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THE SILVER ECONOMY: INNOVATION PATTERNS AND NEW BUSINESS OPPORTUNITIES

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ABSTRACT

L'aspettativa di vita che sta aumentando da decenni e i tassi di natalità che si abbassano fanno sì che l'età media della popolazione globale aumenti. Il fenomeno dell'invecchiamento diventa per cui uno dei temi principali da tenere in considerazione nello studio dei cambiamenti socioeconomici dei paesi, specialmente quelli europei, dove le percentuali di cittadini di età superiore ai 65 anni sono tra le più alte a livello mondiale.

A seguito di questo fenomeno si sta consolidando un nuovo sistema economico definito Silver Economy. Lo stile di vita e i consumi dei gruppi di popolazione di età più avanzata stanno cambiando. Istituzioni, governi e attori economici sono consapevoli che, nonostante le sfide da affrontare, numerose sono le nuove opportunità da cogliere per poter continuare a garantire una qualità di vita adeguata, non solo agli individui più anziani, ma anche a tutte le altre generazioni.

Nuovi percorsi di innovazione, collaborazioni strategiche fra stakeholders e nuove forme di imprenditoria contribuiscono in modo fondamentale all'espansione della Silver Economy, portando allo sviluppo di soluzioni tecnologiche che coinvolgano in modo trasversale più di un settore economico e che garantiscano un invecchiamento sano e attivo della popolazione.

INTRODUCTION

The world population is ageing, due to increased longevity and reduced birth rates. Compared with other economic and social phenomena, such as pandemics, wars, and technological revolutions, demographic changes are more predictable. It has been shown that in the European Union, the share of individuals over 65 years will continue to grow over the next eight decades, up to 2100.

Political, social, and economic systems are already under pressure from a rapidly changing demographic structure. Aiming at ensuring long-term well-being for all and respect for fundamental human rights, it is crucial for stakeholders to act on the effects of ageing, to offset its negative consequences and leverage new emerging opportunities.

As a result, the concept of the Silver Economy was born: a new economic system focused on providing products, services, capital, and other solutions in various fields to older adults so that they can continue to be an integral part of the society where they live. The primary objective is to help them maintain their mental and physical conditions by promoting healthy and active lifestyles so that they can continue to be socially involved and supportive of other generations and in the labour market.

This thesis will elaborate on the topics mentioned above and it will be divided into four chapters.

Chapter I presents a definition of the Silver Economy and explores the economic areas affected by it. Then, the ageing trends in Europe and the new challenges arising from ageing are examined. Taking Italy as a benchmark, it is studied why "Silvers" are the new protagonists and how their consumption, habits and lifestyle have changed in recent years. Linked to the concept of the Silver Economy is Active and Healthy Ageing. Determinants of this phenomenon are explained, with a focus on the importance United Nations give to them.

Chapter II points out the opportunities and challenges in the Silver Economy in terms of technological innovations. Innovation patterns are contributing to consolidating the silver market segment. The development of innovation requires players to operate in an open environment, where strategic partnerships and international projects are the necessary routes to tangible results related to the expansion of the Silver Economy. In the last part of the chapter, it is explained how new forms of entrepreneurship participate in spreading innovation, with startups and investors as key players.

In Chapter III the focus is on digital health. This chapter gives the definition of digital health and explores what are the drivers of digitalization in the healthcare sector, also presenting success stories that have revolutionized patients' health management. Furthermore, an international analysis on the potential of the Internet for health management is carried out. Starting from data on the general use of the Internet in the EU and Italy, data related to the use of the Internet for specific health purposes in the older population will be examined.

Chapter IV identifies the role of public stakeholders in the Silver Economy, clarifying how they influence and support the development of this economic system with provisions and policy recommendations. Finally, some considerations are introduced regarding possible barriers and limitations to the development of the Silver Economy.

I.THE SILVER ECONOMY

I.1 WHAT IS THE SILVER ECONOMY

I.1.1 *Population demographic trends*

Over the last decades, we are witnessing a more than notable increase in world population ageing. This process is inevitable and involves every human being, which is why it must be addressed with the utmost awareness and foresight. The number of people aged 65 years old or more has never been so high, especially in Europe, where one in five individuals exceeds this threshold to date.

The first phenomenon affecting the demographic composition of the world population is greater longevity mainly due to better health conditions. People live longer and freer from limitations and obstacles associated with health status. Additionally, fewer are women of childbearing age. Therefore, the birth rate, intended as the ratio of the number of births in a population in a given territory over a specified timeframe to the average population of the same territory and period, has been steadily decreasing in developed countries in recent decades; in the EU in 2020, 4.7 million children were born, almost 3 million less than in 1960.

I.1.2 *Definition and value of the Silver Economy*

In taking a more generalist view, ageing has been usually considered in its negative connotation, with a special focus on the sustainability problems it may generate in the medium-long term. The common thinking is that large numbers of elderly people entail financial, social, and health-related complications for governments, institutions, and households.

Nevertheless, a different approach is required, to fully understand how modern countries' socioeconomic environment is changing due to the ongoing ageing phenomenon. This latter is not only a challenge for societies, but a great opportunity to bring forward new transversal solutions that might improve the collective well-being, by considering new emerging needs and new lifestyles. The economic system is becoming aware of the structural change in society that is already occurring. Here is how a different resource allocation and new markets development become the milestones for a new huge market: the Silver Economy.

The Silver Economy is defined as the ensemble of goods and services targeted at older adults, including all the further economic activities generated by their expenditure.

Before going forward, a clarification of "older adults" is needed. The European Commission defines them as persons who have reached the age of 50 or more,

because is often at this time that the attention starts to focus more on personal health and possible future needs for the old age period. However, the utilization of this threshold has been revisited in the most influencing reports on this topic, as it happens in the United Nations report on World Population Ageing, or in World Health Organization studies, where older adults in developed countries are identified as those who are 65 years old or more. This is generally the age threshold coinciding with the retirement age and to which almost all countries in the OECD area refer when ruling the end of the working age. Nowadays, the age of 65 in the definition of older adults makes total sense, since at age of 50 is illogical to categorize individuals as silvers, being in the prime of their working age and having probably several more years of healthy and active life. The 65 years threshold is suitable for the current situation but will not remain the same in the future, because it will change according to demographic trends.

After having clarified how older adults are classified, it is possible to provide a more precise and comprehensive definition of the Silver Economy. This latter can be defined as the sum of consumer or investment products and tangible and intangible services for people over 65 years old, including the different forms of mental and health assistance they may need, and the further economic activity generated by these expenditures.

The Silver Economy is a phenomenon of global resonance. From a purely monetary perspective, the potential value of this economy is estimated to be approximately 7.6 thousand billion dollars only in the US and 15.6 thousand billion globally. These values exceed the economic wealth that each country alone could ever generate, except for the US.

