
R&D Policy of the Korean Government for Aging Society

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Abstract

The 1st National Plan for Aging Society with Low Fertility, which the Korean government announced in 2006, caused the gradual increase of R&D investment in order to prepare for an aging society in Korea. This study explores if the directions and strategies of R&D projects related to aging are suitable to improve the quality of life for elderly people and establish a sustainable aging society by analyzing the features of R&D investment from 2004 to 2010. The results show that most R&D projects conducted by departments focus on the development of assistive devices for the elderly to support everyday lives. The Korean government's R&D policy to prepare for an aging society is based on the narrow interpretation of Quality of Life (QoL) in an aging society that tries to resolve the socioeconomic problems of the elderly; however, the policies have ignored the independence of active elderly individuals and the social integration of the young and elderly generations. The research shows that a paradigm shift is required from a 'Senior' to 'Aging Society' because almost 1/3 of the Korean population is over 65 years old and the expansion of the research embraces from assistive technologies for the elderly to the design of social infrastructure such as transportation, education and work.

Keywords

Demographic change, Age friendly industry, Saeromaji Plan, Assistive technology.

1. INTRODUCTION

Korea is aging faster than any other country in the world. As of 2010, people aged 65 and over represent 11.0% of the entire population in Korea and the number is expected to increase to 14.3% by 2018 (Statistics Korea, 2011a). Korea has passed the aging society stage and is now becoming an aged society. Korea is expected to be the country with the oldest population in the world by 2050 (UN Department of Economic and Social Affairs, 2005).

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A prominent feature in the Korean demographic change accompanied with a low birthrate. Statistics Korea estimated in 2010, that for every 100 youth population (1-14 years old), the population aged over 65 years was 68. They also predicted that this trend will intensify by 2016 and that those over 65 years of age will be 100.7 for every 100 youths, exceeding the youth population (Statistics Korea, 2012). The birth rate will continue to decrease and the aging society index will gradually increase.

The response of the Korean government to an aging society was relatively slow considering the pace of its demographic change. However, the government announced The 1st National Plan for Aging Society with Low Fertility (*Saeromaji Plan*) in 2006 and has pushed forward a diverse array of R&D projects as well as a variety of welfare programs for the elderly. In particular, this tendency caused the gradual increase of R&D investment to prepare for an aging society in Korea. The new R&D projects have just been launched and it is too early to discuss the investment results; it remains necessary to investigate the social and political goals that the R&D projects pursue as well as examine their propriety in order to facilitate the contributions of the projects to an aging society.

This research examines how Science and Technology Policy in Korea has responded to an aging population that is expected to generate enormous changes in society; subsequently, it first investigates the social and political background of Korean R&D government projects related to an aging population. To understand the social and political context, this study analyzes the national aging trend, its features, the relevant social discourse, and *The 1st National Plan for Aging Society with Low Fertility* established by the Korean government; additionally, it explores how existing R&D projects have regarded the aging phenomenon.

This paper examines the status quo of R&D projects associated with an elderly or aging society that the Ministry of Education, Science and Technology, Ministry of Knowledge Economy and the Ministry of Health and Welfare have conducted. In addition, it analyzes the project research topics and the R&D investment trends with data collected via the NTIS (National Science and Technology Information Service). This research analyzes the limits of the existing R&D projects in terms of population aging. Finally, it outlines future policy tasks required for implementation.

