

# Ageing Societies: Japan. Technology in Response to Demographic Changes

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**Abstract.** The Japanese population is ageing at a pace without precedent in history. Although Japan is already facing social difficulties today due to the national population situation, in the very next future challenges will grow and the government, as well as institutions, will be at the front line in order to deal with new population patterns. This paper investigates the existing relations between the present demographic transformations and current use of technology for elderly care assistance in so far as ageing society is concerned. Secondary data analysis was used for this purpose.

**Keywords:** ageing society, assistive technology, immigration, Japan, working mothers.

## 1 Introduction

During the last years of XIX century, several post-developed countries around the world started to experience similar phenomena of social change and ageing society is one of the most notable. After decades of national populations grow (even considering an unstable path due to conflicts, epidemics and poor sanitary conditions) today several countries show a tendency of slowing demographic growth. Some of them are even starting to experience shrinking in population size and ageing society due to the increase of life expectancy at birth and low fertility rate. Nowadays, life expectancy in Japan is 79 years for men and 86 years for women, according to the latest data available from the World Health Organization (WHO) [29], making Japan the country with the highest average life expectancy in the world. How technological solutions, in particular assistive technology, can cope with the increasing need for elderly assistance becomes one of the most urgent topics in a hyper-aged society like Japan. Technology could not only be employed for health care of elderly people but in general, to improve the quality of life of an ageing population.

This paper offers an overview on the significant role that assistive technology can have in the discourse of “Ageing Japan”. The first part of this work presents the latest demographic trends of Japan and, throughout the paper, we will see the impact that social transformations have in the field of elderly assistance. Current economic patterns and the present family structure are

indeed changing the way older people live in the contemporary society. This paper discusses the possibility that assistive technology can lead to higher level of social inclusion and participation of elderly people in the community. For this purpose, a literature review of available publications is mainly used.

## **2 Demographic changes in Japan**

### **2.1 A general overview**

The total world population is growing at unprecedented rate and it exceeded 7 billion in 2012 [20] even if the worldwide population growth rate has started to decrease in the last decades. While the number of inhabitants is increasing everyday at a very fast pace, many countries around the globe are experiencing, or will start to in the near future, a fall in the number of births. This is already a major concern in several post-developed countries where the Total Fertility Rate (TFR) is below the replacement level standardised at 2.1 for developed countries [28]. Countries such as Taiwan, Latvia and Bosnia-Herzegovina are already below the replacement level and they are just three of those countries known as Low Birth Rate Countries where the TFR is under 1.3.

Japan's population in 2012 was 125,957 million [27]. In 2008 the population reached the peak; the following year marked the starting point of a declining trend and experts claim that this is just the beginning of a fast and constant tendency. If no significant change in present demographic patterns occurs, Japan is expected to enter a long period of population decline. According to the medium-fertility projection, by 2060 the young-age population size (under 15 of age) will decrease to around 7 million, the working-age population (15-64 years of age) to around 44 million and the old-age population (over 65 of age) to around 34 million meaning also that the number of workers supporting the elderly people is supposed to drop, from 2.8:1 as of 2010 to 1.3:1 by 2060 [16]. As a direct consequence, the age picture diagram of Japan has rapidly shifted from having a broad basis to be now a constrictive pyramid, where the middle but especially the top of the diagram becomes wider to the detriment of the basis. As of December 1, 2012 people over 65 were 30,972 million, 24,3% of the total population [16].

Japan is the only country (along with the small Principality of Monaco) that has a population of over 65 that accounts for more than 24% therefore, it can be considered as the first Hyper-Aged Society in the world, term that indicates a country where more than 21% of the population is 65 years or older. Taking also into consideration that the national TFR is 1.3 [16], the strategies that the Japanese society as a whole is going to apply in order to face this changing situation is going to attract the interest of scholars and policy makers especially of those countries that might follow Japan soon in his attempt to re-adapt to the transformation of its social context.