According to the Silver Economy report 2018 from the European Commission, the areas of impact are three. The direct impact of the Silver Economy includes every activity directly correlated to the supply of goods and services purchased by older adults; the indirect impact, reflecting every supply chain-related activity starting from direct providers; thirdly, the induced impact, the whole value of the generated employment by the economic activities described above.

In the European Union, the impact of the Silver Economy has a huge dimension. For example, going back a few years, already in 2015, it had a value equal to 4.7 trillion euros in Gross Domestic Product, and it created over 78 million jobs. Studies have shown that these numbers have grown constantly in recent years and a positive trend is expected in the years to come. Only in the Eurozone, the growth is estimated to be 5% per year until 2025, reaching a value of 5.7 trillion euros (Ruggiero, Fatigati, 2022).

It is interesting to focus on Italy, the second country for the highest old-age dependency ratio, after Japan. In Italy, in 2018, there were 173 over 65 for every 100 young people (age range between 15 and 64). The number of over 65 in this country will increase in the next decades, reaching a peak of 20 million. In Italy, the demand generated by this category is higher than any other demand of other population categories, and its value is almost 200 billion euros (Confindustria, 2020).

Hence, domestic economic actors are already realising the impact that the change in population structure will have on the production segment and on services. Healthy older adults represent an attractive customer segment for companies, in fact, several products or services are being converted to make them suitable for growing elderly consumers.

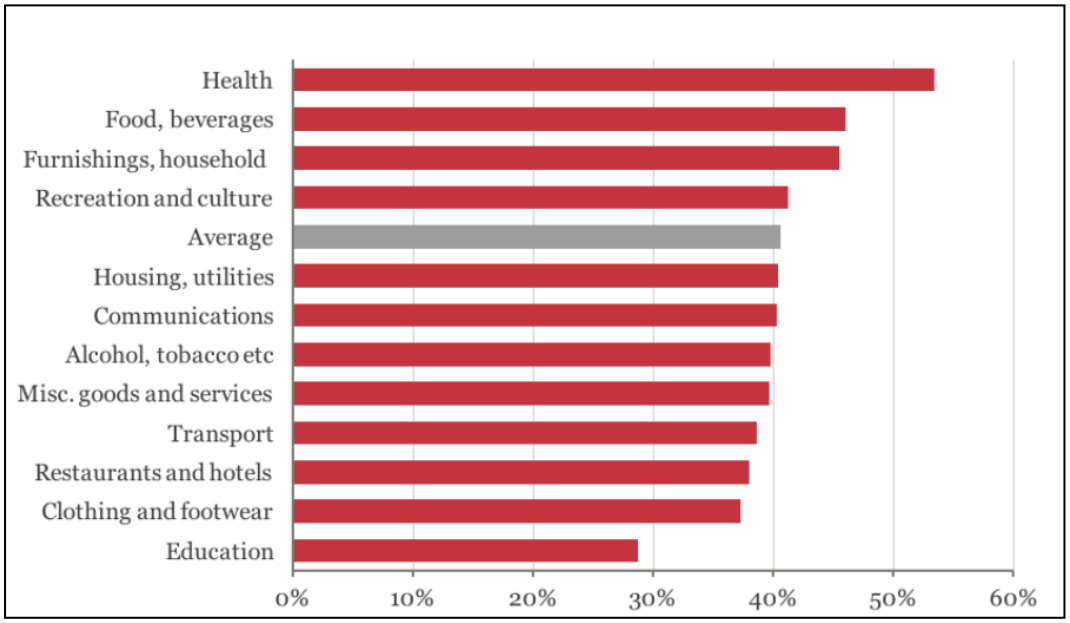
I.1.3 *Silver Economy impact areas*

The Silver Economy covers a broad range of economic sectors, in a direct or indirect way. The actual reality is not consistent anymore with the old conception that seniors' expenditure mainly consists of healthcare goods and services. Of course, healthcare is a leading sector, where seniors are the main customers, but

they also seemed to be oriented to other kinds of consumption, more related to their social and mental well-being.

Healthcare expenditure of seniors accounts for more than 53% of all health expenditures across the Eurozone. Figure I.1 shows the different types of consumption generated by the Silver Economy. After Health, the other two highest percentages of expenditure concern food and beverages, furniture and households. Still above the European average, along with the previous groups, there are also recreational and cultural activities.

Figure I.1 – Silver Economy share of consumption groups in Europe



Source: European Commission, 2018

Statistical studies on private consumption have shown that seniors spend a major part of their earnings in the housing sector. Utilities and other maintenance costs have the largest incidence; however, home furnishings and home services have an important role in composing the total expenditure in housing by seniors. This strong consumption share in housing could be explained by the fact that their age group is the one with the highest number of homeowners, many of them even own two houses.

Given the attention that older adults put on their houses, a new approach to housing is spreading around Europe and US, it is called Senior Living. It consists of developing different technological and design solutions to facilitate older people's daily actions within their homes, to make them as self-sufficient as possible.

It is interesting to look at the share of expenditure related to cultural activities, it covers 40% of total cultural spending and it is expected to reach 45% in 2025. This sector may accelerate in the coming years, probably as a consequence of the arrival to the mature age of persons with higher educational levels.

Seniors have greater purchasing power than any other age group: they enjoy a higher income and a reduced tendency to spend in daily life, invest and save more money thanks to their long-life working career. The seniors' wealth has been created over time and has been maintained over the years. Today, there is the opportunity to reap the benefits of a generation that expanded its wealth during the

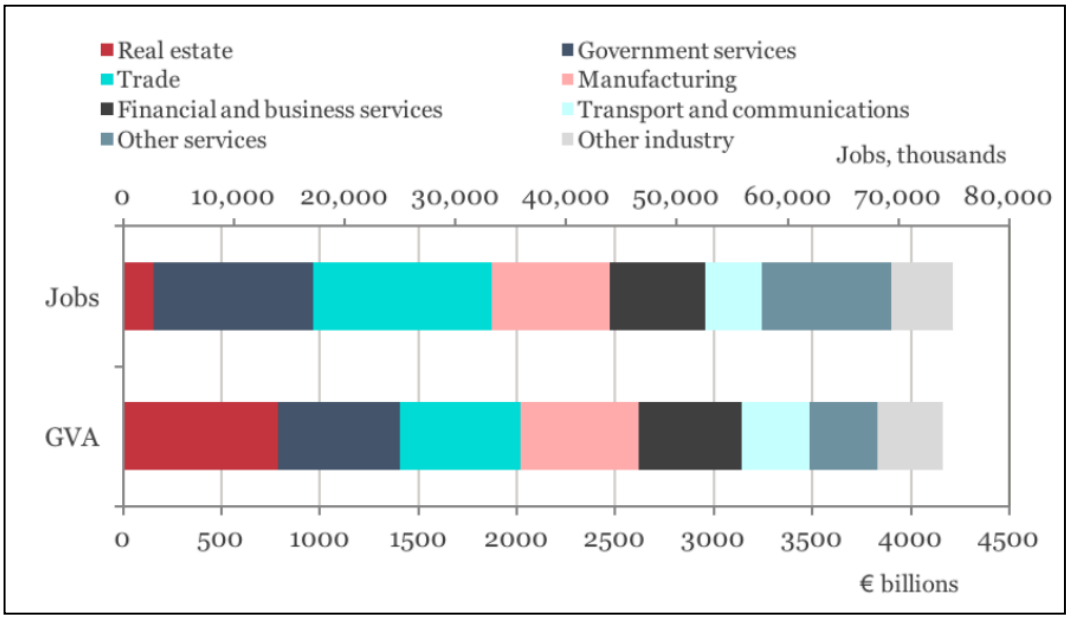
economic boom and has now reached its peak, before being eroded by new generations, due to unstable macroeconomic situations.