2. SOCIAL AND POLITICAL BACKGROUND OF R&D RELATED TO POPULATION AGE

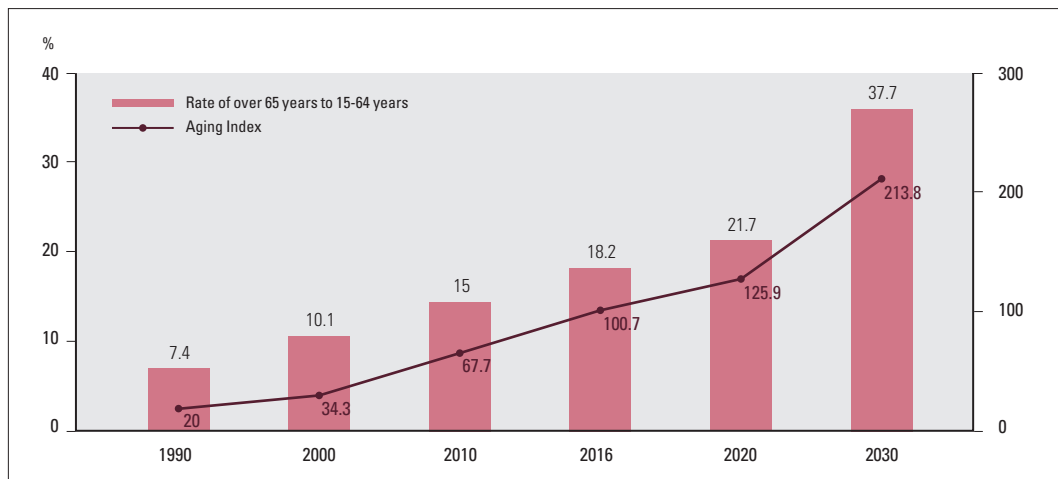
2.1. Social Background: Demographic Change and Increased Social Burdens

The most important feature of population aging in Korea is its fast pace. Figure 1 and Figure 2 show that the Korean population is aging at the fastest pace among OECD countries. This rapid change has increased the number of senior citizens who live alone because the extended life expectancy in Korea has increased the lifespan of widowers. Traditional Confucian family support will gradually weaken and the growth of the elderly who live alone will exasperate social spending by the Korean government.

Many researchers believe that the demographic changes will have negative future implications for individuals and society. Many research papers on this issue note the possibility of economic or social crises caused by social or cultural conflicts between generations (Hong, 2007; Lee, et al., 2008).

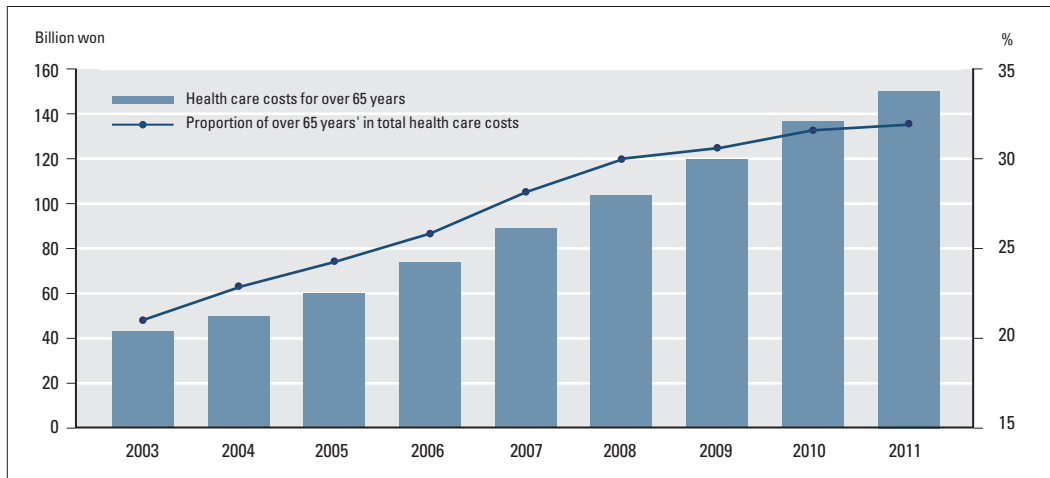
The negative future view of Korean society is mainly based on the implications of an aging society. One of the possible results of the reduction of working population is that productivity and the national GDP will significantly drop. It is highly probable that the reduced labor force will lead to low economic growth. A study conducted by the Seoul Development Institute illustrates that the population between the ages of 15 and 64 (categorized as the productive population) will be reduced from 7.6 million in 2009 to 7.19 million in 2020 and that their average age (31.6 in 1980) will be 42.3 years in 2030 (Seoul Development Institute, 2010). In addition, future generations will face a higher financial burden to support an increased number of senior citizens. The ratio of labor population to general population over 65 is expected to change from 6.6:1 in 2010 to 3:1 in 2030 (Statistics Korea, 2011a). In particular, the costs of health care for the elderly will be a significant burden on the younger generation. The medical expenses per capita paid to care or treat the elderly will continue to grow. The proportion of costs for those over 65 years out of the total costs was around 20% in 2003; however, the figure increased to 31.6% in 2010. There is a high possibility that future Korean generations will bear a proportionally heavier elderly care expense than now.

