The Comparative Research of Universal Design Based on Korean and Japanese Demographic & Economic Change

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Abstract: This paper analyzed the current status of universal design in the Republic of Korea (Korea) and Japan. In the case of Japan, the aged society or the super aged society has been preparing from 1985 when the aging rate was 10%. Japan's activity to prepare it became promoted during 1990's when per capita Gross National Income (GNI) was $20,000~40,000. In Korea, the preparation for the aging society such as physical environment, barrier free buildings or traffic systems, economic support and investigation or survey is not yet sufficient. Korea must start preparation for an aged society, possibly and quickly. And it needs to prepare until 2026, when the aging rate will be 20%. To prepare a barrier free and an aged society must consider both aging and economic status.

Keywords: Universal Design, Barrier Free Design, Normalization, Aging Rate, Gross National Income

1. Introduction

The Republic of Korea (Korea), fastest aging nation among the member countries of the Organization for the Economic Cooperation and Development (OECD), officially became the aging society in 2000 when persons aged over 65 made up 7.2% of the population. According to the National Statistical Office (NSO) of Korea, older persons increased to 3.77 million in 2002, compared with 2.2 million in 1990 and 1.46 million in 1980. It can be forecasted that Korea is destined to become the aged society with the figure rising to 14.3% by 2018. The NSO warns that Korea will enter the super aged society in 2026. Although nearly all OECD member countries face rapidly aging populations, the problem for Korea is that it is expected to have the fastest pace due to the combination of a low birth rate and increased longevity. So, it is a time to prepare for an aged society.

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Japan has already been an aged society since 1994. The present ratio of older persons is calculated at 19.5%. In 2006, it should be predicted by entering in the super-aged society that the older persons will be 20% of the population. Also, Japanese disabled persons have about 5% of population. The ratio of disabled persons is increasing. Because of the influence of appetite culture and environment pollution, the number of children with mental and physical disabilities is not decreasing. And a person who has an acquired disability by traffic accident goes on increasing. All OECD member countries show the same trend as Japan. This increasing trend of older and disabled persons has an influence on the market of goods and services. So, adopting the concept of universal design to use regardless of age or disability is booming in political, cultural, and social systems in Japan. Japan established policies and laws and acts to spread universal design from 1985, at 10% of the aging rate and around 20,000 dollars of per capita Gross National Income (GNI). For example, the acts to barrier-free for traffic environment [1] and buildings [2] were worked out. Also, Japan is leading in establishment of international standards to address the needs of older and disabled persons.

This paper compared historically the current status of universal design in Korea and Japan. Because a universal design is an alternative for an aged society, the aging of Korea and Japan appears a priority among OECD, and two countries have alike and close social and economic systems historically. Korea will enter into the aged society at 2008, and it is presently becoming a social issue. To prepare an aged society, physical and non physical barriers must be removed. But such activities have to be established and carried out under considering aging rate and economic status. Therefore this paper analyzed relations between aging rate and per capita GNI of Korea and Japan. Finally, for the aged society of Korea, this paper suggested reference year and guideline considering its relations.

2. A Disabled & an Older Person in Korea and Japan

In table 1, the current status of persons with mobile disabilities in Korea was shown [3]. In 2003, the disabled persons of Korea were 1.50 million, older persons were 3.97 million, children aged 9 under and infants were 5.96 million. So, persons with mobile disabilities were about 25% of population (12 million). Even though repetition of data is allowed, the data show us that persons with mobile disabilities aren't a low percentage in Korea, and it is time that they should be considered.

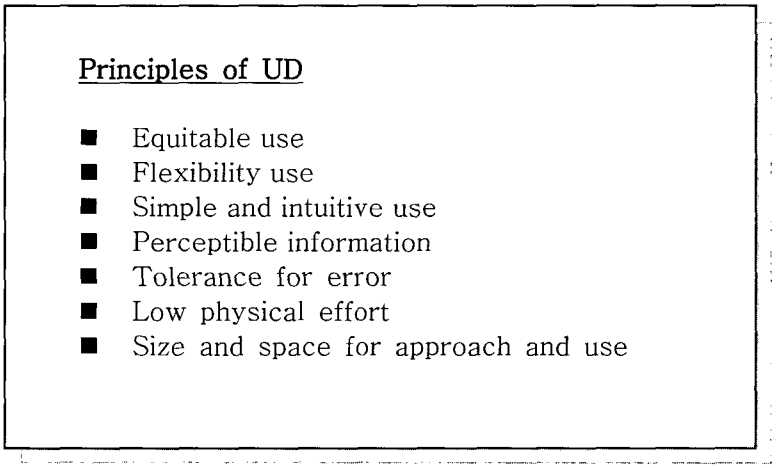
In case of Japan, by "2005 White Paper of Disabled Person", disabled persons occupied about 5% of the population. The current status of persons with disabilities was printed in Table 2 [4].