## **2.2 Elderly care in ageing Japan: transformations in the traditional family system**

After recovering from the end of the Second World War, Japan enjoyed the so-called “Economic Miracle”, 1960s-1980s, when the financial and economic situation were the sources of a general euphoria. It was in these years, indeed, that Japan’s “Bubble Economy” grew at such a fast rate that became the second largest economy after the United States of America but, at the same time, the new financial and trade policies led to speculation, in particular in the real estate market. Overconfidence and excess of liquidity were the main causes at the origin of the burst of the bubble at the end of the ‘80s and the beginning of a dark period known as “Lost Decades”, from which the country is trying to recover still nowadays, trapped in economic stagnation since then. The Economic Miracle years and the Lost Decades in particular, marked a crucial point for the transformation of the Japanese family system, which went through substantial changes. Since the 1980s the number of births started to decline. Economic disenchantment and new values, such as individualism, have accelerated phenomena that are common to most every post-developed countries: pursuit of career and personal fulfilment; nuclear-family households or single-person households; emancipation of women; decline of marriage rate; rise of mean age of first marriage and, consequently, decreasing of birth rate.

Official data can help us to have a better view and understanding of some of the important changes that are occurring in the contemporary Japanese society. Until 1950s households consisted in 4-6 people on average but from the late 1950s family patterns started to change and the number of family members dropped below 4 people [12]. The reasons have to be found in the changing lifestyles of young couples compared to the generations before and to the falling birth rate. The average mother’s age at first childbirth is increasing constantly since 1970, from 25 years to almost 30 years old nowadays: this means that a woman has potentially less chances to have children.

The traditional Japanese family system, referred to as *ie*, was institutionalised during the Meiji period (1868-1912) and it followed a patriarchal line: the eldest son inherited the head of the family and his wife became a member of the household adopting his family name and cohabiting with the elderly parents-in-law. In these last decades the traditional family system has been challenged by different lifestyles and values; in addition, the emancipation of women challenged traditional customs and gender-based division of tasks, particularly related to family burden such as elderly care and childbearing.

Despite gender equality is acknowledged by the Constitution and laws, in practice even today gender division in the workplace and in the household find their roots in the ideal of the traditional *ie*. Due to the increasing number of working mothers, women not only have to care about childbearing and housework but job as well. If we add that many of them have to look after elderly parents and/or parents-in-law, sometimes living under the same roof, it is understandable why women in Japan seem to view marriage life less

favourably, be more frustrated by child rearing and feel less satisfied from family life in general than their counterparts in Asia, Europe and US [9].

Today, nearly 90% of households fall into the groups of nuclear-families and single-person families constituted by 2.42 persons on average [6]. 20.5% of the households fell into the category “elderly households”, indicating people aged 65 years or over living alone, together with the spouse or with a dependent aged 18 years or under. A major concern today is to find the right answers to the multiple needs of families taking care of elderly relatives at home and guaranteeing services to those elderly living alone or far from other family members.

Women, especially daughter-in-law, were the ones supposed to take care of the old relatives in the traditional family system. Nursing home and professional home care services from personal care attendants was unpopular in Japan as, until recently, it was not considered morally correct to place old parents in nursing homes or ask for services apart from health assistance. The responsibility fell entirely on families. Nowadays, contexts are mutating and we cannot talk about “the traditional family” anymore or, at least, a traditional family system. This became clear to the institutions in the late 1980s when, in order to meet the specific demands the care of elderly requires, the government implemented a Gold Plan (after the revision of 1994, the New Gold Plan), which was designed to achieve specific goals over a ten-year period. This Plan sets numerical targets in terms of number of care workers, nursing homes and other facilities. From 1992 home care nursing has been legally recognised through the revision of the Medical Law [14]; in 2000 the Long-Term Care Insurance Law was enhanced and a Long-Term Care Insurance Program started. Under this programme, elderly patients in need of health and assistance services can be recipient of services given at home or at medical institutions and can also receive refund, as the scheme is part insurance-based and part-tax funded [22]. However, the pressure that the government is going to undergo will intensify with the growing of the old population and more care workers and nurses are needed in medical institutions and as home helpers.