Today's older adults have new lifestyles, new ways of exploiting their free time, and different expectations from their working lives. Several industries are affected by a change in their consumption habits. That is why the Silver Economy must be approached with a transversal vision.

The economic impact of the Silver Economy is consistent. Figure I.2 represents the gross value added generated by the Silver Economy industries and the relative proportions of work, in terms of number of jobs required to generate those figures. The depicted values consider the direct and the induced effects in the most influenced economic sectors in the European Union.

In consumer-oriented sectors like real estate or financial services, respectively represented by the red bars and the dark grey bars in the figure, a lot of value is generated by a relatively low number of jobs. In labour-intensive sectors, like trade or government services, represented by the green and blue bars, the output created is proportionally lower compared to other more productive sectors. The figure is useful to have an idea of the employment in the industries involved in the Silver Economy and the amount of work they require.

Figure I.2 – EU Silver Economy impact by industry



Source: European Commission, 2018

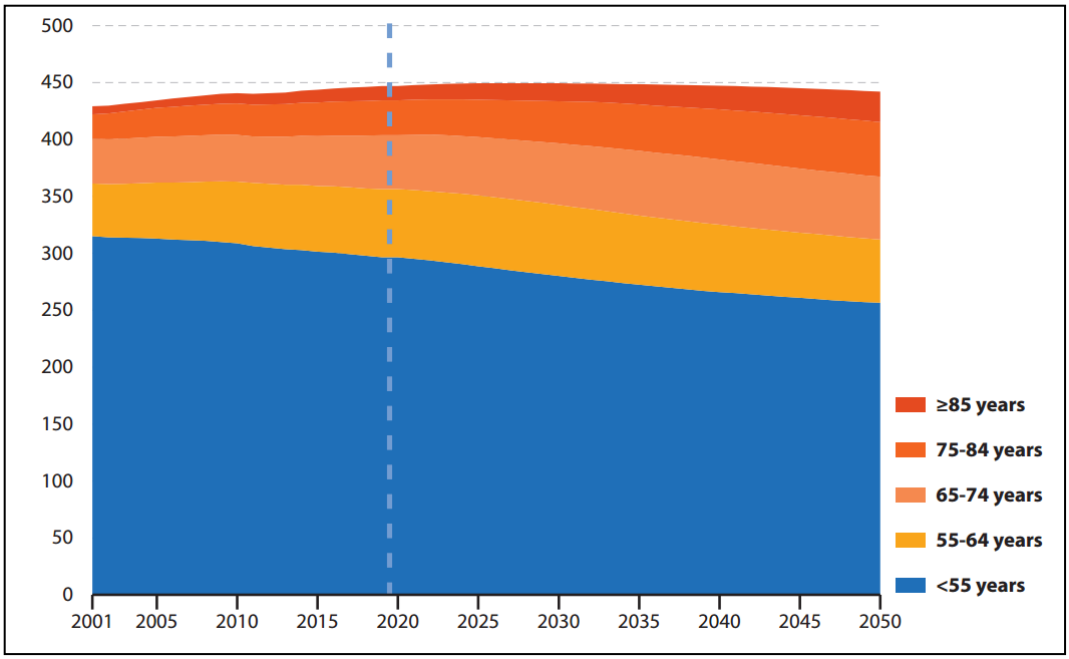
I.2 SILVERS: THE NEW PROTAGONISTS

I.2.1 *Ageing trend in EU*

As mentioned in the previous section, the demographic structure of the world population has never changed so rapidly.

In Europe, in 2018, life expectancy at birth increased to 78.2 years for men and 83.7 for women. This growth is projected to continue: men born in 2070 are expected to live 86 years, and women 90. Furthermore, for the same year, Europeans aged 65 years or more are estimated to cover 30.3% of the total population, 10% more than in 2019, and the population aged 80 years or older will reach 13.2%, more than twice the value of 2019 share. Ultimately, given the ageing process and the important reduction of the childbirth rate, in the next five decades, the share of Europeans in the world will narrow to 4% of the global population (European Commission, 2022).

Figure I.3 – Age trend in EU 2001-2050



Source: Eurostat, 2020

Figure I.3 taken from the Istat report "Ageing Europe" shows the ageing trend clearly and unequivocally. The population slice up to age 55, corresponding to the blue part of the graph, is subject to a decreasing trend; in the next 30 years, the number of Europeans belonging to the so-called young generation will be reduced by almost 50 million. On the contrary, people aged 75-84 are expected to expand by 56.1%, and the number aged 65-74 is projected to rise by 16.6%. The number of total European citizens will not be rising in the future, while the number of future older adults will.

This demographic trend is already having strong consequences on society; therefore, it is fundamental to develop new approaches and new policies that are fit for a growing older part of the population that is already witnessing major changes, due to the green and digital transition and to unexpected events such as pandemics and crises. Member states and the EU hold the responsibility to act on ageing by identifying key issues and supporting all the actors involved on a national and international level.

I.2.2 *New challenges of an ageing population*

Silvers, intended as people over 65 years old, are the new protagonists of an economy that puts their needs and their expectations at the centre, starting from the consideration of the most important aspects of a changing society such as human rights, participation, and well-being. Economic and institutional actors are putting their efforts into developing "Sustainable growth", focusing on several areas of improvement related to ageing.

Healthy ageing and constant learning are the most important themes of discussion. The issues are connected to the fact that life spans are lengthening and consequently

silvers' years of active life. Active ageing and social participation will be covered in more detail in the following chapter.

The attention is also focused on the improvement of the overall labour performance, in a working system where the working-age population is shrinking. In 2020, people aged 55 years or more accounted for one-fifth of the total workforce (Istat, 2020). The goal in the labour market would be to keep seniors in the workforce for longer by extending the retirement age, which some EU members are already implementing, and by introducing new working solutions more suitable to their lifestyle, such as part-time positions or mentor roles requiring less physical and mental effort.

On the other side, in most cases, retirement coincides with an income reduction. Therefore, social protection systems must follow the changing of working policies, in order to avoid the spread of poverty conditions among seniors, often linked to requests for social and medical assistance.