The Japanese government printed "2005 White Paper of Older Persons." According to this report, older persons of Japan were 19.5% at Oct. 1, 2004 [5]. By NSO of Korea, older persons of Korea were 9.1% at 2005, the aged society. Aging estimated was summarized in Table 3. In Table 3, we can see that Korea will come into the super society from the aged society after an interval of only 8 years. Some cities or districts of Korea have already entered the super aged society.

3. Universal Design

3.1 The History and Definition of Universal Design

The American National Standard Institute (ANSI) announced an ANSI A117.1, making buildings accessible to and usable by the physically handicapped, in 1961. Other Acts established were: The Architectural Barriers Act in 1968, The Rehabilitation Act in 1973, and The Equal Education for All Handicapped Children Act in 1975. In 1990, an American with Disability Act (ADA) was established to widely protect the rights of disabled persons. The ADA evaluates facilities that the disabled person can't use as "discrimination," and guarantees an even opportunity for employment and the user's rights to the product and service. By the acts, a systematic frame that secures a disabled person's right of accessibility/mobility advanced greatly. But, the act is an only minimum standard so that a disabled person can easily use products and services, though it meets the criteria under the laws. It is neither the act for entire products and services nor maximum. In other words, the majority of disabled persons still experienced inconvenience in using products and services. Also, due to accidents, peoples who had disabilities increased in America, and they demanded removal of mental and physical barriers. In such status, Ronald L. Mace, founder of the Center for Universal Design of North Carolina State University, put forward a universal design. This concept is to make products and services that anyone can use regardless of age, physique, or disability. He suggested the seven principles for universal design such as follows [6].



The similar concepts of universal design were "join-used goods (kyoyo-hin in Japanese) in Japan [7]," "barrier free design in USA [8]," "normalization [8] and design for all in EU [9]." In table 4, universal design and similar concepts were compared.

3.2 The status of universal design in Japan

3.2.1 The market size

Actually, the definition and range of the product of universal design has not cleared in Japan. So, to analyze the market size of universal design's product, this paper referenced the report of "The marketing research of joint-used goods [10] by Kyoyo-Hin Foundation. It has carried out the research since 1997. The report assumed the things which were designed for older and disabled persons among household appliance

products (including AV, information and communication machinery), an elevator, a vending machine, a toy, a car, to be joint-used goods. In Figure 1, the Japanese market size of joint-used goods was diagramed. The Japanese market size of joint-used goods was calculated with 1,120 billion yen in 1997 and 2,341 billion yen in 2002. The 2002's market size increased 5.6% (100 billion yen) in comparison with 2001. Because of stagnation of the Japanese economy, household final consumption expenditure has decreased since 1997. Under such economic conditions, joint-used goods showed the growth of 5-10% every year. This proves that the rate of universal design increases greatly in a commodity economy. Also a universal design is spreading to the field where it didn't progress on in before. Therefore, it generally can expect annual market expansion for 10% and more. If it estimates at this growth rate with 2025 becoming a peak of aging, the market size is about 1,600 billion yen (equivalent to about 5% of private final consumption expenditure). Otherwise, silver market size for the older persons in Japan was estimated as 38 thousand billion yen in 2000 and 115 yen thousand billion in 2025 [11].

3.2.2 The action in industries and various groups for universal design

As action related to universal design, Japan's industries and groups are setting, spreading and investigating of individual guidelines by product. Table 5 and Table 6 show guidelines made by each group. The groups and its guidelines related to universal design were printed in table 5, and the content of activity of groups that are working in table 6.

4. The current Status of standardization

There is no trial to standardize universal design in itself, but international, Korean, and Japanese standards supporting universal design are being established. The International Organization for Standardization (ISO), the Korean industrial Standards (KS), and the Japanese Industrial Standards (JIS) related universal design were compared in Table 7 [12~14]. ISO/IEC Guide 71, guidelines for standards developers to address the needs of older persons with disabilities, was accepted in KS A ISO/IEC Guide71 and JIS Z 8071. To provide basic concept of the method of designing the human center of daily life product, ISO 13407 was enacted in June, 1999. And it was accepted already in JIZ Z 8530. Comparatively, the KS and the JIS meets the ISO.

