? Annette Schad-Seifert and Shingo Shimada (eds.) *Demographic change in Japan and the EU: Comparative perspective*. Japanese Studies Department, Johann Wolfgang Goethe-University, pp. 131–154.
- Yamauchi, S. (2015) Kaigo robotto: Genjo to kadai [Care robots: current status and challenges] *Presentation material for the 2nd meeting at Fukushi senshin toshi Tokyo no jitsugen ni muketa tiiki hokatsu kea shisutemu no arikata kento kaiji* [Committee on Community System in Welfare City Tokyo], July 30th, 2015.