FIGURE 1. Elderly Dependency Ratio & Aging Index.



Source: (Statistics Korea, 2011a)

FIGURE 2. Health Care Costs for the Elderly in Korea.



Source: (Statistics Korea, 2011a)

2.2. Political and Economic Background: Saeromaji Plan 2010 and Senior Friendly Industry

In 2002, the Korean government first stated the necessity for action on an aging society in terms of R&D policy via *The First Science and Technology Basic Plan (2002-2006)* (NSTC, 2001). The plan admitted that the national science and technology policy of Korea had neglected public and social issues such as quality of life, safety and social security; subsequently, it insists that future policies should focus on the development of public welfare technology (Ministry of Finance and Economy 2003). In this context, the plan suggests the necessity of the development and application of ‘silver technology’. The first basic plan intended to overcome social problems caused by the demographic changes through the development of technology and promotion of senior-friendly industries. However, the intention of the Korea government was absent in actual R&D projects.

R&D projects designed to deal with demographic changes began in 2006 when *The 1st National Plan for Aging Society with Low Fertility* (Saeromaji Plan 2010) was established. At that time, the government decided to introduce ‘long term care insurance’ and a ‘basic old age pension system’ in order to respond to an aging society. These institutional programs can guarantee long-term security for the aged and help reduce social conflicts caused by economic inequality. The government has made a reasonable decision; however, the government has yet to solve the financial problems that the new institutions will generate. The government should foster senior-friendly industries to boost economic growth by dealing with the financial problems.

The first national plan highlighted the development of social security after retirement, reducing health care costs related to geriatric diseases, improving the health of the elderly, creating jobs for senior citizens and establishing improved living conditions as primary government initiatives (Korean Government, 2005). The government emphasized the economic participation of the elderly because it had to suggest financial solutions to the burdens due to newly introduced programs and

institutions. In 2003, a team in charge of establishing a long-term care system for the elderly was organized; in addition, the government initiated the *Act on Long-Term Care Insurance for the Aged* in 2005. The first plan was instigated under the apprehension of the 2008 economic recession and increased social burdens (Jung, 2011; Lee, 2011). The Korean public agreed that welfare expansion should be part of a contribution to economic growth due to concerns about increased social burdens and low economic growth. Subsequently, the government suggested the promotion of senior-friendly industries and announced a *Senior-friendly Industry Promotion Strategy* in 2005 to organize a Senior-friendly Industry Team. Consequently, R&D projects to prepare for an aging society have been actively conducted to foster industries. In addition, science and technology policies (such as the development of technology to support daily life and health care technology development) have been implemented. In this context, the Korean government selected senior-friendly industries in 2009 as a 'New Growth Engines for the Next Generation'; in addition, science technology came to be considered as a growth engine in times of crisis. Government departments have now launched R&D projects that concentrate on themes based on key words such as senior-friendly, aging society and the elderly.

2.3. Is It the Right Way to 'Quality of Life (QoL)' in Aging Society'?

The 1st national plan and government's R&D strategy focused on the establishment of a sustainable society that could simultaneously meet public welfare needs and promote economic growth. However, how the government understands 'Quality of Life (QoL)' issues that senior friendly technology pursues is also important. To answer this question, some conditions of QoL in an aging society have to be considered.

First, the quality of life needs of the elderly are not simply solved by any single factor such as health or economy. Factors that determine quality of life for the elderly can be divided into health factors, social relationship factors, economic factors, and safety factors. These factors have a high level of interdependency; therefore, they require an integrated approach to improve their quality of life (Bowling et al., 2002; Pinquart & Sorensen, 2000; Han, 2008). Various multiple conditions (not just only physical or economic conditions) are required to make the lives of the elderly more independent and substantially improve the quality of life (Cho, et. al., 2007).

Second, the quality of life in an aging society does not always mean one exclusively for senior citizens. The elderly will represent more than one third of a future society and this demographic feature requires other generations to harmonize with them to maintain continuity. A harmonious society can be established by allowing people in every age group communicate with each other, share convenient transportation, have comfortable housing, and actively participate in the economy and cultural activities. An aging society needs to totally transform existent patterns of production and consumption, traffic systems, housing conditions, and thoughts in regards to education and culture.