5. The Guideline for the Aged Society of Korea

Table 8 summarized the principal activity of Korea, Japan, United Nation (UN) and other countries to design a universal or barrier free society. In the case of Japan, universal or barrier free design developed actively from 1985, when the aging ratio was 10%. In 1990, "Gold Plan (1990 ~ 1999)" started. And then, "New gold Plan (1995 ~ 1999)," and "Gold Plan 21 (1999 ~ 2004)" were carried out to meet an aged society. In 2000, the Japanese government established "The Act of Barrier Free for Traffic System" and "The Insurance for Care Service of Older Persons." In 2004, "The Standard of Barrier Free for Information" was constructed. The feature of Japan to an aged society is that universal and barrier free design was led by

the Japanese government and an aged society was prepared during over 20 years.

The data to show the status of universal design of Korea is not sufficient. In Korea, the status of the industrial and governmental activity, and social environment about universal design could be evaluated as the stage of setting up. The market size of welfare or universal product of Korea was not investigated concretely. But, silver market size of Korea was estimated as 31 thousand billion won in 2010, 116 thousand billion won in 2020 [15].

In 2003, the Korean government recommended the abolition of education background and age limit in enterprises when an employee is hired [16]. The majority of public enterprises began to adopt it in 2005. Also, some private enterprises start to delete items of disability, age in the application form. Such actions can be evaluated as very important and efficient to build a universal society without non-physical or social barriers. Because a universal design's concept must enter into cultural and social consciousness besides, products and physical environment to achieve an advanced universal society [17]. We can see that, in the case of Korea, activities for barrier free buildings and products considering older/disabled persons are not enough by Table 8.

Figure 2 showed relations between the aging and the economy of Korea. In 2008, Korea will meet the era of $20,000 per capita GNI and 10% of older persons. Generally, the turning point of growth of industry and economy was the era of $20,000 per capita GNI. Such was the same in the case of other an advanced countries including Japan. In Japan, a universal or barrier-free design was enhanced from 1985 when the ratio of older persons was 10% and per capita GNI was around $20,000. The Korean government was operating "The plan for activation of aging society" to prepare for the aged and the super aged society from 2005. The plan was described in Figure 3 [15]. The vision of the plan is "to Gold from Silver." The plan's three ways consist of securing international competitiveness, improving marketability, and improving publicity. And four strategies are: selection & concentration, step-by-step promotion, establishment & revision of related acts or laws, and construction of a pan-governmental promotion committee.

The Figures 4 and 5 printed aging rate and per capita GNI of Korea and Japan. The assumption line of aging rate and per capita GNI of Korea were shifted 30 years later from 2000. Because the aging rate of Korea in 2000 and that of Japan in 1970 were about 7%, the aging society. The Korea shifted line and Japan showed a similar tendency. But, two lines indicate difference in the value of per capita GNI. In 1970, per capita GNI of Japan was 3,886 dollars and that of shifted Korea was 10,841 dollars [18~20].

In Figure 6, we can know more that the tendency of aging rate and per capita GNI, representing life quality of nation people, is similar. Aging rate will be 10% and per capita GNI will be about 20,000 dollars at 2008 in the case of Korea. Otherwise, aging rate was 10% and per capita GNI was about 20,000 dollars at 1985 in Japan. Korea's assumption line of aging rate was shifted to the point of 10% of aging rate of Japan in Figure 6. To prepare for an aged society or a super aged society, economic support is an indispensable element. For example, to reform buildings and subways to make a barrier free environment and to create services for older and disabled persons requires economic support. In the case of Japan, from 1985 when the aging rate was 10% and per capita GNI was around 20,000 dollars, activity began to design

barrier free societies, products and environment. Such Japanese activities to prepare for an aged society have grown up more within the 1990's high growth of economy, an era of per capita $20,000~40,000, under the government's lead by long term plan.

Recently, the Korean government decided to enforce "The Insurance of Care Service for Older Persons" from 2008, when per capita GNI will be about $20,000 and aging rate will be about 10%. The insurance in Japan became effective in 2000 when per capita GNI was $37,154, and the aging rate was 17.3%. So, the enforcement of the insurance of Korea shows somewhat early tempo, considering economic and aging status.

As illustrated by Figure 6 and Table 9 considering economic and aging status, this paper evaluated that the aged or universal society of Korea must be preparing from 2008 to 2026.