As anticipated previously, Japan is experiencing social changes that are common to several countries but in such a way and at full speed that it can be considered as unique. One of the most remarkable aspect concerns the expectations younger generations have about marriage and family-life in general. During the last decades we are witnessing some important transformations of roles inside the family, in particular the negotiation of women’s position as wife, mother and worker: from the assumption of becoming a “full-time and professional housewife” to be a working-wife and mother.

As shown by the 14<sup>th</sup> Japanese National Fertility Survey carried out by the National Institute of Population and Social Security Research in 2010, the age at first marriage is increasing steadily (29.8 for men and 28.5 for women) mainly because of meeting the future partner at a later stage in their life and because of a longer courtship [15]. The consequence is a continuous

postponement of marriage that can determine the number of children a woman will have in her lifetime.

The idea that sees the husband as “breadwinner” and the wife as “professional housewife” is becoming culturally less predominant and the participation of women in the labour market has increased. The emerging of highly-educated groups, including a growing number of women, contributes to the ideas of self-fulfilment and more career-oriented, which can lead, in turn, to late or no marriage and less interest in having children. Nevertheless, the working life-cycle of a woman very often can be described by a “M-shaped” graph: finding a job at a young age; working until marriage; continue working until pregnancy if possible; stop working during childbearing; join again the workforce but usually not engaged in full-time jobs.

At the moment, more than half of mothers are not engaged in any kind of working activities and less than 20% has a regular job. Moreover, while after getting married most of women do not quit work, the number of wives who leave the job place upon becoming pregnant is increasing. After giving birth more women try to re-enter the job market and seek for employment, often due to economic necessities, but they are mainly involved in part-time job or hold a position of temporary workers. While in the majority of other post-developed countries women’s participation in the labour force is constant during their working-age period, in Japan we can see a fall between two peaks, “20-24” and “45-49” age. During the first of the two intervals, young women have just entered the job market, while in the latter we find mothers re-joining the workforce after childbearing. To these regards, more services have to be implemented in order to promote and allow women to work. Some of these involve the public institutions (e.g. nursery schools, taxes, promote more gender-equal environment) some others the private world (e.g. flexible working hours, power harassment, maternal-paternal leave). In this case, initiatives will become necessary to take care of children and assisting elderly parents. In this new scenario, who is going to take care of them?

Western nations are also experiencing shortage of domestic workers in the fields of healthcare and assistance. One alternative is to hire workers from abroad. Immigration laws are becoming stricter and stricter in several Western nations but they still often permit workers from abroad to enter the country to work as personal care attendant and professional nurse.

In any case, to delegate the care of relatives to people outside the family is not as usual as in other developed countries. Apart from medical reasons that require professional assistance, it is only in recent times that nursing homes have started to become popular. One of the main explanations has to be found in the Confucian filial piety. Traditionally, family was hierarchically structured and filial piety presupposes respect and care of the family members, older people in particular. Nowadays, new socio-economic conditions make it difficult for children to take care of they elderly parents or relatives. As mentioned before, new types of families are arising, very often children move far from their hometown for study/job purposes and more women are involved in working activities than in the past. The consequence is that about 5 million

elderly live alone with no relatives [26] and this phenomenon might spread over in the next years.

In case the elder cannot receive proper care at home due to family circumstances, nursing homes could be a valuable alternative but because of costs and limited beds availability, hospitalisation, even for long periods, is a cheaper option. However, hospitalisation of elderly people in some cases could mean long-term stay in hospital; elderly that are hospitalised certainly need assistance but it does not necessarily mean need for medical care [8].

Since the 1970s, the phenomenon of “social hospitalisation” has been subject of discussion in Japan; this term refers to the practice of hospitalise old patients longer than their actual needs, resulting in higher expenditures and with critical consequences on the health care system [7].

Hospitals and nursing homes in Japan will soon lack large a large number of professional workers. In other countries, foreign workers constitute a precious source especially in the health care sector, but in the case of Japan things do not appear to be very promising.

