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*Ministero dell'Istruzione,  
dell'Università e della Ricerca*

# **MOVING FORWARD** for an **AGEING SOCIETY:**

Bridging the Distances

Italian position paper



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## Acronyms

{AAL}	Ambient Assistant Living association
{AIFA}	Italian Medicines Agency
{CNR}	National Research Council
{IRPPS}	Institute for Research on Population and Social Policies
{IN}	Institute for neurosciences
{DSU}	Department for social sciences and humanities, cultural heritage
{ENEA}	Italian National Agency for New Technologies, Energy and the Environment
{ISS}	Italian Institute of Health
{CNESPS}	National Centre for Epidemiology, Surveillance and Health Promotion
{INGV}	Italian National institute for Geology and Volcanology
{JPND}	The EU Joint Programme – Neurodegenerative Disease Research
{MAE}	Italian Ministry for Foreign Affairs
{MIUR}	Italian Ministry for education, universities and research
{MYBL}	The EU Joint Programme-More Years Better Lives: the challenge of demographic change

## Preliminary remarks

Since 2012, the OECD Science, Technology and Industry Outlook has been bringing the issue of an Ageing Society to global attention, by analysing facts and figures and investigating the complexity of this demographic and social challenge.

The G8 meeting in 2013, under the presidency of the United Kingdom, recognized the importance of this subject, paying special attention to one of the major challenges connected with increasing life-expectancy in the population of World's leading economies: the dramatic growth of dementia and other neurodegenerative diseases. The G8 Governments in their final declaration, acknowledged "... that dementia affects more than 35 million people worldwide, a number that is expected to almost double every 20 years ..." and recognised its socio-economic impact "... 70 per cent of the estimated annual world-wide cost of US\$604 billion is spent on informal, social and direct medical care."

In 2012, the Italian Ministry of Education, Universities and Research – in fulfilling its mandate to advice on upcoming social challenges by setting out short, medium and long term research policy guidelines – launched a crosscutting consultation exercise on Ageing. The Italian scientific and institutional communities were asked to analyse the matter, and the results of this consultation were presented in this Position Paper, which sets forth to address the complex issue of an Ageing society in Italy, through an integrated scientific approach.

This paper is a first relevant step towards a possible role for Italy to become one of the global hubs for investigating the multiple aspects of ageing societies and outlining possible solutions, within the frame of the larger topic of *Demographic Changes*.

The OECD, with its capacity to address both scientific and economic issues and its independent and intergovernmental nature, is currently the most appropriate international environment to advance this matter, and promote the adoption of an increasingly systemic and cross-cutting approach to the breadth of issues involved in Ageing and societal demographic changes.

Of all the scientific considerations and best practices highlighted in this document, the single most significant notion emerging from this work is the need for a renewed approach to the challenge of Ageing populations and changing demographic profile of EU societies.

I am pleased to see that, within this frame, Europe is addressing this challenge through a number of actions and that, within them, the Italian participation is highly qualified.

I understand that the huge challenge posed by EU demographic changes and by Ageing Societies cannot be addressed with a conventional approach. A new type of integrated science and knowledge is needed.

The current perception of Ageing as a burden for younger generations needs to be completely reconsidered. Elderly people are an integrated part of society and carry one of the most valuable legacy for mankind to improve our future quality of life.

The value of Memory - to be preserved, shared and passed on to future generations - is of paramount importance. Neither individuals, nor their local communities or national societies can preserve their specific identity without fostering and preserving the legacy of memory.

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# 1

## BRIDGING THE DISTANCES, AN INTEGRATED APPROACH

In order to address both primary and secondary consequences of an increasing ageing population, our societies are called today to adopt a completely new mind-set. Studies and policy exercises carried out at national and international level, seem to address the issue of Ageing societies from unilateral sector-based perspectives. Even the health sector, generally considered as having the most wide-ranging approach, runs the risk of providing only an incomplete picture compared to the complexity of the problem. Concentrating on single issues instead of looking at the problem as a whole, could lead to the kind of perverse incentives<sup>1</sup> that have slowed down the implementation of a very ambitious exercise, such as the Millennium Development Goals, set by the United Nations General Assembly in 2000<sup>2</sup>. In this Preliminary Position Paper we decided to explore four priority areas, linked together by a common underlying theme: bridging the distances in order to mitigate the negative impacts of an Ageing society, with the final goal of improving the life of citizens.

Bridging the physical and/or virtual distances is one of the most dramatic challenge for our societies and requires innovative technology and cultural tools. Distances between where we live and where we receive or provide services; social, economic and cultural distances; distances between generations and, last but not least, distances between material and spiritual needs, are the key issues to address in order to the reverse or mitigate the negative impacts of ageing population and turn them into an opportunity for society to grow as a whole.

### 1.1 Priority action areas

Existing distances and the solutions proposed to reduce them, will guide the Italian approach to an Ageing society<sup>3</sup>. Understanding the nature of such distances and finding strategies to reduce them, will allow for a more effective and efficient management of an Ageing society, bringing citizens and communities closer within a more inclusive environment and more natural boundaries. In the light of this, in April 2013 the Italian Ministry for Education, Universities and Research launched a consultation process with several Government institutions and agencies, with the aim to investigate the effects of the ageing population, take stock of some of the main actions adopted so far and open a national debate to guide future policy actions with a new integrated approach. The Paper proposes the following four priority areas:

- Health;
- Silver Economy;
- Built Environment;
- Welfare and Wellbeing.

Bridging the distances seems to be, in the Italian perspective, the possible common denominator

for a comprehensive approach towards solving sectorial problems and achieving solutions, or at least getting some form of mitigation. In line with the OECD vision, the Italian proposal for a new integrated approach sets out to turn the challenge of aging societies into an opportunity.

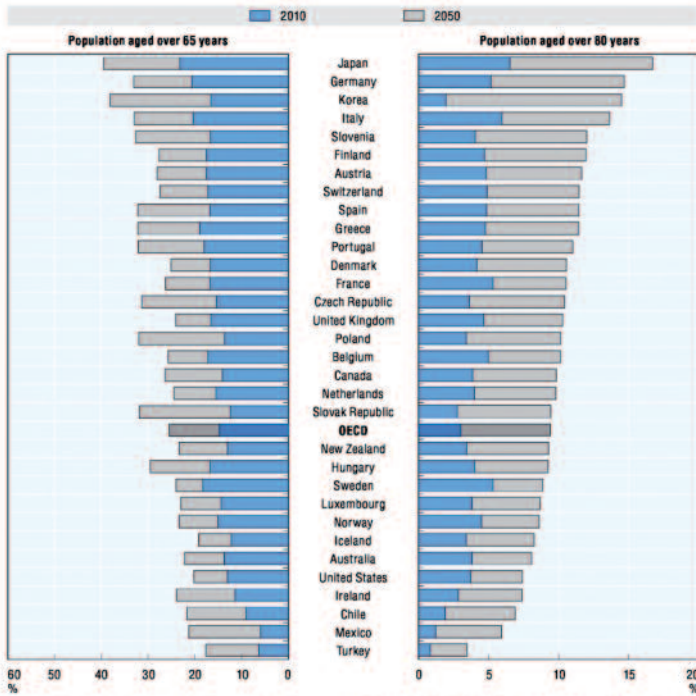


Figure 1 – Statistics on ageing populations at global level in OECD countries for the period 2010/2050

Source: OECD Labour Force and Demographic Database, 2010; OECD (2011), *Help Wanted? Providing and Paying for Long-term Care*, OECD, Paris.

StatLink  <http://dx.doi.org/10.1787/888932689693>

<sup>1</sup>A *perverse incentive*, or “*cobra effect*” occurs when an incentive produces an unintended or adverse consequence. The term was introduced by Horst Siebert (1938-2009), an economist who illustrated the consequences of excessive state intervention on the economy, by referring to an anecdote occurred during the British rule in India. Horst Siebert. [DE] *Der Kobra- Effekt. Wie man Irrwege der Wirtschaftspolitik vermeidet*, Deutsche Verlags-Anstalt, 2002.

<sup>2</sup>The Millennium Development Goals (MDGs) are eight international development goals that all 193 United Nations Member States have agreed to achieve by the year 2015. In the United Nations Millennium Declaration

signed in September 2000, member states committed to:

- Eradicating extreme poverty and hunger,*
- Achieving universal primary education,*
- Promoting gender equality and empowering women,*
- Reducing child mortality rates,*
- Improving maternal health,*
- Combating HIV/AIDS, malaria, and other diseases,*
- Ensuring environmental sustainability, and*
- Developing a global partnership for development.*

<sup>3</sup>Menniti A., Tintori A. *La qualità della Vita degli anziani*, IRPPS-CNR (WP) 12/2006



# 2

## HEALTH

Studies on demographic trends in Italy consistently indicate that ageing population is projected to grow constantly<sup>4</sup> in the near future, as confirmed by OECD data in Figure 1. The Italian National Prevention Plan<sup>5</sup> estimates that the ratio between the number of people aged 65 and over, and population aged between 15 to 64 years, will have doubled by 2050. While there are currently two working-age people for every person aged 65 and over, this ratio is expected to be reversed in forty years' time.

Greater attention towards health issues, preventing diseases leading to loss of independence and reducing the ensuing disability and social disadvantage are a main priority. It is now widely recognized that reaching old age in good health is mainly depending upon genetic factors and lifestyle. Only the latter can be modified in a proper way, but this is a process that needs to begin at a young age, through preventive actions which act both on the general context and on individuals. This means not only adopting health prevention strategies, but also setting up an appropriate environment (home/neighbourhood), able to guarantee a good level of personal and environmental safety as well as stimulating the cognitive abilities for an enriching everyday life. Research studies conducted on ageing population have been carried out with different investigation methods, according to the subject, and include large cohort studies to define the risk factors predictive of chronic degenerative diseases, such as severe cerebral/neurological, bronco-pulmonary and cardiovascular events<sup>6</sup>.

Along these lines, the scientific community, academia and industry, coordinated by the Italian National Research Council (CNR), launched the Project of Strategic interest "Ageing: Technological and molecular innovations to improve the health of older citizens (2012-2014)", which was included in the Italian National Research Plan 2011-13. This initiative, focused on genetic studies, developed a programme for the treatment and prevention of a number of age-related degenerative diseases, using advanced diagnostic techniques. Other research initiatives focus on: the adoption of an integrated approach to the clinical management of chronic diseases, including co-morbidity<sup>7</sup>; assessing the efficacy of preventive actions; creating tools and indicators to assess the quality of geriatric services.

### 2.1 The European framework

Accordingly, the *European Innovation Partnership on Active and Healthy Ageing* (I'EIP-AHA), in which Italy participates at different institutional levels, focuses its Strategic Plan on three basic pillars: prevention, screening and early diagnosis; care and cure; active ageing and solutions to promote independent living in older or disabled patients. Each pillar includes a restricted number of actions, to be implemented on a regional or local level. The Ministry of Health supports an active participation of Italian Regional Authorities to the European Innovation Partnership for Active and

Healthy Ageing. Italy is represented in the EIP-AHA by the *Agenzia Italiana del Farmaco* AIFA, the National authority responsible for Drugs regulation, which is currently coordinating a pilot “Prescription adherence action at regional level”, as part of the EU health literacy strategy<sup>8</sup>.

Over 12 million people in Europe suffer from neurodegenerative diseases such as Alzheimer’s and Parkinson’s, yet treatments that prevent or stop the progression of neuro-degeneration (ND) are still lacking. This places a heavy burden on the individuals with disease, their relatives, and society as a whole; a problem that will only get worse as the European population inexorably ages. As this problem is well beyond the scope and resources of any one country, tackling this ‘grand’ challenge requires enhanced co-ordination of national efforts to stimulate research, by building on a common vision, and facilitating sharing of tools, techniques and other resources more efficiently. Throughout the past five years, such synergies have been created between the majority of European countries through the EU Joint Programme – Neurodegenerative Disease Research, in particular Alzheimer’s (JPND), established in 2009 as the pilot of the Member State-led Joint Programming Initiatives. As of today, 28 countries<sup>9</sup> are participating in JPND including 21 EU Member States, 5 Associated Countries and 2 Third Countries, Canada and Switzerland.