This paper suggested the guideline with time schedule for the aged society of Korea in Table 10. It was written out on the basis of activities of Japan. By figure 6, the reference year was defined as 2008 in Korea and 1985 in Japan when Korea's aging rate and Japan's were 10% and the per capita GNI were about $20,000. Besides, Table 10 tells it to us that Korea needs more action about mental care, architecture and products for older and disabled persons until 2026.

6. Conclusion

This paper investigated the current situation of universal design in Korea and Japan. In the case of Japan, the aged society or the super aged society has been preparing with enough time under government control. Japan's activity to prepare for the aged society was promoted during the 1990's when per capita GNI was $20,000~40,000. In the case of Korea, the establishment of standards was progressive, but Korea was evaluated that an economic support, an examination, a physical environment, and an act like barrier free buildings or products were not enough. It is time that Korea must begin activities to prepare for the aged society. And the aged society would be prepared for enough time or long term plan until 2026, when the aging rate will be 20%. This paper suggested the reference year and the schedule for the aged society of Korea. The reference year was defined as 2008 in Korea and 1985 in Japan.

Reference

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Table 1 The current status of persons with mobile handicaps in Korea

(Standard year: 2003)

	Sub-total	A disabled person	An older person	A pregnant woman	A children (5-9yr)	An infant and a baby
Population, million persons	12.15	1.50	3.97	0.72	3.44	2.52
A ratio in comparison with total population, %	25.6%	3.2%	8.4%	1.5%	7.2%	5.3%

Table 2 The current status of persons with disabilities in Japan

(Unit: 10,000 persons)

Classification		Total	Number living at home	Number admitted to facilities
Persons and children with physical disabilities		351.6	332.7	18.9
	Children with physical disabilities (under 18 years of age)	9	8.2	0.8
	Persons with physical disabilities (18 years of age or older)	342.6	324.5	18.1
Persons and children with intellectual disabilities		45.9	32.9	13
	Children with intellectual disabilities (under 18 years of age)	10.3	9.4	0.9
	Persons with intellectual disabilities (18 years of age or older)	34.2	22.1	12.1
	Age unknown	1.4	1.4	0
Persons with mental disabilities		258.4	223.9	34.5
Total		655.9	589.5	66.4

Table 3 An aging status in Japan and Korea

	Aging society	Duration	Aged society	Duration	Super aged society
Korea	2000 yr, 7.2%	18yr	2018yr, 14.3%	8yr	2026, 20.8%
Japan	1970 yr, 7.1%	24yr	1994yr, 14.1%	12yr	2006, 20.2%

Table 4 The definitions of universal design and others

Name	Definition	Origin
Universal design	Design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design	Ronald L. Mace, USA, 1989
Joint-used goods	A product and service that all person who with and without disability or impairment use to easily	Japan, 1998
Normalization	Making social environment, mentally disabled person can keep house with health person	Denmark, N.E. Bank-Mikkelsen, Denmark, 1969
Barrier-free design	Remove of architectural, legal, economic, and social barrier	USA, 1968
Design for all	The design and improvement of environments, products and services with the aim that everybody, including future generation, regardless of age, gender, capacities or cultural background, can enjoy participating in the construction of our society with equal opportunities and been able to participate in social, economic, cultural and leisure activities.	European Institute for Design and Disability, 1995

Table 5 Groups and guidelines related to universal design in Japan

Group's name	Guideline's title
Association for Electronic Home Appliance http://www.aeha.or.jp/	A guideline for development of household appliance to use easily for a older person/a disabled person
Japan Electronic Industry Association http://www.jeida.or.jp/	A guideline for accessibility of information machinery for disabled person
Japan Elevator Association http://www.n-elekyo.or.jp/	A guideline about an elevator for physically disabled person
Japan Vending Machine Manufactures Association http://www.jvma.or.jp/	A guideline for ticket vendor design for physically disabled person
Japan Housing Equipment System Association(closed since June 2005) http://www.jhesa.or.jp/	A study of the evaluation standard of a universal design to the equipment of a house system
Japan Toy Association http://www.toys.or.jp/	A guideline about toy which a child with disability of eye can share
Japan Packaging Association http://www.jpi.or.jp/	A point to consider package of barrier-free
Japanese Consumers' Co-Operative Union http://www.co-op.or.jp/jccu/	A guideline for packaging of the container that it is easy to use for all
Research Institute of Human Engineering for Quality Life http://www.hql.or.jp/gpd/jpn/www/	Printed items of requirement for universal design in the book, "structured user interface design and evaluation method"