The young generation are responsible for caring for the elderly in retirement. However, this will change due to internal changes in the Korean elderly population and the makeup of the traditional family type.

Third, A majority of the elderly in Korea live in poverty and the elderly poverty rate in rural areas is the highest among OECD countries, accounting for 45.1% (Pensions at a Glance 2011: Retirement-income Systems in OECD and G20 Countries). The number of senior citizens who get into car accidents increases every year. The number of car accidents related to the elderly was 4,303 in 1997 and the figure has continued to grow from 8,141 in 2000 to 12,584 in 2005 (Road Traffic Authority, 2006). The national pension that people aged between 60 and 79 years receive on a monthly basis is about US\$ 300 and their average salary is US\$ 1,300 per month is less than the average monthly wage (US\$ 2,020) in Korea (Statistics Korea, 2011b). Their working environments are also very poor. The industrial accident rate of worker aged over 50 grew increased from 27.6% in 2001 to 31.4% in 2005 (KOSHA, 2005). The data illustrates that it is necessary to design new work processes and work conditions for the elderly.

The next part will examine if the government has applied the meaning of quality of life to 'senior friendly technology' development projects. The research will now examine the research projects of various departments of the Korean government, classify R&D projects by subject and analyze the features.

3. RESONSE OF SCIENCE & TECHNOLOGY POLICY TO POPULATION AGING

3.1. R&D Project by Ministries

In Korea, the Ministry of Education, Science and Technology (MEST), the Ministry of Knowledge Economy (MKE) and the Ministry of Health and Welfare (MHW) conduct R&D projects to prepare for an aging society. The programs in 'The R&D Project for Public Welfare and Safety' by MEST primarily focus on the implementation of basic or source technology R&D to overcome physical disabilities and diseases. 'The Quality of Life Technology Project' by MKE is to improve quality of life opportunities. The project targets all social groups; however, programs in the project specially help support the disabled and the elderly. 'The Assistive Technology R&D Project for the Elderly and the Disabled' by MHW concentrates on the development and improvement of assistive technology and devices to replace imported technology and devices that are widely used in Korea. R&D projects that the departments pushed ahead respectively are as follows:

Table 1 shows that most R&D projects to prepare for aging society have been conducted by MEST, MKE and MHW. MEST pursues its goals through R&D projects for an aging society based on the improvement of public welfare and the formation of an infrastructure for a safe society. R&D projects by MKE are to promote public convenience in daily lives. MHW invests chiefly in the development of assistive technology and devices to help rehabilitate the elderly and disabled with a focus on the implementation of domestic production in order to lower prices.

TABLE 1. Representative R&D Projects by Korean Ministries for an Aging Society

Project	The Quality of Life Technology Project	Development of Technology to Promote Public Convenience		The R&D Project for Public Welfare and Safety		The Assistive Technology R&D Project for the Elderly and the Disabled
Ministry (Year)	MKE (2010-)	MKE (2011-)		MEST (2010-)		MHW (2011-)
Key Goals	Improving the quality of life of vulnerable people such as the elderly, disabled and low income families	Promoting public convenience in their daily lives		Promoting public welfare and safety		Improving the quality of life for the elderly and disabled people
Main Topics	Assistive technology and devices for the hearing and visually impaired and mentally handicapped	Policies on safety accidents and natural disasters		Assistive technology and devices for the elderly and disabled	Policies on food safety and natural disasters	Assistive technology and devices for the hearing and visually impaired and mentally handicapped
Target Group	Disabled Senior citizens		The public	Disabled Senior citizens	The public	Disabled Senior citizens
Type of Technology	Application Technology			Basic and Source Technology	Application Technology	
Number of Programs	7 (2010)	2 (2011)	N/A	7 (2010)	3 (2010)	N/A
Project Budget	9 billion won (2010)	4.7 billion won (2011)		4.5 billion won (2010)		2.5 billion won (2011)

MKE and MHW projects deal with similar research topics (although their respective purposes are different) and are to foster senior-friendly industries through a commercialization of domestically developed assistive technologies. MEST and MKE projects are similar in that the policy targets are divided into the disabled and elderly as well as the public. However, the ministries all seem to set more value on the disabled and elderly group than on the public by mainly developing assistive technology rather than conducting research associated with safety issues such as the prevention of food poisoning. The three ministries all tend to concentrate exclusively on assistive technology development and industrial success.