In converting and limiting the impact of ageing, the pillar is the healthcare system. Healthcare services and long-term care must adapt to different and new health conditions resulting from the ageing process and growing longevity.

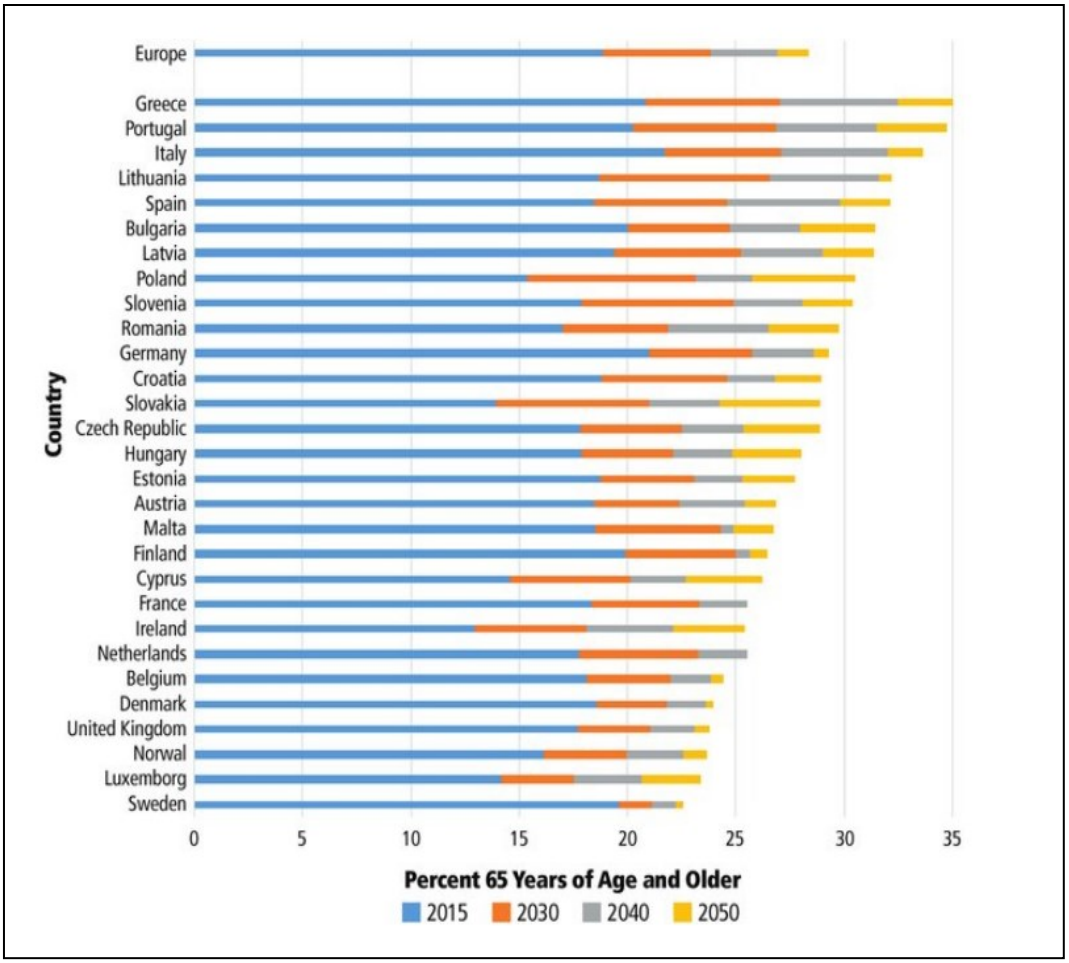
Additionally, another discussion arises, none of the ageing strategies would be possible without a mutual sharing of problems and opportunities between generations. Today's silvers are beginning to see the initial phases of the change in

the social and working systems. However, it is the future generation of seniors who will be mostly influenced by the outcomes generated in the areas described above. Intergenerational solidarity is strictly necessary to act positively on ageing and develop mutual understanding between young and older adults. Younger generations are not excluded from the ongoing changes but are part of the potential solutions.

I.2.3 *Who are the silvers*

Figure I.4 represents the share of people with age 65 or more in the total population of each European country. Among the countries with the highest percentages of silvers, like Germany and Portugal, Italy tops the ranking with almost 30% of over 65 on the total population, proving to be the greyest country in the EU. The estimates predict that at least until 2050 its share of older adults will continue to be among the highest.

Figure I.4 – People over 65 in the EU, 2015-2050



Source: Edmonston, 2021

While it is certain that population characteristics vary in the different European countries due to cultural and social factors, it is useful to depict the actual picture of today's silvers starting from the country which has long been subject to such an influential demographic change, and which can be taken as a benchmark.

The World Health Organisation provides reliable statistics on demographics and life expectancy in Italy. In this country, more than 14 million people are over 65, among them, 6.13 million are male, and 7.95 million are female. As in most industrialized countries, men have a lower life expectancy than women due to congenital diseases, and nutritional and lifestyle differences. In 2020, the life expectancy of Italians, reaching the age of 60, was on average 20.5 years, of which 18.9 were spent in good health.

Starting from these demographics, the Itinerari Previdenziali study and research centre, through a statistical survey carried out in 2022, was able to provide a new portrait of the Italian silvers with the aim of defining who they are, what they do, and what they want. The survey considered several variables such as gender, age, geographic area, employment, household, education, income, and savings.

In the family and social environment, there was a confirmation of a shift in the size and composition of modern households. In fact, 17% of the respondents state to not have any relatives who can support them in old age. On the other hand, almost half of the individuals in the age group 50-64 declare that they are helping children and grandchildren, this percentage decreases to 30.4% for the age group 65-74. This data can provide insights into the substantial gap existing in mutual assistance between generations. Silvers, apart from health problems or other impediments,

take care of family members, but these latter still devote relatively little time to them. A de-familiarization process is underway.

Italian seniors also do volunteering activities and their commitment to this grows with age. On average, 63% of them provide assistance to others in need, whether family members or not. More than 36% of Italian over 75 volunteer on a full-time basis.

The housing theme turns out to be very important for older adults. More than half of the over 65 in Italy own a house, while 22% of them own a second property. Furthermore, almost 85% of the age group 65-74 and 76.8% of those over 75 live in a house with 3 or more rooms. Nevertheless, a share above 70% thinks that their living spaces would not be suitable for dependent or disabled persons. Considering the ageing trend, this number should be taken into account to introduce structural improvements and innovative solutions in the housing sector. Among Italian silvers, there is a positive sentiment towards the introduction of new technologies for safety and mobility, and towards improvements in energy consumption and sustainability.

It is also crucial to understand how silvers perceive their economic situation. More than half of those over 65 consider themselves satisfied with their financial condition, not only those who still work, but also pensioners and housewives.