Table 6 Activities and history of groups related to universal design in Japan

Group's name	Activity and history
Kyoyo-Hin Foundation http://www.kyoyohin.org/	To develop and spread joint-used goods, to consider service for person with disability, and to realize barrier-free society, this foundation was established in Mar. 1999
Universal Design Forum http://www.universal-design.gr.jp/	To exchange information of a company and user, a company, and company, a company and administration and to promote the making of product for all, it was established in June. 1999.
Universal Design Consortium http://www.universal-design.co.jp/	It was established in GBY Co., Ltd. publishing quarterly "Universal Design" in 1997. And, now about 20 companies are participating.
Japan Universal Fashion Association http://www.unifa.jp/	It's propose is that "a study, development and spread of a universal fashion both a physically unimpaired and impaired person," study and development of fashion for disabled and older person. It was established in 1998.

Table 7 The comparison of ISO, KS and JIS

Full Name	ISO	KS	JIS
Guidelines for standards developers to address the needs of older persons with disabilities	ISO/IEC Guide 71	KS A ISO/IEC Guide 71:2002	JIS Z 8071:2003
Basic human body measurements for technological design	ISO/AWI 7250-1	KS A 7004	JIS Z 8500
Human-Centered design processes for interactive systems	ISO 13407:1999		JIS Z 8530
Technical aids for persons with disabilities -- Classification and terminology	ISO/DIS 9999:1997	KS P 1010 KS P ISO 9999:2003	JIS T 0102:1991
Guidelines for the elderly and the disabled-Marking tactile dots on consumer products		KS P 1501;2004	JIS S 0011:2000
Guidelines for the elderly and the disabled-Controllability of consumer products		KS P 1502:2004	JIS S 0012;2000
Guidelines for all people including elderly and people with disabilities-Auditory signals on consumer products		KS P 1503:2004	JIS S 0013;2002
Guidelines for the elderly and the disabled-Auditory signals on consumer products-Sound pressure levels of signals for the elderly in noisy conditions		KS P 1504:2004	JIS S 0014;2003
Guidelines for the elderly and the disabled-Packaging and receptacles		KS P 1505:2004	JIS S 0021:2000
Guidelines for the elderly and the disabled-Packaging and receptacles-Test methods for opening		KS P 1506:2004	JIS S 0022:20001
Guidelines for designing of clothes in consideration of the elderly people			JIS S 0023:2002
Guidelines for older persons and persons with disables -- Housing equipments			JIS S 0024:2004
Guidelines for all people including elderly and people with disabilities--Packaging and receptacles--Tactile warnings of danger--Requirements	ISO 11683:1997		JIS S 0025:2004
Guidelines for the elderly and people with disabilities--Visual signs and displays--Specification of age--related relative luminance and its use in assessment of light		KS P 1507:2004	JIS S 0031:2004
Guidelines for the elderly and people with disabilities--Visual signs and displays--Estimation of minimum legible size for a Japanese single character			JIS S 0032:2003
Guidelines for older persons and persons with disabilities--Information and communications equipment, software and services -- Part 1: Common Guidelines			JIS X 8341-1:2004
Guidelines for older persons and persons with disabilities--Information and communications equipment, software and services--Part 2: Information processing equipment	ISO 13406-2:2001, ISO 9241-14:1997, ISO 9241-15:1997, ISO 9241-3:1992, ISO 9241-4:1998, ISO 9241-8:1997, ISO 9241-9:2000		JIS X 8341-2:2004
Guidelines for older persons and persons with disabilities--Information and communications equipment, software and services--Part 3: Web content			JIS X 8341-3:2004
A guideline for determining the acoustic properties of auditory signals used in consumer products--A database of domestic sounds			JIS TR S 0001:2002

Table 8 The principal acts and activities of Korea, Japan, UN and other countries to design universal and barrier free society