Next, the study will look into the status quo of R&D investment.

3.2. R&D Investment Features of the Korean Government¹

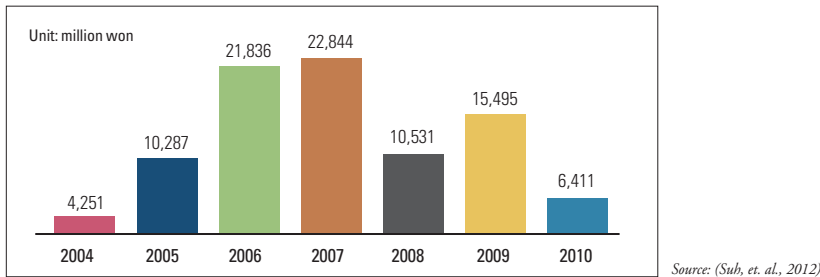
The investment from the Korean government in R&D associated with an aging society suddenly increased from 2006 to 2007. This appears to be because the government strived to foster senior-friendly industries; however, in 2008 the figure decreased by half and in 2010, it fell to the lowest level since 2005, when *The 1st National Plan for An Ageing Society with Low Fertility* was prepared. During this period, the Korean government changed from a left of center president Roh, Moo-hyun

¹ In the Data Bank 'National Technology Information System (NTIS)' are all of the research projects, which are in the period from 2004 to 2010 by Korean Government financed, filtered with the search word "aged society, aging society, senior, old people". The research projects in the area of bio- and pharmaceutical science are excluded.

to a more right of center president Lee Myung-bak. The Korean government has not established a long-term and stable plan in this area; therefore, this research area is very responsive to the policy stance of the regime.

The amount of the R&D investment has remained at the lowest level. In 2007, the investment reached the highest point and its portion of the entire national R&D investment was only about 0.2%.

FIGURE 3. National R&D Investments for an Aging Society (2004-2010).



In terms of research topics, the largest amount of resources were devoted to studies on supporting the physically disabled from 2004 to 2010. The second highest investment was made in research to improve the relevant policies and institutions; in addition, investment in the studies to train human resources for service industries was the third highest during the same period. However, research on the necessities of life, infrastructure, and behavior of the elderly received a very low level of financial support.

FIGURE 4. National R&D Projects for Aging Society by Topic (2004-2010)

