

#### **Home-Care Ageing and ICTs**



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#### Overview

- The historical background of Ageing.
- The perspectives for Active Ageing in Europe and the rest of the World: A Case-study.
- Industrial Property assets vs. Population-ageing as a Prosperity Index.
- Medical-managerial and Biomedical-technological aspects of Ageing.
- Concluding Remarks.



#### The historical background of Ageing





### The phenomenon of Ageing

- Over the past 200 years, life expectancy at birth has doubled from around 40 years to over 80 years in countries in Europe, in Japan etc.
- In some countries such as France, where 250 years ago life expectancy at birth was slightly over 25 years, life expectancy has increased by almost 55 years.
- At the beginning of the 20<sup>th</sup> Century, the life expectancy at birth of women in Germany was 48 years, and that of men was 45 years, while currently it is 82 and 77 years, respectively.
  - This achievement was initially due to overcoming infant and childhood mortality, but during the last decades, it has mainly been occurring at later stages in life.
- Life expectancy is now rising markedly among older adults in particular.





## Ageing as a trend

- The percentage of the elderly within the population of Europe tends to doubling over the next decades.
- The impressive increase in life expectancy that has been observed since the middle of the 19<sup>th</sup> Century and the high, still growing, mean population age constitute a "Novum" in human history.
- This demographic change is not limited to Europe, but reflects rather a global trend.
- By the middle of the 21st Century, it is likely to be more people over 50 years, than below 15 years, upon the globe.
- Although these trends have been well documented, there remains much disagreement about their meaning and the question is whether these trends predict future developments in life expectancy.





### What happens in labor market?

- Although more people are reaching very old age in Germany, with better physical and cognitive functioning, the trends in labor market participation have pointed in the opposite direction.
- For instance, about 25% of the 60-65 year old in Germany, are still employed, since only a few percent among the over 65-year old citizens, are still professionally active, although the official retirement age was raised to 67 years for the younger generations.
  - The population is growing older and declining and cardinal questions are raised, such as whether the achievements of the welfare state might be maintained and even further developed and consequently, if this situation might constitute a threat to the productivity of the country.



# The influence of age-structure on the labor market-share

- Leading German research Institutes, argue that living standards will not be in jeopardy, if the number of employees and their productivity can be raised, by activating reserves on the German labor market among the employed people over 55-years old, among women, and migrants, combined with targeted investment in continuous education and with optimized work organization.
- Similarly, in Austria the results of productivity trends analysis, a negative effect of the share of young industrial workers (29 years and younger) appears.
- However, no significant effect of the share of old employees (50 years and older) has been found, neither any significantly different relationship for the share of elder employees, compared to middle-aged workers.





#### The situation in Greece and Cyprus

- Although Greece is far behind Germany and Austria in terms of economic growth, especially after the 2010 deep and still ongoing crisis, its age-structure and life expectancy at birth, in total 79.8 years (men 77.4 and women 82.2), is very similar to the corresponding ones of these highly developed countries.
- This is due, beyond the better living conditions, also to the great decline in birth-rate after 1980, down to 0.959 % in 1998.
- According to the UNO Greece is currently (December 2013), ranking in the 6<sup>th</sup> place world-wide (behind Japan, Italy, Germany, Bulgaria and Finland), by percentage of population aged 60 and over years.
- On the other hand, although Cyprus is a de facto partitioned Country and 40 % of its territory is still occupied, its profile and achievements concerning Ageing, during a deep economic crisis, are surprisingly good, ranking in position 13 among the 27 EU member-states.



### The perspectives for Active Ageing in Europe and the rest of the World: A Case-study





#### Methodological Approach – Available Data

- The Guiding Principles on Active Ageing and Solidarity between Generations (Council of the European Union, 2012) reaffirmed that active ageing need to be promoted in the three domains of employment, participation in society and independent living.
- Thus, these principles have served in the present project, as a roadmap.
- The available statistical data (UNECE-AAI Results as revised on 10th March 2013), concerning the EU-countries, have been extracted, used and processed, as far as Active Ageing is concerned.
- Further, the emerging Biomedical (BMT) and Information and Communication Technologies (ICT), create a favorable environment, for the fulfillment of the conditions necessary for active aging.
- Therefore, we shall examine some crucial Medical-managerial and Biomedical-technological aspects of Ageing.