## 2.2 Elements of analysis: frailty

One of the most relevant aspects of ageing is “frailty”, an age-related biological status which has been described with varying definitions, ranging from a bio-psyco-social based approach<sup>10</sup> to a bio-medical one<sup>11</sup>. The notion of frailty is now widely used and considered useful for patient assessment<sup>12</sup> and has helped to expand the concept of health beyond illness, to include a whole range of personal, social and environmental aspects<sup>13</sup>. The Italian Ministry of Health has promoted a number of studies focusing on prevention, early detection and intervention, to avert frailty and the resulting loss of independence.

## 2.3 Methodology approaches: prevention

A key element in strategies to preserve health and fight frailty is the adoption of a holistic approach, involving all stakeholders in order to improve health and wellbeing for ageing population. This approach has been widely adopted in the Italian National Health Plan 2012-2013<sup>14</sup> to fight pathologies linked to unhealthy lifestyles, including eating habits, amount of diurnal physical and cognitive exercise and living and work environments. In this context, primary prevention initiatives act as an important lever to promote healthy lifestyles and keep people in a low-risk area (favourable risk), with the goal of reducing the incidence of chronic and degenerative diseases, sudden death or other less serious events which, however, entail heavy social and economic costs. Adopting a cross-sectorial approach to risk factors means implementing initiatives which aim at changing individual unhealthy behaviours, while setting more favourable environmental conditions<sup>15</sup> to help achieve a change in lifestyle. For this reason, policies addressing health determinants<sup>16</sup> need to be further developed and strengthened, through appropriate national, regional and local actions. From this point of view, chronic disease prevention is not only possible but also a priority for the economic and organizational sustainability of welfare systems, because it can help delay the onset of chronic conditions later in life.

To this end, the Italian Ministry of Health promotes and coordinates the programme “Gaining Health: making healthy choices easy”<sup>17</sup>. This is a national strategy based on the “*Health in all policies*” principle: the aim is to disseminate and facilitate the adoption of behaviours with a positive influence on health, such as physical and mental exercise, healthy eating habits, avoiding obesity and encouraging participation in programmes on early detection of preventable or controllable medical conditions.

## 2.4 The role of the Italian National Health Service

The capacity of the Italian National Health Service<sup>18</sup> to promote prevention activities in healthy population, in areas not traditionally considered within the scope of health policies will play a crucial role in guaranteeing the sustainability of healthcare. Alongside prevention, the National Health Service is currently facing two great healthcare challenges:

Promoting healthcare and social services for non-self-sufficient individuals, mainly concentrated among elderly population, based on a Disease Management approach which promotes efficient and effective care options, tailored to the needs of the patients they address.

Improving the financial efficiency of the National Health Service in order to address the increased costs of healthcare, resulting from the development of new drugs, as well as innovative rehabilitation strategies and diagnostic technologies.

That considered, it is essential to keep up surveillance activities on health determinants, monitor the effect of prevention activities in the different ages of life and re-engineer social and health services at all levels considering that, in some instances, age-related health problems are detected with delay or remain unknown.

Alongside prevention programmes, other important actions include deeper understanding of epidemiological indicators related with the impact of ageing, testing healthcare models, as well as introducing elements to promote integration of older people within their local environment. In line with the World Health Organization strategy indication on Active ageing<sup>19</sup>, recommending epidemiological surveillance of population aged over 64 and monitoring actions, the National Centre for Epidemiology, Surveillance and Health Promotion (CNESPS-ISS) was entrusted by the Ministry of Health to carry out the above activities among citizens aged 65 and over through the initiative *Passi d'Argento*<sup>20</sup>, conducted in cooperation with Regional and local authorities.

The aim of this initiative is to set up a systematic and on-going survey on the quality of life, health and the perception of the elderly on services for the ageing population. The surveillance activity will have to be sustainable in the long-run with the resources of the National health and social services, and provide information to guide a rational and efficient approach to policies and strategies at National, Regional and Local level<sup>21</sup>.

## 2.5 Acting locally

On a local level, actions should focus on guaranteeing universal access and ensuring a timely, coordinated, comprehensive and cross-disciplinary care of patients, integrating social and health aspects. This means setting up a smart system combining selection of the correct approach with the maximum degree of personalisation. All these features must be part of any Regional Health Plan, in

order to implement the National Health Plan and the National Prevention Plan on a local level.

In order to be efficient and to answer individual and collective needs, the network of social and health services – made up of the different healthcare centres, from primary care and domestic assistance, to highly specialized hospitals – should always offer continuity in time and accessibility, addressing each citizen to the right level of healthcare facility, based on his/her individual needs<sup>22</sup>. This also in view of the fact that chronic/progressive diseases typical of the ageing population are long-lasting (sometimes 10 years or more) and changes significantly their requirements.

Therefore, within the frame of a single diagnosis (i.e. Alzheimer) a track of different services should be designed able to follow-up the natural evolution of the disease with a flexible menu of services able to comply with the changing needs of the Patients/Family.

The Italian answer to that need is the concept of “District”, a multi-disciplinary facility, able to coordinate prevention, diagnosis, health care, rehabilitation, general practice and home care systems, ensuring that social and health care provision is consistent across the territory. To this end, a network of social and healthcare structures open to citizens at all times, is currently being set up.

## 2.6 Health: bridging the distances

### From prevention to active ageing:

- *Promoting healthy lifestyles at any age, from school to retirement and beyond;*
- *Improving epidemiological surveillance on a local level, in order to guide and monitor prevention activities;*
- *Strengthening healthcare capacity locally through greater integration among social and health structures;*

### From patient to healthcare:

- *Early identification of the risk of frailty;*
- *Organising and integrating management of chronic conditions;*
- *Creating multidisciplinary disease-related professional teams;*
- *Developing technologies supporting independence in older people (domotics, robotics and e-health).*

- <sup>4</sup>The dependency ratio relates the number of children (0-14 years old) and older persons (65 years or over) to the working-age population (15-64 years old), measured per hundred persons.
- <sup>5</sup>*Piano Nazionale della Prevenzione – PNP 2010-12*
- <sup>6</sup>“The incidence of dementia in Italy is similar to that observed in the majority of industrialized countries. Around 150,000 new cases are expected to occur every year. A significant gender effect was evidenced for major dementia subtypes.”. Carlo A, Baldereschi M, Amaducci L, Lepore V, Bracco L, Maggi S, Bonaiuto S, Perissinotto E, Scarlato G, Farchi G, Inzitari D. 2002
- <sup>7</sup>Co-morbidity: the presence of concomitant chronic conditions, which are not necessarily related to one another.
- <sup>8</sup>The European innovation partnership on active and healthy ageing - AIFA Commitment, Coordinator: Sergio Pecorelli – President, *Agenzia Italiana del Farmaco (AIFA)*.
- <sup>9</sup>Albania, Austria, Belgium, Canada, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom (Cf. Box no. 26)
- <sup>10</sup>Gobbens 2010
- <sup>11</sup>Fried 2004
- <sup>12</sup>Kaethler 2003
- <sup>13</sup>Bergman 2007
- <sup>14</sup>*Piano Sanitario Nazionale 2012-2013*.
- <sup>15</sup>Improving the quality of air, water and food, redefining the urban environment in order to facilitate foot or bike mobility, reclaiming contaminated land, guaranteeing safe and sound working environments, and all related factors.
- <sup>16</sup>Genetics, lifestyles, working and living conditions, health services, socio-economic and cultural environments, physical environment, World Health Organization (WHO).
- <sup>17</sup>The Programme “Gaining health: making healthy choices easy” (approved with Decree of the President of the Council of Ministers – DPCM 4th May 2007), promotes the idea of health as a public asset to be preserved, by integrating collective and individual actions: it is based on a cross-sectoral approach to risk factors and on the definition of coordinated intersectoral strategies which can act on environmental factors and on socio-economic determinants influencing the onset of chronic diseases.
- <sup>18</sup>*Servizio Sanitario Nazionale –SSN*.
- <sup>19</sup>Active ageing is a process of optimizing opportunities for physical, social and mental health, to enable older people to take active part in society without discrimination and to enjoy an independent and good quality of life”. World Health Organization (WHO).
- <sup>20</sup>*Verso un sistema nazionale di sorveglianza della popolazione ultra 64enne: risultati della sperimentazione PASSI d’Argento*. Rome Istituto Superiore di Sanità; 2013. XX p. (Rapporti ISTISAN 13/XX). Currently in print.
- <sup>21</sup>In 2010, the surveillance methodology “PASSI d’Argento”, which was launched as a research project, has been included in the Regional Prevention Plans in 18 out of 21 Italian Regions.
- <sup>22</sup>Hence the problem of the appropriateness and economic convenience of certain institutionalized practices and the need to strengthen territorial assistance.

# 3 SILVER ECONOMY

The first Conference *Silver Economy in Europe* was held in Bonn on February 17, 2005 with the aim of finding economic and political opportunities, at regional, national and international level, connected to the demographic phenomenon of the progressively ageing population. On that occasion, a Memorandum of Understanding was produced entitled “Bonn Declaration for the Silver Economy as an opportunity for quality of life, economic growth and competitiveness in Europe”. The demographic changes, as shown below, that is the increase in the number of families composed of couples with no children, with one-child only or single parent families, together with the widespread increase in life expectancy, have brought about a profound change in the social milieu and the loss of the traditional protective role of the family towards the weakest members of society.

The ageing of the population faces us with important economic and social challenges, such as the increasing pressure on the welfare system and on public finances. In addition, the social exclusion of elderly people produces further negative effects as examined in the Chapter “Health”. The increasingly high number of elderly people in the demographic pyramid, especially in the most industrialised countries, contributes to create a socially widespread perception of elderly people as a burden for the working population.

An ever-increasing number of elderly people in good health could become a wide and precious capital of knowledge and experiences, which, together with the availability of time, could greatly benefit society<sup>23</sup>.

If, on the one hand, the progressive ageing of the population is a natural process, on the other, it is indeed possible and beneficial to delay and reduce its negative consequences. Elderly people can represent an important supply of resources for all members of society: support for the family, work force in the charity field and finally, a new stakeholder on the market with the economic power to buy new products and services especially targeted<sup>24</sup>.

Recognizing the scale and importance of demographic change, many European countries are seeking better evidence to inform policymaking. In 2010 nine of them came together to explore the potential for collaborative and comparative research, using the EU framework for Joint Programming Initiatives (JPI). A JPI named More Years Better Lives: the Challenge of Demographic Change has been therefore launched where 14 EU countries and Canada are represented. Italy is part of it since the beginning by a delegate representing the Ministry of Education, University & Research and the Ministry of Health<sup>25</sup>.

## 3.1 The impact of population ageing on society

The European Union, like most regions of the world, is undergoing relevant demographic changes which will strongly impact the social structure of its population. The combined data of EU Member States, analysed with regards to the future pension-fund provisions in the EU<sup>26</sup>, show an increase

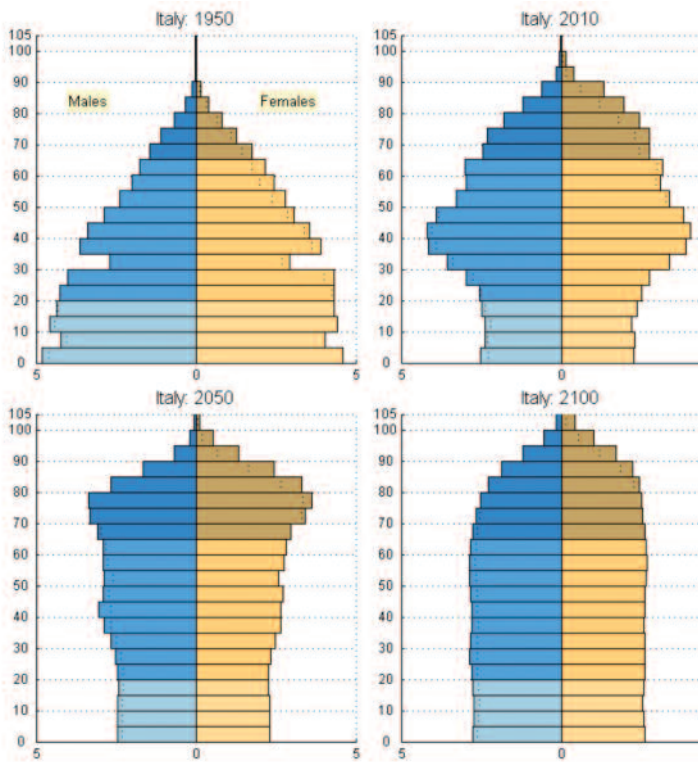


Figure 2 – Italian demographic pyramids from 1950 to 2100: Population by age groups and sex [percentage of total population]  
Source: UN, Economics and Social Affairs Department.

in the life expectancy of European citizens of 8 years for men and around 7 years for women in 2060, as compared to 2010. The number of European citizens over 65 increases by about 2 million people each year, while the number of active members of the population decreases constantly; however it is important to remember that this ever-increasing share of the population can provide resources to society on various levels, such as for example family support or voluntary work in various charity fields.