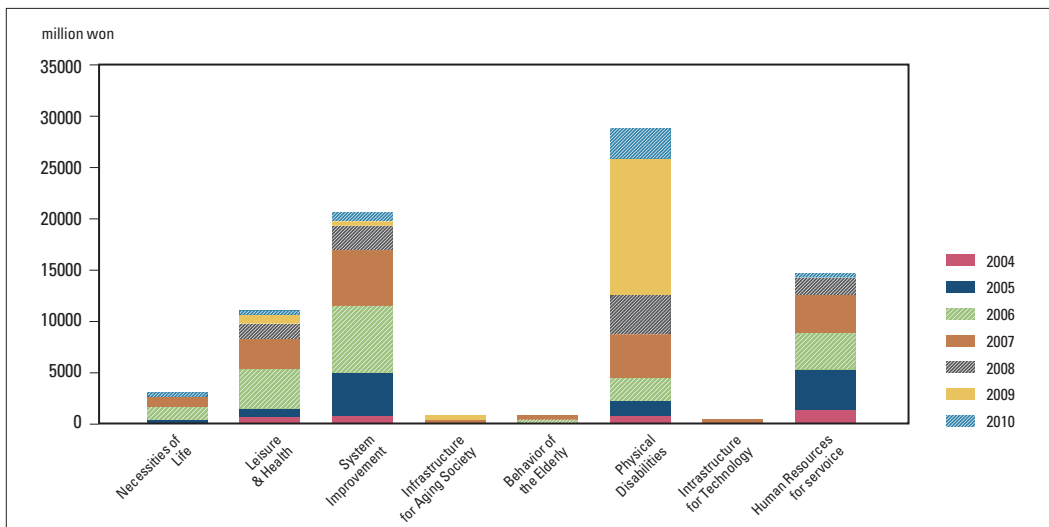


Figure 4 illustrates the features of the R&D projects conducted in the respective years. In 2004, the research was mainly performed to train human resources for the service industry versus other topics that failed to receive adequate financial support and attention from the government. The most predominant feature of the investment trend in 2005 was that the studies on the improvement of relevant policies and institutions drastically increased. The first national plan was in course of enforcement and this situation seemed to cause a significant increase in the field. Subsequently, the R&D projects between 2006 and 2010 were conducted based on the first national plan, whose ultimate goals were to prepare policies for the elderly and foster senior-friendly industries. In 2006, investment increased in the fields of human resource training (for the service industry) and to promote health. This character is closely associated with the idea that leisure and care represent a great part of the senior-friendly industry. In 2007, studies on how to alleviate the difficulties that the elderly and disabled have in their daily lives started to receive significant attention and financial support. In particular, the investment in the field related to the physically handicapped was significantly higher than in any other field in 2009 and 2010. This is because the ministries initiated significant R&D projects such as *The Quality of Life Technology Project* and *The R&D Project for Public Welfare and Safety*. Therefore, it is clear that the highest funded research field was in regards to the physically disabled under the circumstances that the Korean government pushed ahead with the promotion of senior-friendly industries. However, research fields related to the behavior of the elderly or infrastructure (including traffic, communication and urban planning) were still neglected. Especially, government expenditures for the studies on the necessities of life (including food, clothing and shelter) and infrastructure construction projects (such as the establishment of a test-bed for new technology for an aging society) were very low.

4. S&T POLICY FOR AN AGING SOCIETY IN JAPAN

R&D projects on an aging society in Japan have important messages for seeking a new way to improve Korean R&D policy. The background to the R&D projects in Japan is very similar to Korea, but their ultimate goals are definitely different from those of Korean R&D projects.

The similarity is because both Japan and Korea have severe worries about their rapidly aging populations. In Japan, it was the mid-1970s (Tanaka's government period) when aging became a national concern as the proportion of the elderly represented 8% of the entire population. In the 1980s, the Japanese government established the Ministerial Meeting for Longevity and an Aging Society to counter population aging. After that, the government promulgated *the Framework Act on Preparation for Aged Society* in 1995 based on the results of research conducted over three years. The government continued these efforts; however, discourses on aging in Japanese society covered a variety of subjects such as the effects of aging on economic growth, employment and pension as well as the expectations of social spending in terms of cost and social need. The long-term economic recession in Japan made people more aware of the problems of an aging society (Kim, 2004). The Japanese economy faced a population decrease and an aging society after escaping from the initial shock of the real estate bubble collapse; therefore, it became necessary to overcome problems and reduce welfare expenditures. The Japanese Ministry of Health, Labour and Welfare began to take the lead

in R&D project investments in regards to an aging society with a focus on health and medical services (see KHIDI, 2012).

The main difference between Japan and Korea is in how to promote R&D projects. Japan focuses on the application and improvement of developed technologies to the elderly and evaluates them in terms of user satisfaction. The country tries to actively assess the diverse needs of users and develop new technologies. Japan has fostered various specialized institutions and organizations that analyze the characteristics of the elderly and observes their technology demands. There are medical research centers on anti-aging or longevity and the *Association for Technical Aids* helps develop and improve daily necessities. This association focuses on R&D project planning, human resource training, and technology standardization for the disabled. In addition, the Institute of Gerontology at the University of Tokyo is a representative research center that specializes in analyzing social issues caused by population aging. The institute now conducts 'Redesigning Communities for Aged Society' to find solutions to social problems that are expected to evolve in a super-aged society. This project deals with subjects in diverse fields such as housing, traffic, information systems, and labor environments.

5. CONCLUSION: PROBLEMS AND NEW POLICY DIRECTION

5.1. Problems

The study examined the Korean government's plans and policies to prepare for an aging society as well as investigated how policies have been applied to the science and technology field. Subsequently, two conclusions were drawn from the analysis.