However, this perception becomes more negative for women and in southern Italy. The same trend exists in their perception of their future economic status since half of them believe that their situation will remain equal, or it will be even better.

Most Italian seniors are primarily afraid of health complications and loss of independence. They are also worried about the abandonment of relatives, loneliness and in a minor way, poverty.

Another aspect to consider is the approach of silvers with new social interactions. Mainly because of the fear of being left behind, they had notable progress in technology usage, like mobile phones, personal computers, and different digital platforms. Almost the entirety of them has a smartphone and very often use the internet to connect with others, read online news, and in a minor way interact with the public administration.

The underlying aspect of the senior lifestyle is surely their health. On average, 75% of them perceive their health conditions as good or discrete, and almost the same share of people between 65-74 takes medication regularly. They are satisfied by their general practitioner and book regular medical checks. Almost the totality of the respondents uses public health services. 62% of them, especially those earning an income from work, benefit from private supplementary services.

A focus goes on nutrition, which is one of the main factors for remaining healthy. A positive trend has been discovered in choosing a diet that suits the health conditions and this attention increases together with the age. In younger seniors, it is more common to buy ready-made food, whereas in the 65-74 and 75 and older age group this activity becomes rarer. Few silvers choose to rely on a dietician, mainly due to needs related to pathologies and eating disorders.

The lifestyle of Italian silvers was also studied in the same survey. Here there is a negative insight because more than 30% of them do not practice regular physical exercises to stay healthy. Data improve for mental health because almost half of them train their mental abilities by reading books, newspapers, and media. In this habit, educational qualification makes the difference: in fact, those with higher education practice intellectual activities more often (Itinerari Previdenziali, 2022).

Nowadays, holidays and mobility-related activities prove to have a noticeable importance in silvers' life, and the numbers will increase in the short-term, due to an increasing number of individuals who, despite advancing age, will remain active and in decent health conditions.

Lifestyles and consumption of older adults are transforming together with new needs, technologies and policies, these data can prove it and they are a starting point to make all social, institutional, and economic actors aware of it, to create a more inclusive and sustainable society.

I.3 THE ACTIVE AND HEALTHY AGEING

Ageing well has become a necessity and can no longer be considered a privilege of the few. As a result of this irreversible demographic phenomenon, it is of fundamental importance to develop a shared vision of how longevity is primarily an asset and a resource rather than a problem.

This point of view leads to new considerations on how it is possible to transform later years of life into something positive for older adults and the societies where they live.

I.3.1 *Determinants of active and healthy ageing*

The term Active Ageing, coined by the World Health Organization, refers to a broad set of processes that could potentially lead seniors to increase their quality of life by adopting new habits and lifestyles and welcoming new opportunities generated in health, security, and social environments.

This concept encompasses all aspects related to individuals' physical and mental well-being that can enable them to be an active part of society, especially in older age, receiving assistance and support if the necessity arises. Being an active part of society is not limited to the work field, but also refers to cultural, civic, and social affairs.

Being active is a direct consequence of staying healthy, hence, active ageing is strictly related to healthy ageing. By maintaining independence and autonomy, seniors can devote themselves to all those activities that would otherwise be neglected due to problematic health conditions. Therefore, any proposal related to active ageing should start from a first main assumption: individuals should be supported in their capability to take decisions on a daily basis and in their ability to perform activities of daily living.

However, empirical evidence shows that there are several factors threatening the pursuit of active and healthy ageing and risking to nullify the opportunities discovered in major longevity.

By understanding how ageing is influenced by external and personal factors, a broad range of solutions can be applied to improve the life's quality of today's older people, but also of tomorrow's generation of silvers.

It is possible to segment the influencing factors into two macro-categories: culture and gender. They represent the cross-cutting determinants of ageing. Cultural values and traditions are the primary influencing factors of ageing; they determine how different generations relate to each other and how health issues and healthy habits are perceived.

On the other hand, being male or female has always had different implications on the population's lifestyle. Gender has always represented a determinant of social status, especially in developing countries, influencing the population's well-being and access to different types of resources, such as education, healthcare, or work.

The two macro factors entail other phenomena to be considered to fully make effective healthy ageing policies. Specific determinants exist, from health and behavioural situations to social ones.

Not surprisingly, healthy ageing is achieved only if supported by efficient healthcare and social care. In spreading active and healthy ageing, an integrated and coordinated system of health and social services must be implemented, with the first aim to promote health and prevent diseases. Seniors must be aware that they can improve their health conditions, firstly by avoiding dangerous behaviours, and taking preventive decisions. At the same time, all health institutions should be aware of the shift that is taking place: today's patients need more than before a continuum of care, monitoring and orientation.

Another influencing determinant for healthy ageing is behaviour. Healthy behaviours are sometimes undervalued, especially in older age. However, it is never too late to adopt new habits to improve health conditions. The ageing process is highly affected by dangerous activities like smoking or drinking alcohol, which

cause functional decline and shorten life expectancy. On the other side, positive effects on ageing are seen in physical activities and healthy eating. Regular physical activities delay functional declines, as well as a balanced diet reduces the risk of chronic conditions caused by malnutrition.

In ageing, there are also factors that cannot be predicted. Genetics, for example, play an important role in the way people age. Nevertheless, it has been studied, that the development of diseases in seniors is most often caused by external or environmental factors rather than by genetic or biological determinants.

I.3.2 *The Decade of Healthy Ageing*

To disseminate awareness of active and healthy ageing, several actors are striving to create a common framework that can bring real changes in this field. Governments, international agencies, institutions, and universities are committing themselves to the creation of an action plan, giving rise to the Decade of Healthy Ageing 2020-2030, coined by the United Nations.

It consists of a 10-year collaboration between several stakeholders, with the aim of creating guidelines and providing answers to everything that threatens the ageing process, increasing the quality of life of older adults, their families and their communities.

For pursuing these goals, during the decade several areas of action will be covered, aiming to have effective results in the medium term for improving healthy ageing, starting from the way it is perceived.

Despite the already large contribution that seniors make to society, they are often not seen in a positive way and their needs are overshadowed. Thus, the first objective is to change the general thinking and public opinion on age and ageing.

Once this shift has occurred, it will be possible to make communities understand that seniors have abilities and qualities that are extremely valuable for common well-being. The aim is to help seniors to maintain their physical and mental ability longer, as well as enable them to continue as much as possible to perform whatever creates value for them and those around them.

In order to do so it is necessary to support and implement the entire system of care and health services that can respond promptly to their problems.

Physical and mental complications often limit the possibility of older adults staying healthy and remaining active in society. Often, they cannot care for themselves autonomously and help is needed. That is why the focus goes on providing them with support and long-term assistance, with a special concern for their human rights and life dignity.