### **2.3 Foreign professional workers**

According to the Statistics Bureau of the Ministry of Internal Affairs and Communications, foreign residents in Japan were 1,9802 million as for March 2013 [21]. After the Great East Japan Earthquake and tsunami hit Japan on March 11, 2011 the foreign population in Japan fell as many residents and short-term foreigners left the country. Even before the natural disaster occurred, Japan has a net migration rate equal to zero [13] and one of the lowest immigration rates among OECD countries. Statistics show that in the last years the foreign population is declining.

The government is aware that in order to maintain the current economic structure new strategies are necessary, especially considering the latest trend of the national population. One of the most recent attempts, is trying to attract particular categories of foreigners by guaranteeing “preferential immigration treatment” as explained in the guidelines of the new points-based immigration policy, enhanced in 2012. Applicants that meet specific requirements (e.g. academic, scientific and economic) are eligible for the new process: foreign people who are able to earn 70 points or more are recognised as “highly skilled foreign professionals” and will be given special treatment. Foreigners that fall in these categories are, among the others, IT engineers, scientists and specialists of fields that are particularly relevant such as medicine [10].

It is clear that the strategy of the government is to attract skilled and professional migrants instead of non-specialised foreigners making a selection through the points-based system. Besides the introduction of this new policy, Japan has signed Economic Partnership Agreements (EPA) with Asian countries, such as Philippines, Indonesia and India, in order to strengthen partnership and cooperation in Asia. These bilateral free-trade accords formalise also the commitment of the Japanese government to accept a fixed number of nurses and care workers especially from the Philippines and

Indonesia. EPAs are an attempt in order to meet the need for professionals in hospitals and nursing homes in Japan as it seems that the country need approximately 400-600,000 personal care assistants and about 40,000 nurses [24]. The Japanese Health Ministry declared that measures will be launched in order to facilitate the training and hiring of foreign nurses and professional care workers. Everything seems ready but there are three main barriers instead: a language barrier, the current organisation of medical institutions and a cultural barrier.

In order to be allowed to work as nurse and care worker in Japan, all candidates must pass a qualification test in Japanese. Foreign candidates are guaranteed a 30% more time to complete the test as well as *hiragana* reading, the basic Japanese phonetic alphabet, is provided for all the ideograms. Candidates, that are already professionals in their countries of origin, are trained in local institutions and must pass the examination within three years upon their arrival for nurses and four years for care workers. If they fail to take the national license after this period of time, they have to leave the country. The total pass rate of the latest test, February 2013, was 88.8% and 9.6% of foreigners managed to pass it, that means only 30 candidates from Philippines and Indonesia [25]. One of the main problems in failing the test seems an insufficient proficiency in Japanese language and since 2008, when Japan began accepting workers through EPAs, the number of unsuccessful foreign candidates is the great majority. But language is only the first problem. Even if the candidates are able to pass the test, they might suffer discrimination because of the difficulties they face from a linguistic point of view when performing their tasks. Being the test completely written in *hiragana*, foreign workers may not be able to read basic ideograms and, therefore, not able to perform even simple tasks, despite their professional background in their home country. For this reasons, Japanese nurses and care workers might still be preferred to a Filipino or Indonesian nurse. Moreover, if the candidate fail to pass the national examination, the money that hospitals and nursing care facilities spent on their training will be lost, an additional reason that can discourage employers and private families to hire them.

The third barrier is a cultural one. As we saw before, children and women were the persons who held the responsibility to take care of the family members when they got old. For families in Japan, to rely on the help of a home care worker can be challenging as well as to put elderly parents in nursing homes. However, the number of children is going to decrease dramatically in the near future and more women will likely have an employment, which means that other solutions have to be proposed in order to answer the growing needs for elderly assistance. Health care is going to become one key sector from several perspectives, labour market included. The existing programme designed to bring foreign nurses and care attendants appears to be less effective than expected. Not only there are difficulties concerning the literacy of candidates and funds management but also the failure in meeting the expectations of these workers. It seems that many of the candidates were treated mostly like assistants than professional nurses in the workplace and this could represent one additional point that need to be

improved [17]. Moreover, it is very difficult to hire a home-helper from abroad, meaning that families searching for home assistance have to hire foreigners already living in Japan or rely on medical institutions.