Year	Korea	Japan	UN and Other Countries
1959			Act of 1959[1] (Denmark)
1960		-Welfare Act for Persons with Metal Disability -Act to Progress Employment of Disabled person	
1961			ANSI publishes ANSI A117.1, making buildings accessible to the physically handicapped (USA).
1964			Civil Rights Acts(USA)
1968			The congress passed The Act of Architectural Barriers(USA)
1969		In Sendai, the movement enlarging of living right of disabled person was started. And then this movement was expanded nationally.	Declaration on Social Progress and Development(UN)
1970	The Act of Social Welfare	The Principal Act for Disabled Person	
1971			Declaration on The Rights of Mentally Retarded Persons(UN)
1972		In Machida city(Tokyo), bus with lift equipment services at first.	
1973		In Machida city(Tokyo) established The Act of Civil Construction Considering Disabled Person"	The Rehabilitation Act (USA)
1974		Figure language has begun to be serviced in TV	
1975			Declaration on The Rights of Disabled Persons(UN)
1976		Standardization of signal equipment for blind person	
1980		Ministry of Economy, Trade and Industry started "development of technology of care system for older and disabled persons," at first in housing field	WHO printed international classification of impairments, disabilities, and handicaps,
1981	-The Act of Persons with Disability Mentally and Physically -The Act of Welfare for Older Person	The Kyoto municipal enterprise in subway adopted barrier-free, at the first, among the public transportation	-International year of disabled persons(UN) -Establishment of Standard of Building Design Considered Disabled Persons(UN) -Special Education Needs(UK)
1982			-The New Traffic Act(France) -Adopting world program of action concerning disabled persons(UN) -The proclamation of The Decades of Disabled Persons (1983-1992)(UN)
1983		Act for Research and Development of Welfare Product	
1985		The incision was adopted for the phone card for blind peoples.	
1986		Establishment of a measure to long life society	
1988			Fair Housing Amendments Act (USA).
1989	Welfare Act for Disabled Persons	Establishment of a "Gold Plan (1990~1999)," strategy to promote health and welfare of old person for 10 years	
1990			Congress passed the Americans with Disabilities Act (USA)
1991			-Accessibility Guidelines for Buildings and Facilities (USA). -United Nations Principles for Older persons(UN)

[1] In Denmark, a social movement took place about the rights of the mentally retarded persons. A result of it was established The Act of 1959. In the introductory paragraph, it was stated that mentally retarded persons should live "as near to a normal life as possible."

1993		Establishment of Act for Disabled Persons	
1994		-Establishment of " a New Gold Plan(1995~1999) " -Enforcement of Heart Building's Law to promote to construct building that older and physically disabled person can use easily	
1995		-Establishment of regulation for making welfare city in every province -Printed guideline for household equipment to prepare long life society by Ministry of Land, Infrastructure and Transport -Printed disabled person's white paper by cabinet office	
1996		Starting loan service for barrier-free of house in annuity	
1997		Founded universal design's award in "Good design award" which is subjected by Ministry of Economy, Trade and Industry	
1998			The Amendments of Section 508 of the Rehabilitation Act (USA)
1999		-Gold plan 21[2] (1999~2004), -Kyoyo-Hin Foundation	
2000		-The Act of Barrier-free for Traffic System -Insurance of Care Service for Older person	
2001			WHO re-printed international classification of f unctioning, d isability and h ealth, (revision of 1980's)
2003	Korea government recommended that abolition of educational background, age limit in the application		
2005	-The Act to Progress The Mobility' Right for Physically Disabled Person -The Plan for Activation of Aging Society		
2009	Insurance of care service for older person, (executing schedule)		

Table 9 The comparison of aging rate and per capita GNI

	Older person's ratio; 10%	Achieved year of $20,000 per capita GNI	Aged society Year, per capita GNI	Period for preparing super aged society	Older person's ratio; 20%
Korea	2008	2008	2018, ($30,000) (assumption value)	2005 ~ 2024	2026
Japan	1985	1987	1994, $39,795	1990 ~ 2004	2006

Table 10 The guideline for the aged society of Korea

Year	Korea's current status	Action items, recommendation	Reference year of Japan
2003	-Korea government recommended that abolition of educational background, age limit on applying		1980

[2] Plan to succeed the new Gold plan
- construction of older person' image with activity
- dignity securing and independence supporting for older person
- formation of a local society which support it each other
- Establishment of care service trusted by a user

2005	-The act to progress the mobility' right for physically disabled person -The plan for activation of aging society, "To Gold from silver"	-Establishment of act and examination of needs -Adopting barrier-free in the public transportation facility, public bus and subway -Development of technology of care system for older and disabled person in housing field -Civil construction considering disabled person -Standardization of signal equipment for blind person	1982
2007	-Insurance for care service of older person, (executing schedule)		1984
2008	**Aging rate 10%**		**1985**
2009 ~ 2021		-Propagation of barrier-free in the public transportation. Ex., bus with lift equipment and elevator in subway station -Research, development, and standardization to spread of welfare product or joint-used product -Enlargement of barrier free building -construction of regulation/environment for making welfare city in every province	1986 ~ 1998
2022 ~ 2024		-Construction of non-physical environment to lead older person or disabled to social participation of older person like as "gold plan 21" of Japan -Construction and development of care service	1999 ~ 2004
2026	**Aging rate 20%**		**2006**