Although the active ageing framework offers clear and tangible applications, no action could be ever implemented without the participation of national and international actors to shared transversal objectives. Networking and partnering will surely help the framework to extend opportunities for seniors to be influential in society, raise intergenerational cooperation, and push every type of organization involved to engage them as an active part of their communities.

Older adults are an extremely heterogeneous group. Therefore, research and innovation cover a fundamental role in targeting actions to improve their quality of life and generate new social and business opportunities. Research activities are the starting point to spreading knowledge on ageing, as the amount of information available today is relatively limited compared to the relevance of this phenomenon. Thanks to research and experimentation, innovation will be fostered in social, business, technological and scientific fields.

II. INNOVATION IN THE SILVER ECONOMY

II.1 INNOVATION PATTERNS

There is no unique definition of innovation. However, in any context where it is discussed, there are always two common features: a problem or a necessity, and a potential solution. By following this approach, the focus shifts from an economic and profit-oriented point of view to a more human-centred vision. In fact, before considering the potential gains that could be obtained by the introduction of a new product or service into the market, innovators should instead focus on the evolving population needs. When the primary purpose of innovative solutions is to improve people's lives, collective acceptance and market validation will come as natural consequences.

Regarding the development of innovation in the Silver Economy, the approach described above is fundamental, even if the validation process is not immediate since the final users represent a niche of the total population (not though so limited nowadays) with very specific and heterogeneous needs and requirements. That is also why innovators in the Silver Economy usually carry out qualitative research, rather than quantitative, in order to gain in-depth knowledge of attitudes and perceptions of silvers.

The Silver Economy covers a single, but heterogeneous market. While it is certain that the Silver Economy regards a single and distinct market with goods and services for seniors, it's wrong to say that it is homogeneous, because diversification is the key feature to follow the changing demographic, health and social factors of the senior population.

There are many ways to classify older adults in their market, depending on the purpose of the analysis. Therefore, different segmentation criteria have been developed over time. Classes of individuals with similar characteristics can be created. For simplicity, socio-economic factors, like age group, income, or health status, are the first to be utilised. Nevertheless, the heterogeneity of this market is mainly given by behavioural factors: knowledge, attitudes, and experiences are what influence the purchasing decisions and the adoption of new lifestyle solutions by modern silvers.

The common perception is that the Silver Economy market is directed at a new life phase, not existing years ago, in which the full adult life is passed, but that does not coincide with the traditional definition of elderly, since better health conditions allow the adoption of new habits and behaviours.

When measuring innovation, the spreading of new technologies is related to the market in which they are adopted. The relationship between technology and the target market defines the type of innovation that is being developed.

In the case of the Silver Economy, there are enormous innovation opportunities generated by the emerging demand for tailor-made services for older adults. So economic actors are shifting resources to capacity building, because of the growing dimensions of the silver market predicted in the future, but also to larger products and services accessibility, without forgetting solutions for spreading social equality.

From this perspective, the winning technologies would be the ones that can successfully cope with a changing environment, where the current procedures, services and products risk being no longer suitable for a growing ageing population. Customer-centric innovative solutions will gain market share by improving seniors' quality of life, focusing on a different perception of ageing.

All this can be linked to the concept of disruptive innovation, also called stealth innovation. This type of innovation does not create new markets from scratch but consists of an introduction of new technological solutions that suddenly overcome the current ones, by becoming cheaper and more effective over time. Under these

conditions, existing business models are revolutionized by new products or services that increase customer satisfaction and enhance user-friendliness.

II.1.1 *New technology paths*

When studying innovation in the Silver Economy some important aspects should be taken into consideration. Silvers nowadays are discovering opportunities to live better and longer; they pursue this condition by making use of technological devices that did not exist before. Moreover, they exploit tailor-made services, taking advantage of the digital tools that have been available in recent years.

Technology in the silver world plays a fundamental role since it represents the bridge between seniors changing needs and innovative solutions created for them. It is possible to identify three technological trends as common threads for innovation in every sector of the Silver Economy. These technologies do not only concern applications in the mature market, but they represent the starting point for developing new products and services tailored to older adults.

The first thread is represented by vocal assistants. This technology has growing potential. Nowadays it is used for simple routine operations (such as listening to the

daily news or finding the nearest pharmacy), but if exploited well it could play an important role in simplifying more complex actions performed by older adults: think of just making a call without having to press buttons or opening doors without moving.

Another booming technological trend is represented by the Internet of Things, also known as IoT. Progresses in this path will permit almost every object of daily life to acquire its own identity in the digital world. IoT is based on the idea of "smart" objects interconnected with each other to exchange information that has been collected or processed. Besides smart homes, manufacturing plants, and transportation, this technology could have an increasing application, if integrated into products for silvers, thanks to the collection and elaboration of data related to different aspects of their life.

Furthermore, Artificial Intelligence (AI), intended as a system for learning and interpreting natural language, will be fundamental for spreading personal services and experiences. AI can be described as an ensemble of different technologies interacting with each other to enable machines to perceive, understand, act and learn with human-like levels of intelligence. All of the above will make existing services and apps more efficient and accessible, introducing new ways of applications in the

life of older adults. Significant examples might be integrated service platforms for fitness and health or domestic robots.

The creation of a system of integration of all the technologies previously described provides the possibility of developing new solutions for continuous monitoring and support of the seniors, allowing them to have an increasingly active life. The impact is going to be enormous, especially regarding hospital and home care.

II.1.2 *Innovation challenges*

The potential development of the Silver Economy also depends on the rate of adoption of new technologies by older adults. According to the AGE Platform Europe study, published in 2019, only 8% of individuals in the age group 65-74 have sufficient digital skills. Despite this not encouraging data, the real situation has changed in the last few years, also due to the pandemic. Today more and more seniors are discovering telecommunications, computers, and online services.

New innovative challenges are emerging to cope with social and technological changes. Furthermore, several are areas of application to discuss: from wellness and leisure to finance and security matters.

Firstly, age-friendly environments, home solutions, as well as any technology that permits to maintain or improve physical and psychological well-being are those that attract the most attention from the market segment of seniors. The main development area concerns the optimization of living spaces, at home and outdoors, to create suitable environments for people with mobility difficulties or other physical impediments. Today, also thanks to the diffusion of the senior living concept, houses are more technological and more connected. Many functional aspects can be managed by technology through voice assistants, interactive platforms, as well as apps for smartphones linked to different types of appliances. With IoT, every object at home can potentially become smart and learn actions to be repeated daily at a specific time. New technologies and applications are helping to create spaces where a silver feels comfortable and autonomous.

The way of exploiting living spaces is changing. A new approach to life at home was born, it is called ageing in place. This term refers to living at home and in communities safely, autonomously and in a comfortable way regardless of age, income, or ability level (Centres for Disease Control and Prevention, 2009). More and more digital platforms provide integrated home care services, with the possibility of monitoring health status, required assistance modality and related costs.