The government might choose to invest resources to encourage the mobilisation of domestic workers with employment potential, like women, or to move to another direction that has not to be meant necessarily as a substitution of human work but that can add a valuable help: technology.

## **5. Towards technological solutions<sup>1</sup>**

### **5.1 Robots in medicine**

Lately, there is a lively international debate about the needs of the ageing population and, in particular, about possible solutions that come from technology. To allow elderly people to live independently avoiding hospitalisation when it is not strictly necessary, can have positive effects not only on the national welfare but on the quality of life of the people and their personal expectancy. Most importantly, technological advancement could give to older people the instruments to continue living their life in dignity taking into consideration their feelings and according to their physical/mental condition. Japan is at the forefront of technological development and its commercialisation, and robotics is one field with growing devices and applications. We can already find a wide set of robots and machines on the Japanese market from kitchen robots to artificial pets, from *RIBA II 1/2* to *My Spoon*. *RIBA II 1/2*, for example, is able to lift patients from the bed and carry them to the wheelchair, while *My Spoon* is designed to feed people.

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<sup>1</sup> Disabilities and critical medical conditions are not analysed.





**Fig.1** *RIBA-II 1/2*, a “caregiving” robot able to lift and carry patients up to 80kg of weight (Source: Riken Research Center, 2011).

These new robots, along with others already developed and tested, might be useful to support caregivers in their daily activities but the presence of the latter cannot be substituted, that means a double cost for the hospital. Furthermore, at the moment, humanoid nursing robots are sold for millions of yen and few private citizens or hospitals can afford them.

The central government is planning to give financial assistance to companies producing low-cost nursing care robots, in particular: - lifting and moving robots; - robots that can help patients to walk; - portable robot toilet; - movements monitoring robots especially for patients suffering from dementia. The government expects that from 2016 these robots can be sold for about 100,000 yen and, according to the plan, it will be possible for companies to rent the machines at 10% of their selling price. In this way, robots would become affordable and their use widespread. Behind this plan, there are official projections, which show that the market of nursing care robots not only will grow considerably, both in production and revenues, but that can constitute a new and strategic sector for exports [1]. Besides, we do not have to forget that Japan will need an increasing number of care workers. Since it is unlikely that the country will be able to meet the demand for nurses and care attendants under the present social policies and immigration law, this strategy might be the starting point for a shift towards robots and technological devices. Several humanoid robots have been developed and others are under development. Robots like *HOSPI-Rimo* and *TWENDY-ONE* belong to those set of robots developed for health assistance purposes. *HOSPI-Rimo* has been developed in order to facilitate the communication between people with reduced mobility and people far away, for instance, their attending doctors. It

is also capable to move autonomously and it is already used in hospitals in Japan [19]. The human symbiotic robot *TWENDY-ONE* can understand vocal instructions and is able to help a person with mobility impairments and manipulate objects.

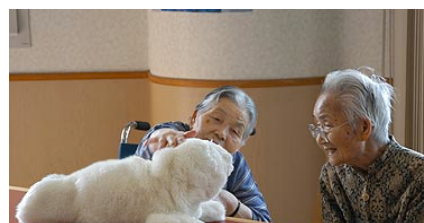


Communication Assistance Robot "HOSPI-Rimo"



**Fig.3, 4** HOSPI-Rimo (left) and TWENDY-ONE (right). Robots able to perform complex tasks when instructions are provided. (Source: Panasonic Corporation; Waseda University Sugano Laboratory)

It remains to see whether robots will be successfully accepted by patients, particularly from the emotional perspective. Even if robots can be effective they cannot replace human work and, most important, human warmth. Specialised workers are multitasking compared to robots being in some circumstances more efficient than machines. *Paro* is one example of the tentative to combine technology and affection. Due to sensors and artificial intelligence the seal-like robot is able to “interact” with people responding to words and caresses with facial expressions. The robot is sold for about 5,000\$ in many countries in the world.