To this purpose, however, the issue must be seen from the viewpoint of generations, since the rate of population growth in the past varied according to regions and social classes, but, more in general, there has been a decrease in the number of children which will be able to assist the elderly people of the future, many of whom have only one or no children at all. Furthermore it is necessary to find a solution to the gender distance which nowadays means that most of the assistance to elderly people is given by mature or elderly women.

Nevertheless in Italy, more than elsewhere in the world, the family remains a kind of pivotal social protection, which provides services and support for its weakest members. The structure of the Italian family in general, and of the rural ones in particular, has only apparently faded away: it is, on the contrary, of fundamental importance in order to allow some sort of social resilience to the global economic crisis we are going through. Whenever the family structure is absent, biological ties should be replaced with an equally efficient model based on social solidarity.

All this creates various and variable distances throughout life, between the requirements of elderly

people and the assistance provided by families and the welfare system. The way to close this gap is through the market of domestic help, caretakers and nurses and/or the Welfare State<sup>27</sup>. Services and/or fiscal benefits should be levelled with the aim of reducing such distances according to the needs and financial means of families. Another important point regards the role of foreign caretakers (*informal care givers*) in the care of non-self-sufficient people, which cannot be neglected when defining possible policies for an ageing society.

### 3.2 Socio-economic policies for the Ageing Society

The policies for an ageing society are so wide-ranging that they require a macro social and economic analysis: this was defined in the above-mentioned OECD document as the *Silver Economy*, a portion of the market which touches on a number of industrial sectors as well. New economic and industrial markets could be established and dealt with:

- New applications of digital technologies for patients who need medical assistance;
- New housing technologies with interactive services, based on the best technologies in all *Smart Living* sectors;
- Implementation of activities linked to the conservation of intellectual power (*life-long learning* and use of free time for learning activities);
- Robotics aimed at the reduction of physical limitations;
- Means for a safe mobility;
- Recreational, travelling, cultural and entertaining activities;
- Upkeep of good physical condition;
- Added-value services for improving the quality of daily life;
- New insurance and pension provision instruments;
- New means of fruition of cultural heritage ( museums, exhibitions, archaeological sites) through the use of innovative communication technologies especially developed for elderly people, including those with disabilities;
- Actions aimed at levelling services and /or fiscal benefits in order to reduce the gap between the assistance required and the assistance available within the family.

In order to identify the most adequate interventions to bridge the distance between today's economy and the Silver Economy a key role is played by surveys that collect information on social and economic conditions, health and well-being of the population aged fifty or over. For example, SHARE (the Survey on Health, Ageing and Retirement in Europe<sup>28</sup>) allows researchers and policy makers to quantify the importance of unused capacity – be it labour or spending capacity – that so often characterizes the economies of developed countries, particularly in the cases where institutions and individuals have not yet fully adapted to population ageing.

The current global recession has increased the difficulties the welfare state encounters in taking care of the needs of the weaker individuals in society, such as young people who in many countries go back to the parental nest (the so-called boomerang kids<sup>29</sup>), and of course the frail or disabled senior citizens. Survey data can be used to identify groups of vulnerable individuals. For instance, the analysis of SHARE longitudinal data reveals that lack of adequate savings and self-reported difficulties making ends meet predict - better than an income below the relative poverty threshold



- the deterioration over time not only of self-assessed quality of life, but also of physical health, and the appearance of depressive symptoms<sup>30</sup>.

Potential demand for long-term care is on the rise, partly because of the increased prevalence of Alzheimer's disease and other types of neurodegeneration and public resources to provide it are limited. In some countries, such as Germany and Japan, compulsory insurance schemes have been introduced to insure this risk, but caring for many of today's oldest old will keep falling on today's young old, either directly or at least financially. In this context the analysis of household-level data, collected in interdisciplinary surveys like SHARE that focus on the older population, is going to play a crucial role to identify the most effective ways to provide public support to those who do not enjoy the benefits of an adequate family or social network.

### 3.3 Silver Economy: bridging the distances

#### From present-day Economy to Silver Economy

- *Moving toward innovative economic models providing opportunities for a good quality of life;*
- *Reducing inter-generational/ interpersonal gaps through social activities, such as baby sitting, and assistance to people with physical and mental disabilities;*
- *Connecting with service providers (health, personal, and supply services) both physically and virtually (ICT/mutual aid);*
- *Enhancing pro-active and reactive professional training activities (University of the Third Age, schools of arts and crafts) to support active ageing and intergenerational knowledge transfer;*
- *Making a user-friendly (namely elderly-friendly) ICT and digital innovations.*

<sup>23</sup> Ferry M., Vironen H., Dealing with Demographic Change: Regional Policy Responses, n. 72, European Policy Research Centre, 2010.

<sup>24</sup> Ronchi, E., OECD (2011). Promoting Innovation and Growth in Services for a Silver/Ageing Economy. OECD Knowinno/Innoserv Workshop.

<sup>25</sup> The Joint Programming Initiative (JPI) "More Years, Better Lives – The Potential and Challenges of Demographic Change" seeks to enhance coordination and collaboration between European and national research programmes related to demographic change. Areas affected by demographic change cover a wide range of research fields and policy topics ranging from health to social welfare, education & learning, work & productivity to housing, urban & rural development and mobility. The JPI therefore follows a transnational, multi-disciplinary approach bringing together different research programmes and

researchers from various disciplines in order to provide solutions for the upcoming challenges and make use of the potential of societal change in Europe. Currently 14 European countries and Canada are participating in the JPI „More Years, Better Lives“. [Cf. Box no. 6 and 26]

<sup>26</sup> European Commission, White Paper "An Agenda for Adequate, Safe and Sustainable Pensions", Brussels, 16.2.2012.

<sup>27</sup> Cf. Box no. 18 – Working conditions and worker's representation in the healthcare sector.

<sup>28</sup> Cf. Box no. 13.

<sup>29</sup> Wiemers 2011

<sup>30</sup> Börsch-Supan, Axel; Brandt, Martina; Litwin, Howard; Weber, Guglielmo (2013): Active Ageing and Solidarity Between Generations in Europe. First Results From SHARE After the Economic Crisis. Forthcoming, De Gruyter, Berlin.

# 4 BUILT ENVIRONMENT

The current human development model which is better definable today as “urban civilization”<sup>31</sup>, has positive and negative aspects inherent to the very nature of the city. Despite the negative aspects, living in a city still offers a number of recognized benefits for the community, mainly related to a greater availability of services to citizens<sup>32</sup>, meeting also most of the needs of the more vulnerable elements of society.

Many of the fundamentals that help to improve citizens’ quality of life are available to most segments of the population: schools, hospitals, social services and healthcare facilities, and in general, highly specialized services available not so far from residential areas, could be considered a great success of urban living. However, complex urban systems also imply a certain degree of vulnerability, that is also part of the very nature of the city especially when city functioning is subject to failures, due to external reasons.

Urban criticalities can negatively affect the life of citizens when the functioning of the city is compromised by internal or external factors: traffic congestions, strikes, loneliness in large condominiums, garbage collection failures, blackouts or extreme natural events like earthquakes or flooding. In addition, each urban system also has its own *Ecological Footprint*<sup>33</sup>, which has a conspicuous impact on climate, landscape, biodiversity and ecosystem services with short and long-term consequences.

Moreover, the current urban trend towards concentration of services in decentralized areas (polyclinic hospitals, shopping centres or multiplex cinemas) and the use of automated services via ICT connections has an impact on people with reduced mobility and low level of digital knowledge like most of the elderly people. There is the need to reengineer urban life, preserving physical and cultural interconnections which acted as its initial driving force, while avoiding excessive interdependence that could cause serious critical issues.

## 4.1 Built environment priorities

Given this general context, vulnerable citizens, especially older adults, are more likely to be affected by inefficiencies caused by serious urban emergencies<sup>34</sup>. This is the reason why the management of complex urban systems should focus on the optimisation of services, networks and infrastructures, through increased quality standards, high sustainability levels and, ultimately, the provision of essential services ensuring the safety of citizens. The three scales of analysis, chosen to analyse the implications of the Ageing society for built environment, are:

- Single building;
- Urban and territorial planning;
- Mobility systems;
- Elderly-friendly ICT facilities.

Those domains include, at all levels, the crosscutting issue of support infrastructures providing basic goods and services.

## 4.2 Single building analysis

Increased life expectancy has reached a dimension that requires a complete overhaul in the housing offer, focusing more on the needs of senior citizens, an increasingly large share of the population with varying degrees of autonomy, from active and independent to mobility impaired or non-self-sufficient.

In addition, older people often experience decreased mobility<sup>35</sup> as a consequence of reduced autonomy or lack of motivation to leave the safety of one's living environment. For this reason, adapting housing and healthcare facilities to the change in lifestyle of older adults is becoming a priority. Alongside existing housing and healthcare solutions<sup>36</sup> such as the Assisted living residences (*Residenze Sociali Assistite*) and the community Health centres *Case della Salute*<sup>37</sup>, new housing and healthcare facilities are being developed to meet the needs of vulnerable citizens. Smart enabling technologies have become an innovative crosscutting element when refitting or building new housing facilities, to meet the requirements of active ageing or provide sustainable services management for frail elderly people.

The planning and design approach will need to incorporate the values and perspectives arising from this new cultural and demographic scenario, adapting solutions to meet the needs of ageing societies. Understanding the evolving needs of older adults, as they progressively arise in life, is the first step towards finding flexible solutions providing assistance while encouraging ageing in place (home/neighbourhood/services).

In 1989, Italy adopted a regulation<sup>38</sup> setting out design criteria to ensure accessibility and adaptability of new private buildings and public housing, in order to avoid architectural barriers. In this scenario, the UK "Lifetime Homes"<sup>39</sup> standards are now being investigated in Italy. The Italian Workers Compensation Authority (*INAIL - Istituto Nazionale per l'Assicurazione contro gli Infortuni sul Lavoro*) is promoting the standard for Italian Lifetime Homes (*Una casa per tutte le età*<sup>40</sup>) based on the 16 Design Criteria of the Lifetime Homes Standard<sup>41</sup> established within the UK experience. Lifetime Homes represents a valuable innovative building model, supporting the changing needs of individuals and families at different stages of life.

## 4.3 Urban and territorial planning

Careful urban and territorial planning helps to address and solve some of the issues arising in Ageing societies as a consequence of today's built environment. Since 2010 much effort has been made to set up also at EU level an initiative, dedicated to Urban Innovation in a long-sighted perspective, involving countries for joining forces and put forward their needs and interests in urban research and innovation. Italy, namely Ministry of Education, University & Research, has played an overriding role in promoting some of the eight world challenges (ageing society, migration, climate change and peak oil)<sup>42</sup>.

In the future complex scenario of cities, planning methodologies must take into account the concept of internal distances, while segmenting urban, suburban and rural environments into

urban cells with varying dimensions, sustainably organized, according to the needs of its inhabitants and the related service provision<sup>43</sup>.

These closely interrelated smart and sustainable “urban cells”, come together to form a smart community thereby rethinking the social, economic and cultural land-use on a local level, thereby closing the distance between citizens and their needs<sup>44</sup>. The main issues addressed by these sustainable urban cells are:

- Consistent spatial distribution of highly specialized health care infrastructure and second-level health centres (counselling, general practitioners, pharmacies);
- Distribution of recreational places (clubs, parks and gardens);
- Accessibility to place of worship or other places linked to spiritual values;
- Monitoring and surveillance to ensure early response to emergencies (Neighbourhood Watch schemes, local police, doctors, chemist’s, but also porters and other relevant local contact persons);
- Urban Agriculture and Community Gardens.

Improving land-use planning encourages older citizens to live in a stable environment reducing relocation to assistive facilities. Finding the best planning solutions will have pay attention to ensuring that residential areas are close to the services and facilities required by senior citizens, while ensuring their inclusion in a demographic context with all ages represented, avoiding the unhealthy “ghetto effect”.