The awareness of being able to remain active and healthy in older age has boosted trust in wearable devices, sensors, and wellness applications. These new tools are gaining a large market share, especially among silvers. Today is possible to measure, but most importantly to share a series of fitness or health-related information such as heartbeat frequency, sleep quality, breathing and more. Wearables are revolutionizing users' lifestyles by collecting important sets of data that can be used for fitness and especially health purposes.

Smartwatches, fitness trackers, smart eyewear and new medical devices are the tools hosting increasingly complex applications. Generally, these types of apps can be categorized according to their purpose. The wellness management apps regard physical and mental well-being, while the health apps provide more specific services concerning the disease to treat or prevent.

The adoption of fitness devices will increase at the same pace as the attention given to the importance of an active and healthy life. On the other hand, the utilization of health apps and digital health tools has the power to potentially revolutionize the healthcare system. With the Internet of Medical Things (IoMT) new data-driven algorithms, methods and software can be generated to help both patients and doctors stay connected in remote modalities. Patients can be monitored remotely by doctors and interact with them, receiving support and assistance.

New advanced technologies are the basis for an upgrade in robotics. This technology covers a big role in the Silver Economy because its principal idea is to

simplify human life. Robots act as physical operators and artificial intelligence as their brains, working together they can support the performance of complex tasks for seniors and facilitate their social relations.

By combining engineering and technological innovation there is the possibility to create physical assistants that can support people with limitations, but at the same time act for social purposes, reducing the sense of isolation that is a widespread problem among seniors. Through vocal commands the robots can establish an empathic relationship, inducing the human to gradually increase the number of interactions and requests.

Robots will gain importance in several aspects of life. With functional robots many tasks performed by humans will be carried out by artificial machines, think for instance moving objects or monitoring certain environments for security purposes. Focusing on healthcare, the applications are multiple: *"AI and robotics can assist speed up medicine roll out dates and improve hospital operations in a variety of ways, from patient care to drug production and clinical research"* (Shakare and Sharma, 2022, p. 1).

Another important innovation challenge resides in the mobility sector. The choice of modalities to help silvers move from one place to another is a recurring theme,

as means of transport are hardly accessible to this population group. The introduction of driverless cars on the market opens a solution to increase their mobility. The first population target to benefit from this innovation would be older adults who otherwise could not move or could do so with lots of difficulties. There are already examples of driverless trains and taxis that mark the beginning of a market that has not yet gained the full confidence of customers but will surely show ample improvements in the coming years.

Facilitated mobility for older adults means a more active life, more leisure, and more social interactions. Related to the mobility sector, a new way of interpreting tourism is spreading. "*An EU silver tourism roadmap could help address the need for improved infrastructure, accessible transport, age-friendly hotels and inclusive ICT solutions. It could also include the provision of medical care during travel and at destination. Selective use of mHealth (mobile health solutions and devices) could address these challenges and better integrate person-centred care. Holiday packages and tours that overcome these and other barriers to mobility can be promoted*" (EU Commission, 2018, p. 36).

II.2 THE INNOVATION ECOSYSTEM

II.2.1 *Open innovation*

Being the Silver Economy itself a transversal phenomenon, it would be impossible to think of innovation development in this field as a close system. A new decentralized and participatory approach is required, that can act as a bridge between actors for sharing information, knowledge, and ideas.

Decades ago, innovation was conceived as an internal process within organizations, which was rarely externalized to create synergies and connections. However, the originator of the term open innovation presented a vision opposed to this latter. Open innovation is defined as the internal and external flows of knowledge to both accelerate innovation processes internally and expand the markets for external use of innovation. According to this description, the most recognized feature of open innovation is the flow of technology and knowledge coming from the outside into organizations. But modern innovation processes do not stop here. Discoveries and solutions should also circulate in the external environment to create an interconnected system of information among actors.

Discussions arise when dealing with open innovation. The most prominent one is how to measure open innovation processes. Another field of study is the firm's choice for the appropriability of innovative strategies. With the occurrence of new global challenges and the acceleration of technology, the attention goes to the importance of network forms of collaboration, that will permit the application of open innovation practices to new contests like SMEs, startups, and non-profit organizations.

As in any other innovation context, in the Silver Economy, no economic or institutional actor can innovate effectively on its own, without a strategic network of collaboration. New ideas and technologies that are not applicable internally are supposed to go outside, to find the right system or business model to be improved.

Partnerships create common value-added, and finding suitable partners is a common challenge in open innovation. New collaborations always entail costs in terms of search, validation, compliance, as well as establishing human relationships. Nevertheless, they are more necessary than ever when the transformations taking place affect the entire globe, as in the case of the population ageing phenomenon.

II.2.2 *Strategic partnerships*

Innovation nowadays is much more about networking and strategic partnering, rather than merely productive and business aspects. Open innovation is boosted by strategic partnerships, meaning to create long-term relationships focused on creating joint value. The higher the value generated, the more strategic is the partnership.

Common positive outcomes are recognised as the result of strategic partnerships in any field. The first objective is often the acceleration of the development or the improvement of a product or a service, by relying on R&D collaborations sustained by financial partners interested in the innovation pattern that is being followed. For example, in the present situation, a huge amount of financial resources is being disposed to pharmaceutical, health, and technology companies, as they partner with different providers to share liabilities and costs to create more value and find mutual support.

Another key outcome deriving from strategic partnerships are the integrated solutions. Companies specializing in the production of a particular technology are supposed to make it available to other companies to satisfy new and unexpected market needs.

When entering the Active and Healthy Aging matter and Silver Economy expansion, networks and collaborations must be considered from a broader point of view. Innovative firms are not the only protagonists, but they are part of a complex ecosystem in which ideas and knowledge mainly come from research institutes and universities, which is also why an open innovation approach is required. Policy-makers bodies are enclosed in this network, as well as healthcare providers. Ultimately, there are the seniors, representing the final block of the system, who will validate innovation processes and seize the value created by all the stakeholders.

The role of entrepreneurship and institutions will be explored later in the paper. However, it is of interest to dwell on the contribution that the creation of dedicated ecosystems can provide to the development of the Silver Economy. Several medium to long-term projects are creating positive synergies between all stakeholders, leveraging local, national and cross-national connections.

II.2.3 *Special projects for the Silver Economy*

On a European level, the first steps for the creation of partnerships to sustain ageing innovations are made by institutions. The EU Commission demonstrates to have perceived the relevance of the ageing phenomenon. The most influential network that has been created is the *European Innovation Partnership for Active and Healthy Ageing* (EIP on AHA).