**Fig.2** *Paro* has been found to reduce patient stress and stimulate interaction also in dementia and Alzheimer’s patients. (Source: Paro Therapeutic Robot [www.parorobots.com](http://www.parorobots.com))

Nevertheless, *Paro*, like the other robots, cannot be considered completely commercially successful [2], which means that the goal of combining technology at the service of elderly patients and their feelings is not yet fully achieved.

These are just a few examples of robotics applications in the medical field. The present researcher believes that technologies should not be developed as separately from human feelings and mutual understanding but technological progress should consider adopting a more human approach. The alternative to research on humanoid robots, which is captivating and futuristic indeed, could be the promotion of other types of solution able to fulfil the needs of the patients while respecting them as persons. Such alternatives might include, among the others, technological applications to be used not only in hospitals and nursing homes but at home as well, aiming at avoiding hospitalisation unless necessary for medical reasons while enabling people to live in a familiar environment with the help of assistive technologies. In this way, social participation of elder people could also be promoted as an attempt to limit the possibility of social withdrawal and loneliness.

## **5.2 Discussion on the role of Assistive Technology (AT) and Ambient Assisted Living (AAL) technologies in the Japanese society**

As noticed before, the concept of filial piety is not forgotten in present-day Japan. This ethical aspect has prevented the widespread of nursing homes until recent years, when socio-economic transformations have made more difficult for Japanese families to take care of their elderly relatives without an external support. Nursing homes can be very expensive and the number of place available is not enough to cover all the requests. Taking also into account the Confucian-influenced traditional family structure, in Japan the responsibility for taking care of old people is still a “family matter”. In 2011, the great majority of long-term care recipients over the age of 65, received assistance at home rather than in institutions [18].

To care about elderly parents presents several difficulties but when they are bedridden or suffer from dementia the burden might overcome one’s own capacity and goodwill. The Long-Term Care Program offers reimbursement to patients for health-related expenses, including refund for remodelling homes. Recently, there is an increase in insurance benefit for modifying housing according to a survey of the Ministry of Health, Labour and Welfare [6]. Under this point of view, the advancement of Assistive Technology (AT) but, particularly, Ambient Assistive Technology (AAT) could have potential in today’s Japanese society.

Assistive Technology is “an umbrella term for any device or system that allows individuals to perform a task that they would otherwise be unable to do, or increases the ease and safety with which the task can be performed” [3]. Ambient Assisted Living (AAL) technologies relies on Ambient Intelligence

(AmI), which surrounds people in an environment with intelligent devices, often invisible, that are able to collect information about their state and adapt to their needs [31]. Monitoring, embedded sensors and ICTs systems are some of the AAL technology that could have an important role in improving the quality of life of ageing societies. In addition, lighting has become a pervading element in the theme of ageing society, influencing both the design of AAL technologies and the study about the impacts that light has on the behaviour and mood in the elderly.

AAL can be seen as a new way of living and a new way of perceiving care and assistance. Fall detection systems, sensors collecting and analysing living parameters, and new communication tools such as interactive platform are just some example of the available AAT. More people could live at home, in a safe environment while continue receiving health assistance in different ways (from remote or simply through health related data collected through sensors). Smart-homes could be equipped with AAL technologies able to collect living parameters electronically in a natural way, being sensors invisible to the user but nonetheless connected to medical specialists. In-house technology applications could help families to take care of their elderly relatives at home and, from the opposite perspective, older people could live in the environment they are used to with the awareness of being in safe living conditions. Also, we do not have to forget that IT and ICTs literacy levels are going to increase during the next years, which means that more and more people will gain familiarity with technological devices and applications.

At this point, doubts are raised about privacy and user acceptance of these solutions. As every instrument, technology could produce positive but also negative effects, according to the non-neutrality perspective that sees technology as “an autonomous force on users” [4]. In a reality of technological innovations diffusion, the priority is going to become sustaining a high standard of living rather than focus on how to control more fragile people. In other words, in order to exploit the great potential of innovation for the purpose of elderly care, more efforts should be put on studying the social dimension of AAT and AAL.