Smarter and more ecologically appropriate land use includes creating park and greenway systems for ecological and recreational purposes; designing development to reduce driving and resource use and to promote social vitality, public health, and a sense of community<sup>45</sup>. Gardens are no different from any other community project and they can be launched by a change in land use or other regulation. This policy would encourage social interaction and a sense of community in high – density places, and at the same time it would support environmentally sustainable cities reducing “food kilometers”. Community gardens are also an excellent way for senior citizens to work on social projects, educating, inspiring and conveying their precious knowledge in this field to younger generations<sup>46</sup>. Elderly people also benefit from these projects thanks to social participation and access to healthy, fresh food. Italy, despite being a country with a long tradition of food culture, is rediscovering in times of crisis an interest in social farms that become vital places combining food production and solidarity, culture methods and environmentally friendly tourism<sup>47</sup>.

#### 4.4 Mobility

Developing age-friendly urban communities means adapting transport, infrastructure, public places and related services accordingly. Public mobility is a priority that needs to be addressed in view of bridging the distances between services, recreational areas and senior citizens’ living environment. Sustainable mobility plans for an Ageing Society should include:

- Campaigns to promote road safety for older drivers;
- Implementing self-driving vehicles;

- Providing tailored transport solutions for mobility impaired citizens and creating safer and user-friendly infrastructure, removing all physical barriers;
- Tailored safety systems for vehicles used by older people;
- Real-time information on public mobility services;
- Campaigns to promote a safer mobility environment for older people.

In order to meet the demands of an ageing society, public and private transport will need to be sustainable from a social, economic and environmental point of view, thereby avoiding *perverse incentives*<sup>48</sup> such as increased emissions and traffic congestions.

## 4.5 Built environment: bridging the distances

### From goods and services to end users

- *Zero miles energy, food and water supply.*

### From residential areas to healthcare services, recreational facilities and places of worship

- *Re-thinking territorial distribution in order to simplify access to services;*
- *Cloud connections linking sustainable urban cells;*
- *Implementing housing policies integrating working and retired people;*
- *Mitigate the current urbanization trends, preserving and/or revitalizing small communities that naturally enhance older people's value and role.*

### Between older people, their families and social life:

- *Smart communities;*
- *Improved/innovative mobility;*
- *Disseminating the Lifetime Home principles and solutions such as intergenerational co-housing.*

<sup>31</sup>The year 2007 marked a turning point in the history of mankind's social evolution. The percentage of residents in urban areas compared to the rest of the planet was reversed, with an average of more than 50% of global population (i.e. 3.3 billion people) living in or around urbanised areas, for different reasons (Project SoURCE – Sustainable Urban Cells – Sapienza University in Rome, 2011).

<sup>32</sup>This aspect is perhaps, since the dawning of history, at the very origin of the need for men to gather in sedentary groups, with common goals (Project SoURCE – Sustainable Urban Cells – Università La Sapienza, Rome, 2011).

<sup>33</sup>Wackernagel, M. and Rees, W. 1996. Our Ecological Footprint: Reducing, Human Impact on the Earth. The authors have developed the concept of “ecological

footprint”, which represents the amount of biologically productive land and sea area necessary to supply the resources a human population consumes, and to assimilate associated waste, with particular reference to the impact of cities on the environment.

<sup>34</sup>Roberto Vacca, wrote the essay entitled “The coming Dark Age” (1971) following the Great Blackout of the East Coast of the USA in 1965 and outlines the scenarios of fragility of a large complex urban systems, considered as structurally frail and potentially dangerous for human life. Prof. Vacca states “It is not necessary for a few kilomegaton of hydrogen bombs to explode for hundreds of millions of people to be killed: The same result may occur by less violent and more intricate means: that is, by virtue of the fact that vast

concentrations of human beings are involved in systems that are now so complicated that they are becoming uncontrollable. This hypothesis-of an apocalypse that is impersonal, haphazard and unpremeditated - is more tragic than the other.

<sup>35</sup> “The elderly spend most of their time in their own home, or in a very restricted environment and is therefore a fundamental requirement adaptation of physical facilities and services related to them to the changing needs of the aging population” (*Vienna International Plan of Action on Aging*, adopted by the World Assembly on Aging held in Vienna, Austria from 26 July to 6 August 1982).

<sup>36</sup> In Italy, the demand for health services, and the related public and private spending, are expected to increase significantly, especially with regard to long-term care. The emergence of these needs is increasingly justified by the progressive general aging of the population, with a significant increase in people aged 80 and over and of Alzheimer’s and dementia cases, as well as by the strong increase of the so-called mononuclear families, and finally, by the progressive evolution of the hospital system which will be mainly oriented towards the management of severe cases.

<sup>37</sup> Cf. box no. 1

<sup>38</sup> Ministerial Decree no. 236 June 14, 1989 - Italian Ministry of Infrastructure.

<sup>39</sup> <http://www.lifetimehomes.org.uk/>.

<sup>40</sup> [http://www.superabile.it/web/it/canalitematici/senza-barriere/soluzioni\\_progettuali/unacasapertuttelet-13-/info-1714258939.html](http://www.superabile.it/web/it/canalitematici/senza-barriere/soluzioni_progettuali/unacasapertuttelet-13-/info-1714258939.html)

<sup>41</sup> On 25 February 2008 the UK Government announced its intention to work towards all new homes being built to Lifetime Homes Standards by 2013. The sixteen criteria are: 1) Parking (width or widening capability); 2) Approach to dwelling from parking (distance, gradients and widths); 3) Approach to all entrances; 4) Entrances; 5) Communal stairs and lifts; 6) Internal doorways and hallways; 7) Circulation space; 8) Entrance level living space; 9) Potential for entrance level bed space; 10) Entrance level WC and shower drainage; 11) WC and bathroom walls; 12) Stairs and potential though floor

light dwelling; 13) Potential for fitting of hoists and bedroom / bathroom; 14) Bathrooms; 15) Glazing and window handle; 16) Location of service controls.

<sup>42</sup> The EU Joint Programming Initiative (JPI) “Urban Europe global urban challenges, joint European solutions” was approved in May 2010 by GPC (High level Group for Joint Programming) as a second wave theme thereby highlighting the fact that this theme constitutes a societal challenge and that there is a clear added value in coordinating research in this area. In December 2011 the Competitiveness Council officially endorsed JPI Urban Europe – global urban challenges, joint European solutions – and called upon the European Commission to offer support in the implementation of this initiative (Cf. Box no. 26)

<sup>43</sup> Progetto SoURCE – Sustainable Urban Cells – *Università La Sapienza*, Rome, 2011, Cf. also Box no. 12

<sup>44</sup> Progetto SoURCE – Sustainable Urban Cells – *Università La Sapienza*, Rome, 2011, Cf. Box no. 12.

<sup>45</sup> Stephen Wheeler “Planning for Sustainability.” 2008. In Eugenie Birch and Gary Hack, eds. *The Practice of Local Government Planning*. Fourth Edition. Washington, D.C.: The International City-County Management Association.

<sup>46</sup> Within North American cities, residents and community organizations are practicing urban farming and gardening for recreation, health and nutrition, community empowerment, and urban greening. Some of the most successful community gardens feature partnerships with schools, youth organizations, senior citizens programs or disability action community programs (CCS).

<sup>47</sup> Helping people with disabilities has become a social mission for many organic farms which are growing rapidly throughout the country in Italy. According to a recent survey by AIAB (Italian Association for organic farming), in 2007-2010 the incidence of social agriculture in the agricultural sector, both private and co-operative, has increased from 24.3% to approximately 33%. Ethics, environment and solidarity are the ingredients of a formula that organic producers are increasingly developing.

<sup>48</sup> Cf. note 1.

# 5 WELFARE AND WELLBEING

Increased life expectancy and improved quality of life could be considered, in general terms, among the greatest achievements of modern society. In the light of this, Ageing populations could represent an opportunity for societies to grow as a whole. However, senior citizens should no longer be viewed as a burden on the welfare budget and an obstacle for younger generations; on the other hand, they should be more and more regarded as an opportunity for present and future societies. Several international studies confirm that older adults can become a valuable resource: by remaining active and independent after retirement, they can significantly contribute to addressing the challenge of ageing populations, while preserving their social role and identity.

## 5.1 Robotics in support of an Ageing Society

The new frontier in assistive robotics are *robot companions*<sup>49</sup>, sentient machines designed to provide personalized assistance in different areas, including assisting mobility impaired or non-self-sufficient people. The type of support provided should be considered in the broadest sense, covering every domain and every aspect, from healthcare to everyday life. Based on a multidisciplinary scientific and engineering programme, these Robots aim to introduce a whole new approach towards machines and the way they are used in our society.

A large community of researchers and companies in Europe, coordinated by the BioRobotics Institute in Pisa<sup>50</sup>, leads this sector internationally and has been working for years on the development of new robotic technologies and services, whereby robots and users co-exist and interact. These robots will be based on innovative hardware and software solutions. They will be endowed with advanced interaction, manipulation, flexibility, learning, integration, aesthetic and user-friendly skills, to improve acceptance of the proposed systems and services by users and stakeholders. They will also be able to interact with other robots and with the surrounding physical environment, also equipped with Assistive Technologies. The above features will be developed by studying and understanding the physiological, neuro-scientific, clinical, psychological and sociological features of end users, thereby supporting cross-fertilization among the different sciences and engineering.

## 5.2 Factories for custom-made products

Robotics will be able to turn customized manufacturing into reality, adapting products and services to individual requirements and peoples' requests. The flagship initiative "Factories of the Future"<sup>51</sup> explores the possibility to create factories for customized products, moving beyond the idea of mass customization. This means manufacturing products tailored to the needs of end-users, on a much reduced scale.

The distance between serial production and individual needs is shortened, as products are designed and made “to order”: this is particularly useful for the more vulnerable consumer groups, such as senior citizens. Products are tailored to the needs of individual consumers, on the basis of their mobility, health and living requirements. Special equipment, everyday life objects or physical supports could be produced according to the biometric characteristics of a person, with non-standardized dimensions, shapes and finishes.

Along the same lines, FAB LAB<sup>52</sup> projects are currently being launched in Italy to manufacture industrial products (furniture, equipment, dedicated domestic systems, industrial components) in a single item, at an acceptable price. Interacting directly with the individual demands of an ageing population has far-reaching implications and paves the way towards tailored made production. In this sense robotics will influence production, especially in the sector of items for personal use (implants and orthopaedic devices, shoes, glasses, accessories, clothes), but also luxury goods. Other possible market opportunities include segments, such as furniture and home accessories, requiring specialized support and design skills, in order to guide the customization process towards satisfying not only the requirements, but also the individual preferences of customers.

Building on existing knowledge, infrastructure and production methods, Italian firms will be able to count on modern technologies and approaches to increase the traditional flexibility of Italian craftsmanship. This will be coupled by greater efficiency and the capacity to offer a high added value service, while guaranteeing a competitive and economically sustainable production. Coordination of supply and demand will be achieved through the use of advanced ICT tools and intelligent robotics, in fields such as: augmented reality, production and simulation of interaction between products and people, employment of virtual models and exchange of experiences between production plants, new approaches to market demand with flexible production systems and dynamic interaction along production lines, down to the level of individual firm and individual consumer.

### 5.3 Active Aging@work

*“The increasing population of retirees and the rising cost to society are forcing industrialized countries to find new ways to increase production and to extend working life”<sup>53</sup>* Workers will work increasingly longer as a consequence of the reform of welfare systems, as well as company policies (for example a very important German car factory, has decided to use older workforce for the production of their top-of-the-range car, claiming that experienced workers are able to perform the best results in terms of quality).

The expertise of older workers can and should be turned into an advantaged in production lines where skill and experience are crucial, especially in countries like Italy, where the “Made in Italy brand” is an asset for the national economy. This is why enabling and safety technologies will be developed to assist and support older workers, while preventing health hazards.

### 5.4 Social inclusion

Social participation and social support are closely interrelated to health and wellbeing, at any age. In addition to family life, engaging older people in a community’s social, cultural and spiritual activities, helps to maintain their social role, be respected and appreciated and keep relationships



based on mutual help and care. Participation promotes social integration and is key to active ageing. Volunteer work allows senior citizens to be part of a community and to use their knowledge and experience to help others. Creating new relationships, taking on new social responsibilities, engaging with and supporting younger generations could have a positive effect on older people's health and quality of life. Volunteering can therefore play an important role in achieving active ageing, strengthening social ties and promoting intergenerational understanding and solidarity, while fighting the risk of social isolation for the most vulnerable groups of society, including older people. All this depends on a number of factors, which range from social services to labour market organisation, from pension systems and older people's motivation towards solidarity. In contemporary societies undergoing a demographic shift, engaging in active citizenship at all ages means moving beyond the outdated stereotype whereby older people are considered as a being socially disadvantaged members of society.