## Methodological Approach – Active Ageing and Innovation

- The kernel of Innovation achieved so far and to be implemented in near future, is acknowledged in Industrial Property (IP) legal-technical documents, mainly Patent-applications and granted Patents.
- It is imperative to follow this Active Ageing related "innovation trail" and to try to correlate the leading Nations IP-assets, to their total life expectancy at birth, as an additional Prosperity Index, related to Population-ageing.
  - These additional investigations are based on the proper processing of data collected and provided by cardinal international Organizations, such as:
    - *The United Nations (UNO).*
    - The World Health Organization (WHO).
    - The World Intellectual Property Organization (WIPO) etc.





## Some indicative results of the investigation

- The results aim to clarify some medical-managerial aspects of the Continuity of Medical Care, including Home-Care and Assisted living, of vulnerable subgroups of the ageing population.
- The indicative results presented, cover the three mentioned main domains of:
  - Employment.
  - Participation in society.
  - Independent living.
- We compare in case-study two "couples" of European Countries, Germany and Austria representing the "North", versus Greece and Cyprus representing the "South", in a Case-Study concerning Active Ageing of the corresponding populations.





### Employment

- The Cypriots seniors are definitely the "champions" in employment, since 12.3% are still working in the age of 70-74 (!) and they occupy rank 2 in Europe, second only to Swedish and followed by the Germans (10), the Austrians (15) and the Greeks (17).
- More than 25 years after the fall of the "Berliner Mauer", Cyprus is still occupied and divided by the Turkish troops.
- Obviously, you definitely need hard and long-lasting work to overcome this disaster and to become an active member of the EU and the Eurozone...
- An indicative grouping of the Employment-rates is presented in next slide..



## Employment rates of citizens aged between 55-74 years in the four Countries considered



![](_page_14_Picture_0.jpeg)

#### Indicative Participation-forms in the society of the aging population in the four Countries under consideration (best ranking in bold)

- Indicative Participation-forms (e.g. Voluntary activities, Political participation etc.) in the society, of the aging population in the four Countries, as for example in the next Table and Figures.
- Participatory activities of all kinds are crucial for active ageing.
- The Austrians are definitely leading in Voluntary activities in general (32.7% involved), not only in the countries under consideration but also across Europe.
- Cyprus is leading also Europe-wide, concerning voluntary care to children and grandchildren (44.5% involved) and the Austrians are again leading in Care to elder adults (11.9 % involved) and, last but not least, in Political participation (17.0%).

Participation in society (Total)	Voluntary activities	Care to children, grandchildren	Care to older adults	Political participation	
Austria	32.7	25.0	11.9	17.0	
Cyprus	7.6	44.5	9.0	15.0	
Germany	18.3	17.9	8.5	16.7	
Greece	3.6	34.1	11.3	6.7	

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## Participation forms of ageing population in EU (55-74)

![](_page_15_Figure_3.jpeg)

ITU Regional Workshop for Europe and CIS on eHealth development Odessa, Ukraine, October 17-19, 2018

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## Overall participation in societal activities for male population in the 27 Member-States of the EU

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Mean Values concerning all participation-forms of ageing population (55-74) for the EU

- The Mean Values concerning all participation-forms of ageing population (55-74) for the EU are:
  - ◆ Voluntary Activities (VA) 14.9 %.
  - ◆ Care to children and grandchildren (CC) 32.4%.
  - ◆ Care to elder adults (EC) 12.8 %.
  - Political participation (PA) 12.1%.
- The countries under consideration are ranking as following (Men/Women):
  - ♦ Austria 5/8.
  - ♦ Cyprus 14/11.
  - Germany 18/23.
  - ♦ Greece 24/18.