With the use of AAL:

- Institutionalisation might be limited to critical cases, which means less public expenses;
- Elderly people could live more independently at home;
- Families could actively support their old relatives with the support of new tools;
- Intergenerational solidarity could fostered social relations, especially inside the families (ties between grandparents and grandchildren);
- Older people could gain self-confidence and be part of the community again.

As we can see from this list, the stress is put on the wellbeing of the people through social participation. A good balance between AT/AAL and social

inclusion could improve the quality of life of people, not only the elderly that see positive changes in their lives but the families as well, indirectly enjoying the well-being of their old relatives. In general, from a wider approach, the Japanese society as well as other ageing societies, could benefit from this condition. Mere technology itself has indeed the potentials to change the life of people in an ageing society, but it remains to see whether it is successful among real people in a multifaceted community. A multidisciplinary approach combining technology and social sciences could lead to comprehensive results with the final objective of improving people's life. Real applicability and implementation costs should also be taken into account as a fundamental aspect of the whole scenario. Moreover, as highlighted by OECD in 2013, despite the good quality of long-term care and the high workforce standards, little information exists about safety, care effectiveness and user experience. Japan still needs to develop collect indicators on quality of life services. In particular, since the number of elders receiving care at home is high compared to institutions, there is scope for developing studies on the quality of life and care at home with the use of domestic technology applications [18].

## **6 Conclusion**

This paper offered an analysis of three main issues that are now constantly present in the public discourse and debates, all three presented as interesting topics to take into consideration when coping with elderly care in ageing society, and in our case, ageing Japan. The present work could constitute the background for future works for an in-depth research of the topics presented in this study. To give an answer, whether possible, was not the purpose of this paper. However, it is possible to identify the keys so as to find alternatives to the subject of elderly care.

In 2011 the labour force registered a total loss of 360,000 workers and only 48,2% of women was engaged in working activities [26], a figure that reveals a low level of women participation in the labour market. Shrinking population also means decline in the size of active population, a trend that is likely to continue in the future years.

A balanced combination of the three main aspects presented previously (working mothers, specialised immigrants and assistive technology), could lead to possible solutions. At the basis, services to citizens and social policies should be planned to give answers to specific needs, in particular in support of families and working women. Services aiming to help parents economically (e.g. children allowances) and practically (maternity-paternity leave, flexible working hours, childcare facilities) could incentivise women not to leave the job after childbirth and helping them to find an equilibrium between family and working life. This might create the premise for slowing the negative birth rate and a new push in the economy due to the increasing number of workers. From 2012 the Tokyo Metropolitan Government started to launch different initiatives and programmes, in particular major projects to implement services

for families and elderly people “to realise reliable welfare, public health and medical care services for present and future generations” [30].

A proper integration of professionals from abroad can play an important role for the development of various services for elderly patients, such as nursing homes or care facilities. Special agreements to attract specialised workers from abroad, such as the Economic Partnership Agreement (EPA), are already implemented but less effective than predicted. The imperative would be to ease the bureaucratic process before and after arrival and not only to allow them to enter the country through bilateral agreements and sit for the national examination. In addition to the assistance given by licensed and experienced personnel, elderly assistance will be definitely benefit from the use of invisible devices such as sensors. Technological homecare solutions for elderly already exist but robots seem to be a more fashionable topic in Japan. No matter how much they can give relief to care workers, current robots do not possess some of the qualities, such as discernment and compassion, necessary in human relations.

Japan is already facing difficulties related to ageing society and other ageing countries in the world are looking towards the Far East waiting to see Japan’s next step.

AAL, combined with other homecare solutions, could be a valid alternative to traditional elderly care also because of the limited number of nursing homes. In addition, social hospitalisation could be reduced.

The emphasis is put on the personal condition of the final user and further studies should take into consideration the discourse of longevity of the Japanese population. Not only the improvement from a medical point of view have to be observed but the social and personal acceptance of AAL in daily life should also be highly considered. In future research, more efforts could be put on studying the impact that these technologies have on private lives as well as on community. When projecting and developing new form of technological assistance, the emotional side of people, especially elderly, deserves special attention.

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