In Italy, the local welfare systems have used different tools to address the demand of the elderly and their families, whose size and characteristics are quite variable and strongly related to the local context. In this respect a recent project conducted by CNR-IRPPS and the Ministry of Social Solidarity, has analysed the dynamics of supply and demand of social services for the elderly and immigrants in Italy. The results have highlighted a dramatic spatial diversity in the supply and demand of social services. The three areas analysed by this project identified many aspects of the emerging demand for services, as well as the difficulties experienced by the Italian welfare system to fulfil the "new needs"<sup>54</sup>.

## 5.5 Volunteering: developing intergenerational work

The condition of many senior citizens who experience loneliness and are at risk of social isolation is shared across all sections of contemporary societies, which are affected by widespread communication, interpersonal and intergenerational problems. Volunteer work, including activities on a non-profit basis, encourages social exchanges and learning and could provide an answer to this problem: a case in point is *time-banking*<sup>55</sup>, which provides an excellent opportunity for socializing and reducing the distance between people who have time to spare, such as older people, and those who are short of time, for example people who work.

These tools are extremely important for older people's wellbeing because they can help them stay active. The Italian *Time bank* initiative, launched in 1995, counts on a network of 167 associations spread throughout the country: its aim is to help reduce the distance between generations through cooperative work and getting involved in intergenerational events, with senior citizens holding citizenship education or history lessons in schools or taking care of children in public places, while, in turn, young people help older adults through volunteer activities. Initiatives encouraging intergenerational activities are appreciated and welcomed in most cities.

## 5.6 Safety and facilitated access to recreational areas

Public safety is a priority for older people and has a significant effect on their willingness to move about and remain active and positively engaged in society. Although safety problems affect some cities more than others: "*Regardless of the actual level of danger, concerns about security are expressed nearly everywhere, including matters such as street lighting, violence, crime, drugs and homelessness in*

public places. *Going out at night is especially fearful for many older people*<sup>56</sup>. Another concern for older people is access to public places: *“In both developed and developing countries, people think that their city was not designed for older people. In many cities, reference is made to barriers to physical access, which can discourage older people from leaving their homes* <sup>57</sup>”.

In this regard an Italian study was conducted in 2006 by CNR-IRPPS<sup>58</sup>, in collaboration with Ambrosetti – The European House, aimed to highlight some aspects of the quality of life in old age and verify if the elderly lose the joy of living, they maintain their independence, and play a part in their local community<sup>59</sup>.

Very often, public places are not adequately equipped to cater for the needs of older adults, especially people with mobility impairments. Senior citizens have difficulty finding places to sit or reaching places or buildings due to physical barriers. *“Having green spaces is one the most commonly mentioned age-friendly features. However, in many cities there are barriers that prevent older people from using green spaces.* In order to solve these problems, it is important to create new open spaces designed for people with reduced mobility, while at the same time regulating pedestrian and road traffic. In this context, communicating measures adopted to improve safety is crucial in order to build trust and encourage senior citizens towards greater mobility.

## 5.7 Welfare and wellbeing: bridging the distances

### Between the Ageing population and a fair and inclusive society:

- *Moving from a Market-oriented society towards the real needs of individuals;*
- *Reducing the generational gap;*
- *Improving access to healthcare services, recreational facilities and places of worship;*
- *Moving from a state of uncertainty towards a protected environment;*
- *Moving towards the outskirts of existence.*

<sup>49</sup>CA-RoboCom – Coordination Action for the Design and Description of the FET Flagship Candidate Robot Companions for Citizens, <http://www.robotcompanions.eu> /eu Robotics, the European Robotics Coordination Action, <http://www.eurobotics-project.eu/downloads/downloads.html>; Robot-Era – Implementation and integration of advanced Robotics systems and intelligent environments in real scenarios for the aging population. <http://www.robot-era.eu>

<sup>50</sup>BioRobotics Institute, *Scuola Superiore di Sant’Anna*, Pisa (<http://sssa.bioroboticsinstitute.it/>)

<sup>51</sup>“Factories of the Future” is a research programme approved by the Italian Interministerial Committee for Economic Planning (CIPE). This flagship initiative is coordinated by the National Research Council (CNR) with the participation of universities, research centres, government administration, companies and private

stakeholders. It was launched in January 2012 and will run over a three year period. The aim of the project - which is based on the specific characteristics of the Italian manufacturing system and on the developments of European and global industry – is to promote important research initiatives to improve the competitiveness of Italian industry, and particularly of the “Made in Italy brand”, in a global context. The “Factories of the Future” is a Public-Private Partnership (FoF PPP), launched under the European Economic Recovery Plan, addressing the development of the next generation of production technologies that will be applied from 2015 onwards. It shares the key goals set by the European Framework Programme for Research and Innovation Horizon 2020.

<sup>52</sup>The Fab Labs are currently being launched in Italy. The Fab Labs, founded by Neil Gershenfeld “began as an outreach

project from MIT's Center for Bits and Atoms (CBA) ... Activities in fab labs range from technological empowerment to peer-to-peer project-based technical training to local problem-solving to small-scale high-tech business incubation to grass-roots research. Fab labs share core capabilities, so that people and projects can be shared across them. ... MIT's Center for Bits and Atoms is an interdisciplinary initiative exploring the boundary between computer science and physical science. CBA studies how to turn data into things, and things into data. It manages facilities, runs research programs, supervises students, works with sponsors, creates startups, and does public outreach" (<http://fab.cba.mit.edu/>).

<sup>53</sup>The title quotes the conference "Work, Wellbeing and Wealth: Active ageing at work", that will be held 26-28 August 2013 in Helsinki, Finland, organised by the Finnish Institute of Occupational Health (FIOH), in cooperation with the Finnish Ministry of Social Affairs and Health, Eurofound, OSHA, and a number of other organizations. (<http://www.eurofound.europa.eu/events/2013/ageingheIsinki/>)

<sup>54</sup>The research has considered three case studies from different areas of the country (Brescia, Empoli and Giugliano in Campania) and has been conducted with quantitative and qualitative tools (CNR-IRPPS - PRIN Project 2010: "Domanda effettiva e potenziale di servizi sociali da parte della popolazione anziana")

<sup>55</sup>Time banking is an association based on volunteer work, aimed at exchanging units of time used as currency. The unit of currency is always valued at an hour's worth of any person's labour and is assigned to reward hours spent for various community work activities such as cooking lessons, home help, caring for children and elderly people, exchanging equipment, helping out children with their homework and so on. The "time" spent providing services earns "time" that one can spend to receive them. Apart from providing and receiving services, participants also have to the opportunity to build confidence, social contacts and skills, thereby forging stronger community ties.

<sup>56</sup>Global Age-friendly Cities: A guide, World Health Organization 2007.

<sup>57</sup>Global Age-friendly Cities: A guide, World Health Organization 2007.

<sup>58</sup>The IRPPS, in collaboration with Ambrosetti - The European House, carried out a study on a sample of 700 not working women and men aged more than 65 years living in 6 cities Italian. The survey has been conducted in 2006. The aim of the study was to shed light on some aspects of the quality of life in old age and verify if the elderly lose the joy of living, they

maintain their independence, and play a part in their local community. In addition to assessing the level of satisfaction and happiness of the respondents, the study delved into issues such as Control, understood as the ability to manage their lives; Autonomy, defined as the degree of their independence as well as their attitude towards what they have built in their life, live the present and see the future. To this end, a battery of questions called CASP (Control, Autonomy, Self-Realisation, Pleasure) has been used. The study has also assessed the elderly's knowledge and evaluation of a number of services available in their community. Respondents give an overall positive assessment of the quality of services offered, but at the same time they show not to be fully aware of what is around them, since a significant portion of the respondents does not express any opinion. Therefore, the findings showed the need to improve the image of the services offered, and retraining communication, in order to make the elderly more aware of what their city provides. The "distance" of over-65s from their city is emerging as an interesting result of the study because it is widespread, providing a picture of the condition of the elderly on which to reflect and intervene.

<sup>59</sup>The report on the condition of the elderly in Italy by IRPPS-CNR (2006), provides systematic and detailed documentation on the condition of the elderly in the country, covering the various dimensions of the issue ranging across: demographic research; the end of working life; the relationship between aging and health; living conditions of the elderly with special reference to housing and co-living; welfare issues, including the welfare mix and the relationship between state, market and families in care management. The report investigates the condition of the elderly in different areas of the country and by social class, with specific attention to gender differences. It is structured in the following chapters: The aging population in Italy; Old age and health; Working condition of older workers and end of working life; Ageing and living conditions of the elderly; Social life and active citizenship. The research report benefits from a series of acquisitions and contributions, resulting from the work carried out in previous years in the field of population and social policies studies. With regard to the latter, contributions consist of papers published with prestigious journals and publishers, made possible through special CNR funding. With regard to demographic studies, special mention should be made of contributions published in collaboration with the "Demography group" of the Italian Society of Statistics (Società italiana di statistica).

# 6 CONCLUSIONS

Older people have never been so distant from younger generations as they are today: this seems to be a contradiction for modern societies that claim to have technically and technologically reduced distances in all sectors and at all levels. In fact, the social and intergenerational gap has now become wider, and the consequences of such distances will affect the future model of society.

Reconsidering distances and finding solutions to close the gap, however, is not just a problem related with Ageing societies, but has overall implications in most aspects of contemporary life. Another widely recognised problem is the lack of communication among the different sectors in science, including the distance between science/academia and policymakers, a longstanding issue that the United Nations is trying to address, at least in the field of sustainable development, through the *Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)*<sup>60</sup>.

A possible solution is finding a new approach that is able to strike the right balance between technology and humanity, downsizing “communities” to the real needs of citizens, with the ultimate goal of re-establishing the appropriate “distances” while preserving the necessary interconnections. The resilience of our society to demographic changes will be influenced by our ability to preserve such interconnections, while avoiding excessive interdependency, a major factor of fragility in complex human ecosystems.

This will allow for a more effective and efficient management of Ageing societies, bringing citizens and communities closer within more natural boundaries and inclusive environments. This means recreating the real or virtual dimension of that primitive village, which was the starting point of human civilization, created in order to preserve the fragile elements of the community and their role. Safeguarding the role of senior citizens strengthens their social standing and identity and avoids the risk of isolation. Any action adopted in this direction, from social policies to economic incentives, has a positive impact and helps to rebuild a healthy human ecosystem. Reproducing the village dimension provides an opportunity for senior citizens to resume a proactive role, while responding to their daily needs: but more importantly it gives voice to the emotional and spiritual requests that are often neglected in social and economic policies.

The above immaterial needs are closely connected to preserving and sharing memories, a valued legacy passed on by older people. The increasing incidence of chronic diseases associated with the loss of memory, one of the most alarming health crises of the near future, seems to be a sort of nemesis punishing contemporary society for isolating elderly people, the main keepers and guardians of memories.

The transmission of memories, entrusted to elderly people in ancient societies, remains a fundamental need to this day, and is intimately linked to the re-establishment of the “village

dimension” and to the recognition of the identity of ageing people in a changing world. Regardless of personal religious beliefs, the preservation and transmission of personal, family, community, ethnic, societal, scientific and cultural memories is an essential requirement for mankind, and a very human attempt at eventually achieving some sort of immortality.

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<sup>60</sup>The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) was established in April 2012, as an independent intergovernmental body open to all member countries of the United Nations. The members are committed to building IPBES as the leading intergovernmental body for assessing the state of the planet's biodiversity, its ecosystems and the essential

services they provide to society... IPBES provides a mechanism recognized by both the scientific and policy communities to synthesize, review, assess and critically evaluate relevant information and knowledge generated worldwide by governments, academia, scientific organizations, non-governmental organizations and indigenous communities”.

*“ ... l'uomo mortale non ha che questo d'immortale.  
Il ricordo che porta e il ricordo che lascia.”*

Cesare Pavese<sup>\*</sup>

<sup>\*</sup>“Mortals have nothing but this of immortal: memories they take with them, memories they leave to others”  
Dialogues with Leucò, Giulio Einaudi Editore-Arnoldo Mondadori Editore, 1976, pages. 143-149.

# Annexes

## Case studies

The following is a selection of case studies. This list is not intended to be exhaustive and summarizes some of the main policy actions and best practices adopted in Italy, in the different domains related to Ageing populations.