First, the results of the analysis show that the science and technology policy in Korea prepares for an aging society with a focus on minimizing social costs by supporting the lives of the elderly with up-to-date technologies. This perspective encourages the government to keep investing in the research on technologies that are helpful for the daily life of the elderly and are easy to commercialize as well; subsequently, it is likely that the target group of R&D projects associated with an aging society will be exclusive to the elderly in need. However, *The Assistive Technology R&D Project for the Elderly and the Disabled* by MHW, The Quality of Life Technology Project and The Elderly-friendly Medical Instrument Development Project by MKE are all mainly on how to improve rehabilitation programs, care services, and everyday life convenience for the disabled or elderly people. However, the group that needs the technologies is only part of the elderly population and it is necessary to conduct R&D projects to meet the elderly's various needs.

Second, Korean R&D projects tend to focus on the elderly rather than an aging society. Studies on the necessities of life, infrastructure, and lifestyle for the elderly are insufficient; however, research that concentrates on technologies to assist individual life represent most R&D projects. The government appears to have no interest on how to establish an aging society where all the people have to interact in the future. This is largely because the first national plan highlighted the improvement

of elderly individuals' health and economic stability, and fostering senior-friendly industries. In addition, the elderly population gradually became to be regarded as consumers or market participants as the industries grew. This point of view further reinforced research trends. Preparing for an aging society in the science and technology field is to develop technologies that can foster senior-friendly industries. Most government R&D project investments in regards to an aging society intend to promote industries and ultimately pursue economic profits through a business expansion. This approach is generally evaluated as a method to simultaneously achieve the improvement of welfare and economic growth. The aging society policies that the government implements in the science and technology field tend to emphasize industry more than welfare; therefore, there is a danger that public welfare may be neglected by economic logic.

5.2. Paradigm Change: From the 'Elderly-centric' to 'an Aging Society-centric'

'An aging society' is an additional expression of a 'future society.' We must anticipate how our lifestyle will change in the future so that science and technology policy appropriately responds to an aging society. There is a consensus on a future society that R&D projects associated with aging have to assume as a priority. However, existing R&D projects have two faults. One is that they focus only on the physically handicapped elderly's convenience and do not consider those of other generations. Another is that they regard the elderly as a group of vulnerable people that require welfare rather than citizens who can participate in economic, political, and cultural activities (Suh, 2010).

Korean society needs broad discussions on how to transform social structures that include food, housing, transportation and labor in response to an aging society. In this process, science and technology have to broaden the research and policy agenda to contribute to the reduction of a social burden that can create new opportunities for sustainable economic growth.

Senior citizens have traditionally been considered a minority group and individuals supported by the younger generation. However, this view is hard to accept in the future, in consideration of the elderly who are active in economic, social and cultural fields. Furthermore, it will be more unreasonable in an aging society where nearly one third of the entire population will be senior citizens and the most prominent segment of society. The government must formulate and implement policies in regards to the elderly as respectable citizens in order to establish an aging society where every generation can be in harmony. In conclusion, new R&D projects are required to change in the following manner.

First, investment in R&D must be planned from a continuous and long-term perspective. This study verified that investment trends sharply changed when national governments change. However, an aging society does not only imply a society for the elderly, but a future society for people of all ages. R&D projects decisions and performance has to be based on a reasonable long-term macro-strategy; therefore, consistency and coherence in science and technology policy are required.

A R&D road map to prepare for an aging society should be established in accordance with a national future strategy. The goals and strategies of R&D related to an aging society should shift towards

the construction of a future society. Current R&D projects in regards to an aging society and senior citizens are excessively oriented towards the product development of rehabilitation and assistive technologies. Studies on individual lifestyle changes (including the various generations or working environments) and social infrastructure (including transportation, communication and urban planning in an aging society) need to be initiated.

The 2nd National Plan for An Aging Society with Low Fertility established in 2010 shows a significant difference from the first in terms of goals (Korean Government, 2010; Jung, 2011; Lee, 2011). The second national plan suggests two goals. One is to redesign the existing production method in all areas (including the economy, culture and education) in order to make it suitable for demographic changes. Another is to improve the quality of life of the elderly. The first national plan focused on simply assisting the elderly's life and the second national plan emphasizes upgrading the quality of life in an aging society. This difference demonstrates the intention of the government to use a macro policy that can generally improve the sustainability of society rather than micro approaches (such as supporting the lives of senior citizens in vulnerable groups). Therefore, preparation for an aging society will be a major task in the science and technology field, as the first and second national plans are continuously carried forward.

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