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### Indicative aspects and data of independent, healthy and secure living in the four Countries

Independent healthy & secure living (Total)	Physical exercise	Health- care needs covered	Indepen- dent living	Relative median income	No poverty risk	No material depri- vation	Physical safety	Life- long learning
Austria	2.9	94.0	83.4	91.0	94.4	98.0	83.9	5.2
Cyprus	15.9	88.1	89.8	64.0	76.8	92.6	83.3	3.1
Germany	9.2	93.2	95.8	89.0	93.0	97.9	89.0	1.9
Greece	2.2	89.3	77.6	84.0	90.4	87.6	54.2	0.3

Austria is here again leading in five out of eight components constituting independent, healthy and secure living followed by Germany (2) and Cyprus (1).

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## Indicative aspects and data of Active Ageing Capacity and its components in the four Countries under consideration

Active Ageing Capacity (Total)	Achievement of 50 years at age 55	Healthy life- years at age 55	Mental well- being	Use of ICT	Social connecte d-ness	Educational attainment
Austria	56.2	46.6	75.2	43.0	58.2	70.4
Cyprus	57.0	56.1	56.6	17.0	38.1	-
Germany	55.4	43.1	74.0	49.0	47.8	85.7
Greece	56.0	55.6	48.6	11.0	27.3	39.3

- Austria, Cyprus and Germany are each leading in two components of Active Ageing Capacity.
- Greece is very close to Cyprus, concerning achievement of 50 years at age 55 and healthy life-years at age 55.

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#### Germany & Austria

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- Germany is still the "Locomotive" of the European train, in scientific-technical innovation (rank 5 worldwide), industrial potential and social initiatives, including Ageing.
- However, the enormous effort to incorporate the former DDR and to include the East-European countries in the EU, allows for rank-9 in total AA and leading position in 4/18 of its components.
- Austria (rank-10) is leading in 10/18 components; Austrians are working fewer years than Germans and have remarkable rating, almost in anything.

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## Cyprus & Greece

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- Cyprus (rank 7) is the **big surprise** leading in 4/18 of the AAcomponents, although they have to pay also for health and social security of the population, living in the occupied 40% of the country.
- Finally, Cypriots work longer than all other Europeans, second only to Swedish.
- Greece (rank-24) is not leading in any AA-component, although, for most of them, the corresponding data are rather close to the ones of the other three countries.
- The rank-24 is rather misleading, because Greeks are able to balance the mismanaged state-economy, with a unique "family socialism"; parents/grand-parents are strongly supporting the ill-paid or unemployed (~27%) younger generations.

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### Industrial Property assets vs. Population-ageing as a Prosperity Index

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## Industrial Property assets vs. Population-ageing as a Prosperity Index

- There is a strong and rather precise correlation between Innovation, expressed in terms of Patent-ownership in a country, the Prosperity of the population of this country and consequently their total life expectancy at birth, in years.
- That means that Industrial Property (IP) documents and more specific, the number of Patents in force, is an accurate prosperity and thus, Active Ageing Index.
- In the next-slide figure, the 10 leading in IP countries of the World (2004-2013), concerning the number of Patents in force, are presented.
  - As far as their total life expectancy at birth, in years, is concerned, Japan, France and Switzerland are leading with 83 years, followed by UK (82), S. Korea, Germany and Canada (81) the US (79) China (75) and Russia (70).

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![](_page_25_Picture_0.jpeg)

The number of Patents in force for the 10 leading in IP countries of the World (2004-2013) and their total life expectancy at birth in years

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#### What does this graph means?

- The slowly responding IP-related index shows that the explosive increase of the number of Patents in force in China and the high-ranking of Russia, during the last 10 years, is not expressing yet a proportional social progress that would reflect also, better expectations about active aging in both countries.
- The emerging major economies (BRICS: Brazil, Russia, India, China and South-Africa) and especially China, make gradually their presence in the systemic Patent Organizations, considering the legal protection of their technological and industrial achievements, as well as, their economic exploitation, of high national priority.
- They demand also a not negligible share, in several emerging or even already technologically mature industrial branches.
  - These countries, in spite of their economic growth, are still deficient in Healthcare and Social Services, as far as, a significant portion of their population is concerned, and especially the elderly people and their perspectives for active and healthy aging.