### Box 1 • “La Casa della Salute” (M. Paganelli)

The *Casa della Salute* (House of Health) is a health and social care facility where primary care services are integrated with other public health, mental health, social, specialist and hospital services. The Houses of Health, evenly distributed throughout the territory of some Italian regions, ensure the necessary coordination among health workers and a more efficient integration of services. They also encourage consistency in the provision of “essential levels of services”, given the availability and concentration of services and workers in a single location. In addition to social health assistance, as traditionally understood, the Houses of Health are also involved in the implementation of prevention and health promotion activities.

### Box 2 • ICT, Health and Wellbeing – the SPES project (D. De Martinis)

The European “SPES” project (Support Patients through e-service solutions - [www.spes-project.eu](http://www.spes-project.eu)) follows up on the EU “OLDES” project (Older people’s e-services at home). Both projects developed entertainment and health care platforms to remotely monitor the health of older people and improve their quality of life. The SPES project extended the implementation of the OLDES platform in 4 European cities (Ferrara, Vienna, Brno and Kosice), focusing on the following issues: respiratory problems, dementia, disability and social exclusion.

The case studies provided the opportunity to test user-friendly telemedicine solutions, reducing the need for patients to travel in order to receive care, thereby improving their daily life and general wellbeing.

The research projects, coordinated by ENEA (the Italian National Agency for New Technologies, Energy and Sustainable Economic Development), are carried out in collaboration with the Czech Republic, Belgium, the United Kingdom, Germany, Austria and the Slovak Republic, and involve local facilities and services, such as regional health services, which will be using the technologies and know how developed within the projects first hand.

### Box 3 • The IUVO Project (F. Vecchi)

The “IUVO” project will be developed over the next three years with the aim of creating a wearable cognitive robot for the functional assistance of lower-limb motion for elderly or disabled people. The robot can be used with the maximum safety and comfort, and supports movements such as walking or climbing stairs, as well as developing new scientific knowledge in the field of wearable robotics.

“Iuvo” is an example of social innovation whereby research contributes to promoting active aging; it is an interdisciplinary project since it involves the collaboration of bioengineers and physicians (cardiologists to be precise) and because it creates a synergy between research institutes, such as the Institute of BioRobotics of the “*Scuola Superiore Sant’Anna*” and the Institute of Clinical Physiology of the National Research Council (CNR).

#### Box 4 • The Alzheimer's Project: the benefits of a stimulating environment on brain functioning (N. Berardi)

Exposure to a stimulating environment prevents loss of memory and reduces or may lead to recovery of anatomical deficits. So at least it is for mice that exhibit all the typical signs of human Alzheimer, but the results of the experimentation may also have positive effects on humans.

This was stated by a study published in the *Journal of Alzheimer's Disease* signed by Nicoletta Berardi, (Department of Psychology, University of Florence and National Research Council - Institute of Neuroscience -IN-CNR, Pisa), in collaboration with Lamberto Maffei (*Scuola Normale Superiore* and IN-CNR, Pisa), Chiara Braschi (IN-CNR Pisa), Simona Capsoni and Antonino Cattaneo (Environmental enrichment delays the onset of memory deficits and reduces neuropathological hallmarks in a mouse model of Alzheimer-like neurodegeneration). Over the past 15 years, several studies on humans suggested that exercise and a stimulating environment can have beneficial effects on brain function, particularly in elderly subjects.

The results of experiments conducted by researchers on mice indicate that leading an active and stimulating life can act on endogenous factors that prevent the onset of cognitive decline and neurodegeneration. Exposure to a physically and cognitively stimulating environment (enriched environment) increases the expression of neuroprotective factors that can directly affect the metabolism of amyloid beta protein, whose accumulation in the brain leads to the formation of plaques that characterize Alzheimer's disease.

#### Box 5 • The Alzheimer's Project: Train the Brain (N. Berardi)

"Train the brain" is a unique project in the world, and an Italian record. Train the brain, i.e. testing if brain stimulation can slow the course of Alzheimer's disease, is an initiative by Lamberto Maffei, professor of Neurobiology at the *Scuola Normale Superiore* in Pisa and a pioneer of studies on brain plasticity. The project aims to see if putting patients in early disease stages in an environment full of stimuli can change the course of their neurodegenerative disease, by reactivating the natural ability of the brain to change and restructure itself - its plasticity - a characteristic that decreases in adult human beings.

"Train the brain" involves between 200 and 400 patients, who are placed for three to four mornings a week in an ad hoc structure where they are involved in a range of physical and intellectual activities, such as memory exercises, music therapy, watching movies and social activities. At the beginning, patients undergo a check-up and a MRI (Magnetic Resonance Imaging) in order to assess the state of the disease. The same is done after six months of "training", and three months from the end of the program. The idea is that an enriched and stimulating environment provides benefits for these patients, who often lead isolated lives, and may slow down dementia. The project is currently running and is giving good results.

#### Box 6 • The CONN-AGE Project (P.M. Rossini)

CONN-AGE is a PRIN (Research Projects of National Interest) research project funded by the Italian Ministry of Education, University and Research (MIUR) in 2012 and still in progress which aims to develop a database of dynamic and functional brain connectivity both in the healthy aging and in chronic/diffuse/progressive (i.e. Alzheimer) and acute/localized/non-progressive (i.e. stroke) diseases of the central nervous system. In order to reach this goal, several different technologies dealing with brain function will be integrated (i.e. fMRI, EEG, TMS-EEG) in order to define the relationships between the structural and dynamically time-varying linkages of neuronal assemblies in resting-state conditions as well as during task performances. By means of this knowledge not only prognostication for functional recovery will be implemented, but also innovative rehabilitation procedures both for sensorimotor and cognitive deficits will be developed. This project is coordinated by the Catholic University Faculty of Medicine in Rome, universities of Chieti, Milan, Sapienza-Rome; foreign collaborators include the University of Madison (US) and the University of Bern in Switzerland.



### Box 7 • “A year together” (S. Avveduto)

The project was promoted by the Alzheimer's Association of Rome and supported by the Lazio Region (2009-10). The main objective was to improve the quality of life of households with people affected by Alzheimer's disease, through the creation of a territorial and integrated model of assistance. The most relevant aspects of the project were: the integration between services, households, associations and other territorial resources; monitoring disease progression; planning and piloting local services that integrate social and healthcare services and volunteering activities; the participation of multidisciplinary and multi professional teams.

Some of the institutions involved in the project were: the Fatebenefratelli Research Association (AFaR), the Santa Lucia Foundation of Rome, the Psychology Department of the *Sapienza* University of Rome and the National Research Council - Institute for Research on Population and Social Policies (CNR IRPPS).

### Box 8 • Memory: the narrative laboratory (S. Avveduto)

Memory: the narrative laboratory is an action-research project funded by the Municipality of Naples and carried out by IRPPS during the European Year for Active Ageing. The project promotes the highest possible level of activation in a group of frail elderly people, through the exercise of narrative induced in a new ad hoc context created by researchers. In this context, we used an autobiographical tool kit (Demetrio 1997) which uses visual and auditory stimulation (with the use of colourful pictures, personal photos and songs) to prompt self-narration and recall memories and personal events. Tactile stimulation through everyday life objects is also used and several manual tasks are proposed.

The project demonstrates that the re-appropriation of memory through story telling improves the resilience of frail and institutionalized elderly people. The practice of self-narration actually produces beneficial effects which are directly observable. Some people have found in this new narrative context the ability to verbalize; some have gained a greater sense of self-efficacy and showed clear signs of improved motor skills; others have rediscovered the ability to use their hands. The project has therefore achieved remarkable “health gains” and improved the quality of life of individuals, including non-self-sufficient people who are not easily involved in other activities. The Memory project also assumes that narrative exercise is able to play a protective role in the aging process, preserving and/or slightly improving the cognitive abilities of the selected sample of elderly people, slowing down cognitive decline and delaying the onset of dependency.

Dependency in older people can be considered the result of a complex relationship between personal factors and environmental factors. Therefore, it is increasingly necessary to implement pilot tests which identify psycho-pedagogical strategies to develop individual skills of self-protection against the social risk of lack of self-sufficiency. The Memory Project is moving in this direction and develops an intervention model that can be applied as a protocol of care.

### Box 9 • “Sistema Tecnologico per l'Assistenza Territoriale” (SISTAST) and the Intelligible City for All (ICityForAll) project (B. Felici)

The Territorial Assistance Technological System (SISTAST), carried out in collaboration with *Regione Puglia*, is aimed at developing an “augmented reality environment” through a pilot study dedicated to elderly or disabled people, in order to meet their natural need to socialize, communicate, learn, travel and get in touch with new cultures, traditions and places ([www.sistast.eu](http://www.sistast.eu)).

The system seeks to increase accessibility of the surrounding environment, by helping travellers with special needs either in relation to their specific disability or in relation to the chosen destination, services, and scheduled activities; from travelling options (flight, train, car) to moving around and local transport (pedestrian areas, facilities for the disabled), to attractions and other facilities (hotels, museums, etc.). The aim is to ensure that the chosen destination and its features are fully available when travelling alone, with family or in a group, for leisure, business, study, religious or medical reasons.

SISTAST is also designed to give users travel and safety information (all emergency calls are automatically linked to local services). The man-machine interfaces, designed for maximum simplicity, are user-friendly, non-intrusive and with the lowest impact in normal conditions, thanks to the type of probes and sensors developed. Individual users or groups can also access the requested assistance by calling an operator on their smartphone.

The “Intelligible City for all” EU project ([www.cityforall.eu](http://www.cityforall.eu)) is also aimed at facilitating mobility and is carried out jointly by France, Germany, Italy and Switzerland. The project aims to enhance orientation and mobility (public transport) of elderly population with hearing impairment (presbycusis), by developing Audio Aged Sensitive ICT (speakers, alarm recognition, GPS tools).

**Box 10 • Project: “Mattone Internazionale” (M. Paganelli)**

This project, carried out under the supervision of the Ministry of Health, coordinates Italian Regions in the internationalisation of health systems. The project will provide training and educational activities for staff from relevant Ministries, Regional authorities, Hospitals and Local Healthcare Providers (*Aziende Sanitarie e Ospedaliere*), as well as other stakeholders involved in the health sector, with the aim of communicating EU policies and providing information on how to access European and international health, research and innovation programs. The project, furthermore, has put into place specific mechanisms for the subsidizing and qualified participation of all recipients of health policies within the European and international framework.

The year 2012 has seen many initiatives taking place on the theme of Ageing. In particular the European Commission designated 2012 as the “European Year for Active Ageing and Solidarity between Generations” and launched the “European Innovation Partnership on Active and Healthy Ageing”, as set out in the Europe 2020 Innovation Union Flagship Initiative.

To this purpose, the project “*Mattone Internazionale*” is working on the issue of Ageing by facilitating access to documents, links and updates by the European Commission through the creation of a database that collects information and other useful material available to Regional authorities, Health providers, Hospitals and other stakeholders. The aim is to promote and coordinate activities for active Ageing, keeping into consideration the fact that Italy, due to its demographic structure, could be seen in Europe as a paradigm for integration policies in the field of Ageing population.

**Box 11 • The National Centre for the Prevention and Management of Diseases (S. Salmaso)**

The National Centre for the Prevention and Management of Diseases (*Centro nazionale per la prevenzione e il Controllo delle Malattie – CCM*) is financed by the Ministry of Health and is an organism of coordination between the Ministry of Health and the Regions. It organises and coordinates all activities of surveillance, prevention and emergency response and operates in synergy with Regional structures, the Higher Health Institute and other national institutions of assistance and research, both public and private, according to yearly programs devised and ratified by decree by the Ministry of Health.

In particular on the issue of Ageing and related sectors, 5 projects have been financed for a total of approximately 2 million Euros and are currently underway. The projects are: 1. Priority criteria for the care of elderly people affected by disabilities and multi-diseases. Implementation of the MAPLe system in Italy; 2. Optimization of the complete process of patient management on the territory: paradigms of taking charge and managing multi-disease through a platform of Integrated Care; 3. A paradigm of social and healthcare for the underprivileged population; 4. Experimentation of assistance paradigms for the prevention of complications of Alzheimer’s disease on the basis of the wider-ranging chronic care model put into place by ASP in Catanzaro; 5. Implementation in all Italian Regions of a monitoring system on the state of health of the elderly population, in particular those with disabilities, and on the quality of assistance and social and healthcare interventions put into place. 6. System for the integration of medical care for chronically ill patients.