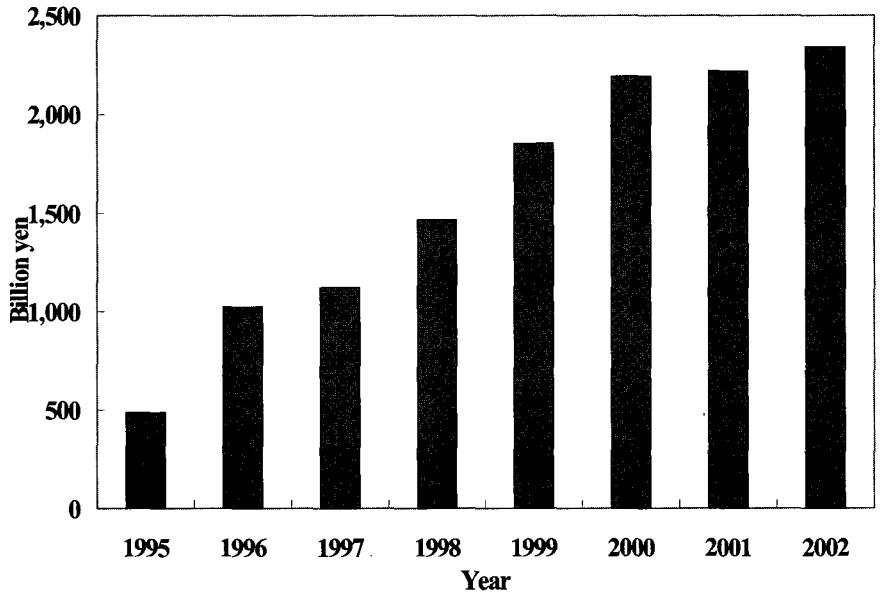

Figure 1 Market size of joint-used goods in Japan

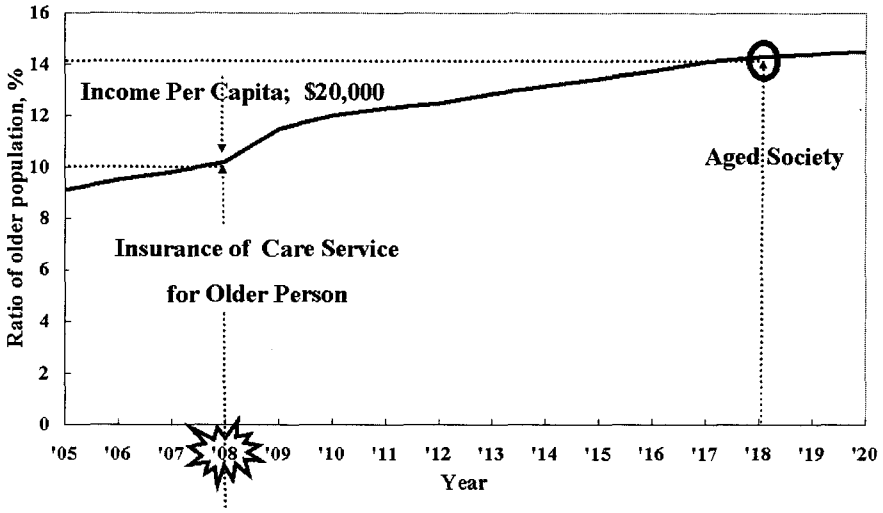

Figure 2 The relation between aging and economy in Korea

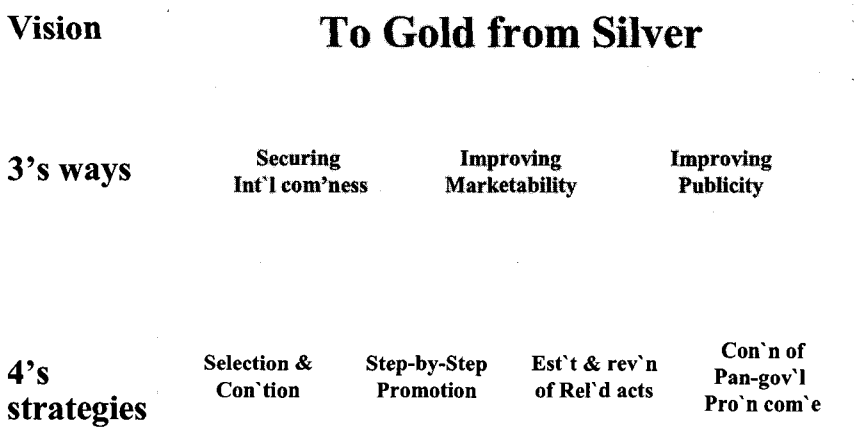

Figure 3 The plan for activation of aging society of Korea

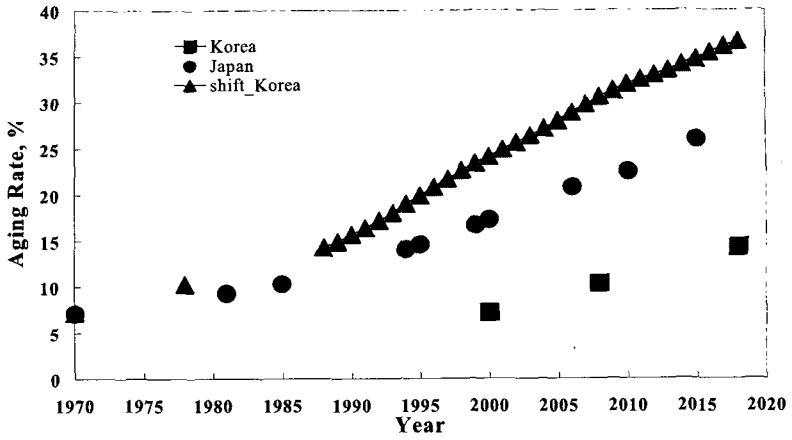