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University of West Attica, Athens, Greece Department of Biomedical Engineering Biomedical Technology Laboratory Innovation potential expressed as worst and best

ranking during the years 2004-2013

Concerning patents in force and total life expectancy at birth in years for the 4 countries.

Concerning our case-study countries, Cyprus and Greece have lost their good placements in the world innovation ranking, based on the numbers of patents in force, from 33 to 86 (CY) and from 17 to 49 (GR) respectively.

This is obviously due to the financial crisis of both countries, however, the very slower responding "life expectancy at birth", in years, index, remains still in a very high level, almost identical with the ones of Austria and Germany.

Austria recovers, by the end of 2013, from its worst positioning 34 to rank 12 and Germany remains at the 5<sup>th</sup> place, behind USA, Japan, China and S. Korea since 2010.

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Cyprus (Rank 33-\$6) Life expectancy: \$0 y. Greece (Rank 17-49) Life expectancy: \$1 y.

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### Medical-managerial and Biomedical/ICTs technological aspects of Ageing

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# Home-based services and preventive health self-monitoring.

- The percentage of the elderly within the population of Europe tends to doubling over the next decades.
- This trend has focused ICT and Assistive Technologies R&D on the development of Ambient Assisted Living (AAL) conditions.
- Presently, there are efforts to expand the home-based services, to include the:
  - Integration and miniaturization of health self-monitoring;
  - All available communication and computing systems; towards an extended home-based and mobile Wi-Fi-enabled IP-hub, providing for health-optimization, by preventive health selfmonitoring.
  - For example, home-based in vitro Diagnostics, optical inspection and documentation of skin alterations etc.

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# The ageing of the population is a multifarious process

- The aging of the population is a multifaceted phenomenon, presents many challenges, concerning how health and social services can be improved, in order to enhance the quality of life of the elderly, especially in the middle of a, more or less, European-wide financial and political crisis.
- After more than 15 years of experience concerning medical-managerial and technological aspects of Ageing, it became clear to us that there is a high degree of heterogeneity, within the ageing population.
- This could be roughly classified in four main groups:
  - *Healthy and active seniors.*
  - Elderly people with chronic diseases.
  - Seniors with physical impairments, handicaps and disabilities.
  - People with mild or serious cognitive impairment or even with dementia.

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#### Healthy and active seniors

- Concerning the first group, although there is a strong association between aging and health outcomes, large groups of seniors in developed countries in Europe, North America, Japan etc. feel to be in good or even excellent health.
- Obviously, helping older people to remain independent and ageing in place, is very important, for their quality of life.
- It is also of major interest to health and social services, due to cost savings, over more expensive forms of care, in various institutional settings.
- This group needs mainly ICT, focused, first, in entertainment, communication and socializing activities, promoting their quality of life and second, on preventive health self-monitoring of basic vital parameters at home (e.g. visual self-inspection of breast for women, blood-pressure, blood-sugar, cholesterol etc.).

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### Elderly people with chronic diseases

- Chronic diseases are physical or mental long-standing conditions that require continuous medical care and have usually significant impact on the person's functional capacity and quality of life.
- They are, either life-threatening (e.g. cardio-respiratory diseases, cancer etc.) or other conditions (e.g. rheumatoid arthritis, osteoporosis, metabolic syndrome etc.) that are not directly lethal, nevertheless, they have serious impact on the health and the well-being of elderly people.
- As the population ages, the prevalence of chronic diseases and comorbidities increases, thus, causing great trouble, in the way chronic diseases should be successfully managed.
- Elderly people with chronic diseases may stabilize essentially their condition, by adding to their health self-monitoring, in accordance with their physician, parameters specific to their chronic disease, related to the efficiency of medication taken or assistive equipment used.