**Box 12 • Retired personnel for Security: a project of the Ministry of Defence (F. Scialla)**

In the Italian Armed Forces, every Service is tightly linked and supports one or more veterans’ associations. The purpose of these associations is inspiring the younger generations of servicemen and preserve traditional values and cultures. The veterans reduce the cultural gap with the new generation passing on their values and transmitting their experience. Agreements between veterans and several Italian local authorities are in force in order to provide social and security services in cooperation and/or in integration with the regular Armed Forces: veterans are actively involved in community work and support local authorities both in case of public events and calamities.

The *Associazione Nazionale Alpini* (ANA – National Association of Alpine troops) counts almost 300.000 members that have served in the alpine troops, a specific subset of the infantry within the Italian Army. One of its main purposes is to support the intellectual and spiritual education of the younger generations by studying mountain related issues and environmental protection. ANA can count on 15.000 volunteers, organized in four Groups (*Raggruppamenti*), patrolling the whole Italian territory in order to act in case of natural catastrophes. It is on call 24/7 and can support directly the Department of Civil Protection of the Presidency of the Council of Ministers or work in cooperation with local authorities.

Moreover, various Regions and Communities have established agreements with Veteran associations in order to provide social or security services in cooperation and/or in integration to the Armed Forces. There are many agreements between local administrations and the Civil Protection in the following areas; security outside schools, in public parks, on local transport; surveillance within hospitals; the ambulance service; assistance to the disabled, the elderly, young people, people in need of help, etc.

### Box 13 • Sustainable Urban Cells Research Project - So.UR.CE. (D. Astiaso-García)

The So.UR.CE. project is a “Significant Bilateral Project” approved within the Executive Programme on Scientific and Technological Cooperation between the Italian Republic and the Kingdom of Sweden. It is carried out by *Sapienza* University of Rome and the Royal Institute of Technology of Stockholm and is financed by the Italian Ministry for Foreign Affairs jointly with the Ministry of Education, Universities and Research.

The aim of the project was to provide practical guidelines and policies in order to re-shape urban areas, rethinking the integrated design of building systems and pursuing the goals of energy savings and environmental sustainability in order to improve the quality of life of all citizens, including senior citizens. Consequentially, the primary goal of the research was to experience the “sustainable reshaping of the city” by identifying a singular or multiple model of “urban cell”, i.e. a minimum core of the larger city model itself, and provide a tool for public administration to assess and re-shape the territory towards a low energy territory. The case studies performed in Lund, Trevignano Romano and Sabaudia, proved to be a significant phase for the validation of the methodology. The theoretical model and the methodology have been applied, and then converted, into actual operational tools available to the Public Administrations (in partnership with private companies/institutions) to plan, acquire funding and implement the necessary projects enhancing the quality of life in urban areas.

### Box 14 • Survey on Health, Ageing and Retirement in Europe - SHARE (R. Pozzo, G. Weber)

Italy plays a key role in SHARE, an interdisciplinary and longitudinal survey on economic and social conditions, health and well-being of the 50+ population in twenty European countries, that has been recognized as a Research Infrastructure by the European Commission and granted the ERIC status (SHARE ERIC). The survey – that has so far involved 85.000 individuals who were interviewed every second year in their homes - collects information useful to the promotion of Active Ageing among those in good physical and mental health, in order to improve the effectiveness of social and health care for those who are no longer independent. The University of Padua (Department of Economics and Management) and CNR (Department of Social Sciences and Humanities, Cultural Heritage) are the key players for SHARE in Italy, but this infrastructure involves economists, sociologists, demographers, epidemiologists and geriatricians from a number of universities and research centres in Italy, Europe and elsewhere. Surveys similar to SHARE are run in the US (HRS), England (ELSA), Japan (JSTAR), South Korea (KLoSA), China (CHARLS), India (LASI), etc. The SHARE data are freely used by the international scientific community to investigate how the ageing process is affected by public interventions in the areas of work and employment, pensions, health care and long term care, in a wide range of European countries (Sweden and Spain, Germany and Italy, France and the Czech Republic, to mention just a few) with different traditions in terms of family ties, local community support, etc. In order to foster interdisciplinary and multinational analyses, the CNR (Department of Social Sciences and Humanities, Cultural Heritage) and the European Commission (DASISH project) promote coding harmonization of information which is originally collected in different languages and reflects the existence of different institutional features (such as different codes for educational attainment levels, employment position and occupation that are adopted across different European countries). This effort also aims at producing meta-data from data bases set up in different disciplines, each with their own methodology, that can be particularly useful to investigate the ageing process.

### Box 15 • Smart Living for an Independent and Active life for the Elderly (P. Clerici Maestosi)

The Marche Region, designated by the Ministry of Health as Network Hub for “Ageing Italy – National Network for research on ageing and active longevity”, has launched a call to promote the issue of “Intelligent house for active longevity and independence for the elderly”.

The call aims at enhancing the implementation of industrial research projects and experimental development of production and scientific systems, in order to create technical solutions for the market in terms of services and products addressed to Smart Living solutions for active ageing and independence of the elderly. The approach adopted is based on common standards and on the needs deriving from the emerging concept of smart city, that is a city able to offer high quality services to its citizens founded on the highest level of efficiency, thanks to the “intelligent” use of ICT.

The call aims at promoting technological solutions for the prevention of chronic diseases in the assistance of the elderly in their own home. Such technologies, although inspired by existing platforms in other fields, such as tele-medicine, must be characterized by a much wider and open application (“Integrated Platform”), which combines the basic functionality of domotics (energy management, eco-compatibility, security, comfort etc.) with innovative so-called smart objects, that are able to interact with fragile end-users and monitor their daily activities, habits and any relevant irregular behaviour which could be a sign of discomfort, danger or the symptoms of a disease that is setting on. There are 6 approved projects, which involve 63 companies, 3 Universities and 2 Research Centres.

**Box 16 • Environment and Nutrition: research and innovation for quality of life (D. De Martinis)**

In the field of medical and food sciences, ENEA - the Italian National Agency for New Technologies, Energy and Sustainable Economic Development - is implementing studies on immune-mediated diseases and inflammatory responses and on biomarkers for early diagnosis (asymptomatic stage) associated with ageing, dementia, neurodegeneration (Alzheimer's disease), and/or with the environmental exposure to ionizing radiation or other agents. All these aspects are investigated *in vivo* and *in vitro* models, in order to assess the therapeutic/preventive effects of (plant-derived) bioactive molecules, developed through green biotechnologies. Other studies at ENEA are targeted towards facilitating healthy eating habits, by developing functional food, probiotics and nutraceuticals. An example is The Buckfood project (<http://utagri.enea.it/en/research/topic/6>), sponsored by the Italian Ministry of Economic Development, to obtain innovative food products (mainly bakery-related), by tuning processes for specific grain flours featuring specific molecules, such as fibres, vitamins and flavonoids. The main objective is to obtain food with antioxidant, anti-inflammatory, hypotensive, hypoglycemic functionalities; these are very important features for diet in general, and very important for a balanced diet when advancing in life.

**Box 17 • Lifetime house, smart home, private assisted house (V. Stefanini)**

A number of more innovative projects contribute to the circulation of a new concept of Smart Living, which is not strictly linked to domotics in the traditional sense, whereby fragile domestic users, in particular the elderly, can be supported in the management of their house and their domestic life by advanced smart technologies such as the following:

- AALISABETH: Ambient Aware LifeStyle tutor, Aiming at a BETter Health. This project deals with prevention and management of chronic diseases through the development of innovative low-impact and user-friendly solutions.
- HicMO: Hic Manebimus Optime ("Here we'll stay excellently", Tito Livio). The objective here is creating a "Domotic Integration Platform" which, starting from the basic system of tele-medicine already set into place, adds a series of smart domestic objects which can act as a "macro-sensor of daily activities and behaviour" of fragile users.
- HDOMO 2.0: Human based DOMOtics 2.0. This project aims at creating a smart hardware and software infrastructure able to learn and act in an integrated domestic milieu, endowed with highly-usable interfaces and characterized by the presence of numerous smart objects for easy access to social and healthcare services and for the prevention of chronic diseases for domestic elderly users.
- PASS: Private ASSisted House for active longevity and the independence of the elderly. This is a paradigm of service such as Private Assisted House aiming at favouring active longevity of the elderly in their own house, where life can continue with the usual activities and behaviours both if living independently or within the family, by using innovative technological user-friendly services.
- TRASPARENTE Network Technologies of Assistance to Projects of Housing independence for the Elderly, this project works within the framework of integrated domotic applications, for an "adjuvant" assistance in daily life to self-sufficient elderly, who need technological support to lead a better quality life and maintain independent life in their own house as long as possible.
- MARCH'ingegno e la Sibilla – this is the development of a unique support technology for the elderly having a double function: that of smart object to work with any system of tele-assistance/tele-medicine and that of autonomous device to monitor, support and if necessary, warn about any possible situation of discomfort and danger for the elderly person.

**Box 18 • SI4Life - Science and Industry together to improve quality of Life (L. Alagna)**

The CNR Institute for Educational Technologies (ITD) participates to the activities of the SI4Life Consortium on "Science and Industry together for improving quality of Life" which has been established with the main aim of answering to the Liguria Region call for the creation of Research and Innovation Centres (on funds PRO Objective CRO FESR 2007/2013 Axis 1). The Centre SI4Life has therefore been financed with the objective of improving services and developing technologies to further assist the elderly and the disabled. The CNR is one of the founder-members of the Consortium and through its 2 Institutes in Genoa, ITD and IBF (Institute of Bio-Physics), actively participates to its activities.

**Box 19 • Working conditions and worker's representation in the healthcare sector (S. Avveduto)**

Within the national project Prin 2009 (funded in 2011 and still in progress), on "Forms of representation and organization of non-standard workers," the IRPPS CNR had the role of local research unit within the network co-ordinated by the Department of Social Sciences of *Sapienza* University of Rome.

The local unit IRPPS/National Research Council addressed various issues regarding the condition of the elderly, focusing on workers involved in care both within the national health system or employed by families. In particular, the complexity of the organization of elderly care was analysed and two surveys were carried out on two specific categories of workers: nurses and family caregivers (*badanti*). In the research project demographic and immigration topics are intertwined in particular in the analysis of the working conditions of *badanti* and the relationship between them and the families where they work.

### Box 20 • The ExCITE project (L. Alagna)

The main objective of project ExCITE (Enabling SoCial Interaction Through Embodiment) is to identify new ways of providing remote assistance and rehabilitation services for ill or elderly people. The project develops the needs for social interaction of end-users through robotics. A number of European countries are involved, among which Italy, Sweden (coordinator) and Spain. Italy is represented by the CNR Institute of Cognitive Sciences and Technologies (ISTC) and the project has been ranked as the most promising and successful in the area of Ambient Assisted Living (AAL).

The robot, called Giraff, is a mobile device of Telepresence which allows remote assistance by medical and nursing staff, family and friends, who can virtually visit a house, move around and communicate with the residents by video call.

### Box 21 • “AitAAL”: Italian Association for Ambient Assisted Living (P. Siciliano)

The Italian Association for Ambient Assisted Living (AitAAL) was born out of the need to establish in Italy, first among all European countries, an Association which would deal, within a strongly multi and inter-disciplinary framework, with the scientific, technological and social research linked to all AAL issues, in line with policies and activities taking place at European level. This cultural non-profit Association, with its main office in Lecce, at the CNR Institute for Microelectronics and Microsystems, includes a great number of researchers and experts of different disciplines, as well as other private and public Research Centres, Universities and Companies operating in the relevant product and service market, Associations and Co-operatives of users and other Public Institutions, among which Local Authorities. Among its various activities:

- The role of motivation and scientific and cultural support to companies and research centres on the territory, contributing to the development of strategic policies and guidelines within AAL.
- Publicizing in Italy the knowledge and usage of innovative support technologies in people's living quarters, with special attention to the needs of the elderly and/or people with disabilities or fragility of any kind.
- Create a network for members to encourage them to share experiences and find synergies and interactions thanks also to the presence of organizations and representatives of elderly and disabled users, thus promoting the matching of offer and demand, and encouraging technological development in favour of such fragile people in the most efficient and sensitive way.