Figure 4 The diagram of aging rate of Korea and Japan

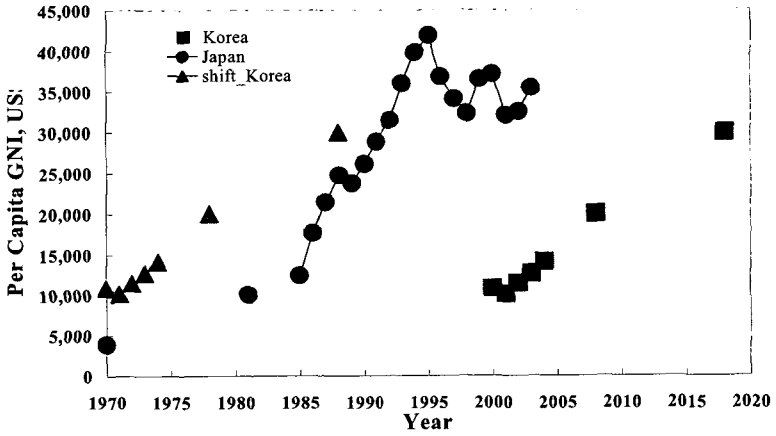

Figure 5 The diagram of per capita GNI of Korea and Japan

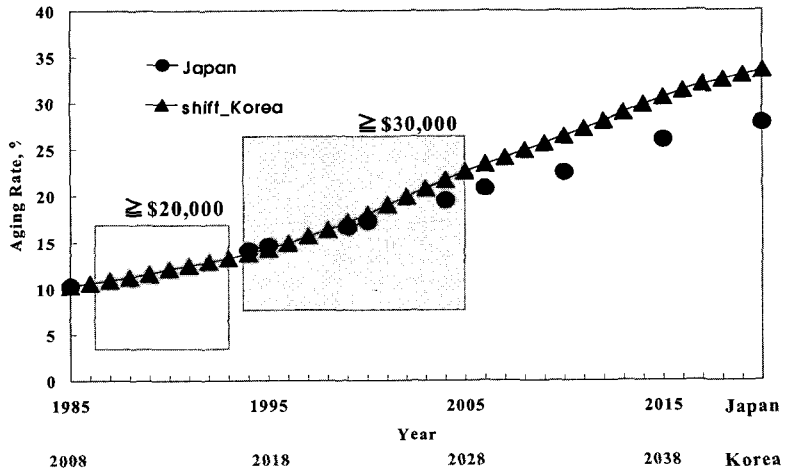

Figure 6 The diagram of aging rate and per capita GNI between Korea and Japan shifted at point of 10% of aging rate