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Some chronic diseases in aging population frequently appearing also as comorbidities

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Addison's Disease	COPD	Epilepsy	Multiple Sclerosis
Asthma	Chronic Renal Disease	Glaucoma	Parkinson's Disease
Bronchiectasis	Coronary Artery Disease	Haemophilia	Rheumatoid Arthritis
Bipolar Mood Disorder	Crohn's Disease	Hyperlipidaemia	Schizophrenia
Cardiac Failure	Diabetes Mellitus Types 1 & 2	Hypertension	Lupus Erythematosus
Cardiomyopathy	Dysrhythmias	Hypothyroidism	Ulcerative colitis

![](_page_34_Picture_0.jpeg)

Seniors with physical impairments handicaps & disabilities or people with mild or serious cognitive impairment or dementia

- For the last two groups, the most important common goal is to ensure Independent Living, by providing specialized supporting Services to individuals, who have impairment (physical, mental, cognitive or sensory impairment) or face other economic or social barriers.
- Concerning physical or sensory impairment, important progress has been done, related to CNS implantable micro-devices, exoskeletons for walking (spinal cord injury) etc.
- Concerning people with cognitive impairment or even with dementia, beyond pharmaceutical and stem-cells promising R & D outcomes, the share of older people in need of care, living at home, will grow even faster, due to the ageing society.
- The ICTs are offering to all these above mentioned categories of ageing population, the strategic platform, upon which, the medical, technical and managerial support are built.

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### **Concluding Remarks**

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About the ageing phenomenon...

The two central questions are:

◆ *First, the opportunities that the gains in average life expectancy do offer and how can they be realized.* 

• Second, what challenges arise from the demographic aging, and how should they be addressed.

■ The impressive increase in life expectancy observed since the middle of the 19<sup>th</sup> Century and the high and probably still growing mean population age, is a novel, first-time appearing and complex socio-economic phenomenon.

■ The demographic change is not limited to Europe, but rather reflects a global trend.

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#### ... in an emerging global society

- The trend began in Europe and has made particular progress, here and in Japan.
- Within Europe, there are several countries with a relatively high life expectancy and a particularly low birth rate.
- Demographic change has already set in, on other continents too, and is now making even faster progress there.
- Today, more people are over 60, than under15 years old, in Europe.
- According to a UNO forecast, Asia will reach this age distribution by 2040, and the Americas will follow.
- By the middle of the 21<sup>st</sup> Century, it is likely to have more people over 50 years, than below 15 years, upon the globe.
- Thus, world population growth, is set to slow down significantly, also in the BRICS.

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#### Active and healthy ageing costs a lot...

- That means, that a new cardinal activity field and an associated important emerging market is being born worldwide, associated to these world population negative growth-trends.
- It seems that life-prolonging, in order to be worth living, should be accompanied with an enormous medicalmanagerial, social and economic challenge.
  - This will be, analogous and comparable only, to the effort needed to grow-up children and to offer education to the youth, in order to prepare and support them, to enter their social and professional life.

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### ...and Europe knows that!

- The EU has a valuable social experience and an excellent scientific and technical background, related to Health-care and Active Ageing, achieved through the highest social expenditure in the world.
- This high social-expenditure, combined with the transfer of the world industrial production eastwards, is among the main reasons of the present European stagnation.
  - Endeavoring a large-scale cooperation, between EU and the BRICS, concerning Health-care and Active Ageing, is an important and legitimate objective, because:
    - It stimulates the **prosperity of the ageing population** in these countries.
    - It helps the economic growth of the Health-care and Active Ageing related industries in Europe.

leading, thus, to **mutually beneficial outcomes**.

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Successfully ageing is definitely **no Illusion**; the presented data and the associated Research and Development efforts, corroborate an objective and rapidly emerging social reality.

Facit...

- It is also definitely a Burden, for most Western governments, because they are not able to ensure the human and material resources, needed to continue the present welfare, for the generations to come and thus, to fulfill the "solidarity duty" for the generation entering now ageing.
  - But I personally prefer to regard Active Ageing, a great achievement of the Humanity, to prolong our life-trip.
- Virtually, an opportunity to understand that only a copious and peaceful cooperation, combined with the amazing technologies, developed during the last 50 years, can find the innovation and solidarity trail, leading to a constructive modus vivendi et cooperandi, in a multi-divided and controversial world and keeping life meaningful...

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#### Thanks for your attention...

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