### Box 22 • “INNOVAAL”: Public – Private Aggregation for Ambient Assisted Living (P. Siciliano)

INNOVAAL is a Public-Private Aggregation for Research, Development and Validation of innovative products and services for Ambient Assisted Living, the first in Italy in this sector. It includes 16 companies and 4 Public Research Institutions, and has been admitted for funding from the Italian Ministry of Education, Universities and Research, following the results of the call on “PON Research and Competitiveness 2007/2013”, No. 713/Ric. Axis 1, with special reference to the “Creation of new Districts and/or Aggregations” (Title III) in the Puglia Region. It is coordinated by the CNR, Institute for Microelectronics and Microsystems based in Lecce, and works on technological and industrial platforms, at the same time researching the resolution of emerging socio-economic issues (ICT for Ageing, Independent Living, Active & Healthy Ageing, Health & Well Being”, etc.). The activities and processes undertaken by research and development projects are supported by the use of the “Living Lab” methodology which, with its “User Centered Design”, is aimed at the validation and endorsement of complex technological solutions in different real life contexts, with the territory acting as a “Social Lab”. Only by encouraging the synergy of public and private elements into a united and complex system, which must necessarily also include Users (elderly or disabled people, etc.), will it be possible to face the Technological and Social challenges in the sectors in which the aggregation operates, thus favouring the creation of a new model of Welfare.

### Box 23 - Metabolic and Nutritional Frailty - FReeMaN from disability (A. Lenzi)

Frailty in the elderly is an important determinant of morbidity and disability, impacting significantly on quality of life, mortality and healthcare costs in the geriatric population. Among the determinants of frailty, metabolic and nutritional aspects related to malnutrition (over and under-nutrition), sarcopenia and osteoporosis seem to play an important role. Metabolic/nutritional aspects and functional features of the frailty syndrome are related to significant modifications in body composition (increased fat mass and reduced lean body mass), muscle strength (reduction of muscle quality with adipose tissue infiltration), bone health and endothelial function. These changes are supported mainly by hormonal changes, oxidative stress, alterations in intermediate metabolism (carbohydrate, lipid and protein) and a chronic inflammatory status.

These alterations are reversible, at least in part, if nutritional intervention and physical activity reconditioning, upon clinical and functional characteristics of the subject, are performed. Physical activity (aerobic /anaerobic activities ...) and nutritional intervention (based on adequate intakes of AA/BCAA, increased intake of micronutrients such as vitamin D) can play a pivotal role in slowing the ageing process and, thus, in the prevention of frailty syndrome. The aim of this working hypothesis is to identify the determinants (clinical-functional, metabolic-nutritional, cognitive-behavioural, socio-cultural) of frailty and to design procedures which could potentially slow the development or hopefully reverse the frailty syndrome. The project involves the collaboration between the *Sapienza* (Dept. of Experimental Medicine - Section of Medical Pathophysiology, Food Science and Endocrinology) and *Foro Italico* (Dept of Movement, Human and Health Sciences, Unit of Endocrinology) University of Rome.

### Box 24 • Project: “The well-being of the Elderly” (S. Bernardini, S. D’Ottavio, D. Volpini)

The aim of the project is to provide an assessment tool that can support a fair and balanced approach to the necessary adjustments in lifestyle in the elderly, in order to preserve autonomy and/or favour recovery, even in the presence of co-morbidities. The assessment will include a biochemical and anthropological study of the nutritional status, as well as the evaluation of physical activity.

The evaluation of the nutritional status will include first the acquisition of specific information about accessibility and bio-availability of nutrients. From the biochemical point of view, a panel of laboratory tests will be adopted to evaluate the major nutrients, as well as the cofactors necessary for their proper metabolism. Biomarkers able to describe the major metabolisms and organ functions will be included in the laboratory panel. The object of the anthropological research will be food as a socio-cultural element.

This research will include three levels: the “cognitive level” has the aim of developing the socio-cultural knowledge apt to start up a self-cultural change in the diet of an older person; the “action level” has the aim of stimulating older persons to begin a process of analysis of their diet in relation to their health condition, and consequently to start a process of self-transformation, matched with medical compliance and a better life quality; the “intervention level” pursues the aim of giving the social and health operators the socio-cultural knowledge that can help them to plan and carry out their intervention in the best possible way, so as to facilitate older people in starting the critical and self-critical process of medical compliance and adherence.

Physical activity is a tool to decrease deficiencies and delay the onset of functional impairment during the processes of aging. The routine administration and guided exercise workout are an effective tool in reducing risk factors correlated to the onset of bone and joint diseases (osteoporosis, osteoarthritis, fractures by falls) and metabolic pathologies (high blood pressure, cardiac arrhythmias, hypotension orthostatic hypotension, obesity and diabetes mellitus). During the project, participants will be tested before and after treatment which consists in the use of exercise as a preventative and therapeutic tool.

### Box 25 • The Parkinson’s disease research in Italy – (L. Zecca)

In Parkinson’s disease when motor symptoms appear, the patient has already lost about 60% of dopamine neurons, then it is mandatory to develop methods for pre-symptomatic diagnosis in order to start early treatment that counteract progression of the disease. The dopamine neurons which selectively degenerate in Parkinson disease are those containing neuromelanin. The collaborative study involving the Institute of Biomedical Technologies – CNR (Luigi Zecca, Fabio Zucca and Emanuele Ferrari) Parkinson Center (Gianni Pezzoli and Joannis Isaia) and Policlinic and University of Milano (Paul Summers and Antonella Costa) have investigated in details the structural characteristics of neuromelanin and its accumulation in brain aging.

In order to diagnose Parkinson’s disease in the early phase they are developing an MRI procedure to detect the loss of these neurons. To this end they developed models of *substantia nigra*, the region containing neurons which degenerate in the disease, in order to reproduce the conditions of vulnerable neurons.

This is allowing researchers to take MRI images of the brain area damaged by Parkinson, and to perform early diagnosis of PD before the onset of symptoms, so that therapeutic treatment on patients will be started when the majority of neurons are still viable.

A very important role plays during the advance of this illness the associations supporting families and patients. In Italy the Associazione Italiana Parkinsoniani (AIP) was founded in 1990 and ONLUS since 1996. The AIP is the Italian largest organization serving over 20.000 patients and their families. It focuses its energies on research, patient services, education (i.e. guides and a monthly newsletter) and raising public awareness about the disease.

### Box 26 • EU Joint Programming Initiative (JPI) – Neurodegenerative Disease Research, in particular Alzheimer’s (JPND): Meeting the Challenge of Neurodegenerative Diseases (A. Maggi)

EU Joint Programme – Neurodegenerative Disease Research, in particular Alzheimer’s (JPND) relies on the shared view that grouping knowledge, infrastructure and funding calls among several European and Third Countries will reinforce the potential for scientific collaboration based on excellence, and will allow participants to raise the level of their ambitions in the face of the public health threat posed in Europe by the increasing prevalence of neurodegenerative diseases. This should accelerate progress in understanding the causes of these debilitating conditions, leading to: earlier diagnosis, development of new treatments and preventative strategies, and provision of more effective care across to improve the quality of life for both patients and caregivers. As of today, 28 countries are participating in JPND including 21 EU Member States, 5 Associated Countries and 2 Third Countries, Canada and Switzerland. During the last five years, JPND has been able to establish and develop a number of major steps in order to fulfil its ambitious goals:

**Scientific integration**, achieved through a common strategic research agenda (SRA) coupled to a multiphase pluri-annual implementation programme, including large joint transnational calls supported by national funding;

**Management integration**, achieved through agreed terms of reference and a FP7-JUMPAHEAD coordination action, followed by a transition phase towards a sustainable structure;

**Financial integration**, through a virtual common pot where in-kind and in-cash contributions are combined, providing an attractive and established model for EU contributions, as well as industrial and philanthropic funding.

This has resulted in the delivery of a first implementation plan that has allowed JPND:

- to mobilize approximately €75 million of additional funding between 2011 and 2014 to support transnational research programs;
- to set up action groups in order to formalize research priorities around palliative care, experimental models, assisted living technologies and longitudinal cohorts;
- to promote engagement, commitment and partnerships with the European Commission and non-EU countries, with industry, with other international initiatives, with patient groups and the general public;
- to promote the emergence, linkage and alignment of National Plans and research initiatives in the field of neurodegenerative disease research.

Through its strong global dimension, JPND has now become the reference for European and global knowledge and innovation in the area of ND research. JPND was consistently highlighted during the recent high-level G8/G7 summit on dementia and is aligned with the summit recommendations. As a result several JPND members are working closely with the OECD on the mapping of e-infrastructures and big data for ND research, using the JPND research mapping exercise as a reference point in this regard. The scaling-up of the implementation of the JPND Research Strategy is also ongoing with partnership options being investigated with the European Commission (through Horizon 2020), other relevant JPIs (such as “Healthy Diet for Healthy Life”) and the United States of America.

### Box 27 • EU Joint Programming Initiative (JPI) “More Years, Better Lives” (P.M. Rossini)

The EU Joint Programming Initiative (JPI) “More Years, Better Lives - The Potential and Challenges of Demographic Change” seeks to enhance coordination and collaboration between European and national research programmes related to demographic change. A Strategic Research Agenda has been recently presented to inform policy and to explore what it means to be born into, grow up in, and grow older in, a world where both five generation families and single person households are becoming increasingly common and where extending lifespan is challenging traditional notions of social and economic sustainability. Demographic change is not just about ageing: factors like fertility rates, rural depopulation, and migration are all significant issues. Furthermore, some of the problems, especially in health and social care, which arise in later life could be prevented by interventions earlier in the life course. In its Strategic Research Agenda the JPI More Years Better Lives identifies four main research domains:

**Quality of life, health and wellbeing:** How to ensure the best possible quality of life for all people, throughout their lives (including the final stages), recognizing the diversity of individual circumstances and aspirations, and the role of social relationships in fostering individual wellbeing.

**Economic and social production:** How can economic and social production be maintained across the extended lifespan in ways that are sustainable, equitable, and efficient in the use of human and technical resources? Production is a complex area.

**Governance and institutions:** How might institutions and decision-making processes need to change, at all levels from local to European, to meet emerging needs and to ensure that all citizens can be full participants in decisions affecting their lives as the normal life course extends?

**Sustainable welfare:** How is it possible to secure adequate levels of social welfare for all people, as the age balance of the population changes, and the proportion who are economically inactive grows?

Welfare systems, in the broad sense, have evolved differently in different countries, but all will be challenged by demographic change.

### Box 28: EU Joint Programming Initiative (JPI) “Urban Europe –global urban challenges, joint European solutions – ( P. Clerici Maestosi)

Since 2010 much effort has been made to set up this joint programming Initiative, dedicated to urban challenges, attract and invite countries to join forces and put forward their needs and interests in urban research and innovation, establish a governance structure, develop a joint strategy and take first joint actions. Italy, namely Ministry of University & Research, has played a overriding role in promoting some of the eight world challenges (ageing society, migration, climate change and peak oil). A Strategic research Framework has been developed and approved by Governing Board in mid-2011, which provided guidance for first actions of the pilot phase and which will be further developed with FP7 Coordination Action in Support to the Joint Programming Initiative on Urban Europe- global urban challenges, joint European solutions, named BOOST.

The kick-off meeting for BOOST project has taken place October 2013 and within end of September 2015 the Strategic Research and Innovation Agenda will be fully developed. A priority for Italy is to put emphasis on promote an holistic approach in those research areas which can have a potential huge influence on “ageing society” to put emphasis on research domains such as demographic change and ageing society and their urban consequence considering even international, national and regional scale. Italy, namely Ministry of University & Research, ENEA and University Sapienza, participated to megatrends study for JPI itself.

The Urban Megatrends Reports have been presented end of September 2013 with the aim of identifying and understanding the challenges stemming from megatrends for urban areas, creating a differentiated perspective of challenges for urban areas across Europe taking into account national and regional disparities, highlighting the complex connections between the challenges and megatrends with a long-term horizon, detecting connections requiring research and innovation, analysing challenges on different scales, proposing a challenge-driven concept for the development of the SRIA. The results of the Urban Megatrend study are going to be utilised in the development process for the Strategic Research and Innovation Agenda (SRIA) of the JPI Urban Europe, and thus contributes to the long-term strategy of the initiative. Besides the study’s relevance for the long-term orientation of the initiative, findings are also used to identify short-term oriented research topics and needs that can be covered in the upcoming joint calls.

A central part of this study has been the identification of diverse challenges deriving from urban megatrends according to the above mentioned categories and paying special emphasis on the regional differences. Among challenges categories and national priority settings for Italy is mentioned ageing society.



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