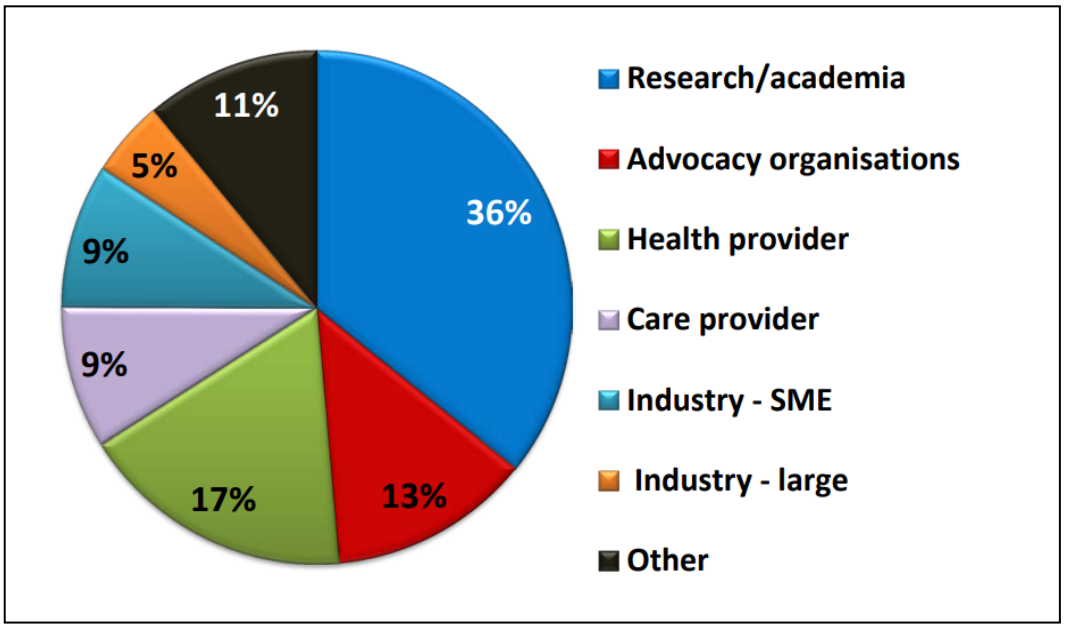
The partnership was born as an information and communication hub for citizens, companies, healthcare providers, researchers, and policymakers engaged in research, innovation, dissemination of best practices, and scientific collaborations. As shown in Figure II.1, it involved every type of stakeholder that might add value to active and healthy living by exploiting new technologies and digital tools.

The partnership's objectives are to increase the life quality of European older citizens, to support and improve healthcare and social care systems, and to support the expansion of new markets.

The EIP on AHA made it possible to realise five interregional projects, covering fundamental development areas related to ageing: EU SHAFE for the creation and the diffusion of age-friendly environments; HO CARE to deliver innovative home care solutions; ITHACA to spread more suitable policies for the elderly; InnovaSPA which was focused on the promotion of thermal cures and treatments;

and TITTAN to make healthcare systems more efficient in relation to active and healthy ageing.

Figure II.1 – Participation in the EIP



Source: Čadová, EIP information day, 2020

In tandem with the European Innovation Partnership, under Horizon 2020[1] financial resources, the *Active and Assisted Living Programme (AAL)* aimed to assist market-oriented research and SMEs in the development of innovative products and services that could make effective changes in older adults' lives and the people who assist

[1] Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years.

them daily. The activities of the AAL have created opportunities to generate an ecosystem of innovation focused on senior living topics, by supporting more than three hundred projects and by building solid communities and networks across Europe.

Since Horizon 2020 came to an end, a new version of this program, called Horizon Europe is being carried out. It continues to give attention, among other research areas, to health, demographic changes, and well-being challenges.

The importance of collaboration for innovation and market development is also recognised by national actors. In Italy, different networks have been created through business and academic collaborations for the development of the Silver Economy.

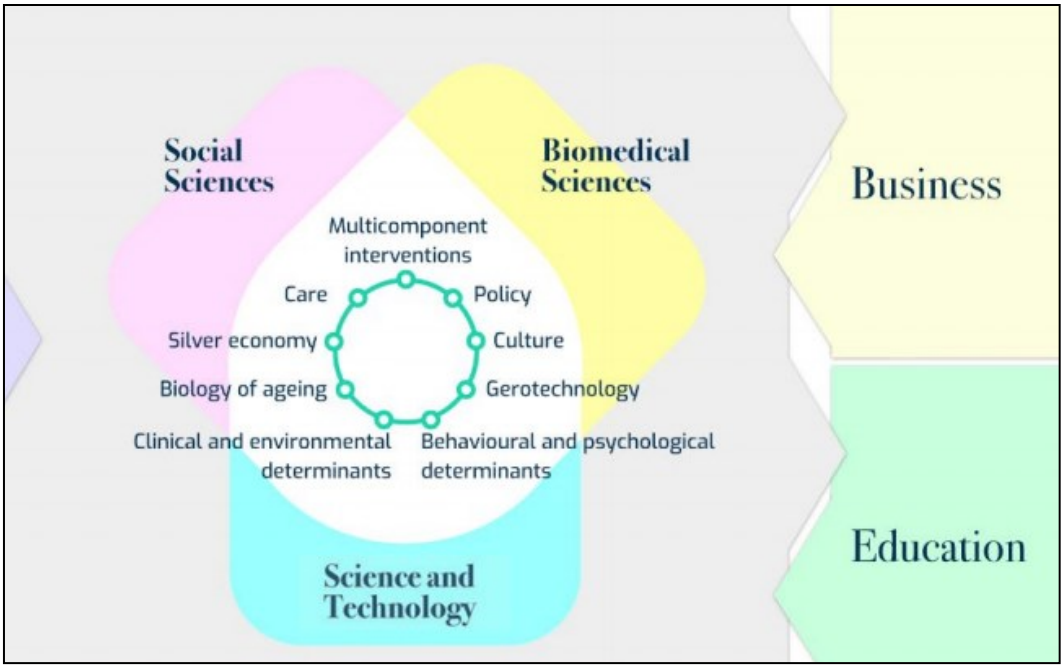
By recognising the social and economic impact that population changing needs are bringing to Italy, several companies took part in the *Silver Economy Network*, the first and most recognised network of Italian businesses offering quality products and services for the more adult population. This network has been created to generate interconnections among producers and service providers, to enhance opportunities offered by the Silver Economy. The mission is also to promote the network initiatives to the largest number of regional and national stakeholders, to involve them in the project and generate further common value.

Funded by the Italian Piano Nazionale di Ripresa e Resilienza (PNRR), it is important to draw attention to a new research programme, which fully reflects the

open innovation characteristics required for the development of new ageing solutions for Italian citizens. *Age-It* is a research programme that aims at making Italy the leading scientific hub in research on ageing, it will set the gold standard in terms of socioeconomic, biomedical, policy and technological solutions for an inclusive ageing society. The programme will involve public and private actors and coordinate disciplines such as biomedical sciences, social sciences, and technology through a holistic, problem-solving and interdisciplinary approach (Figure II.2).

By creating an interdisciplinary blueprint of research on ageing and connecting academia and business spheres, Age-it will make Italy a pioneer in driving breakthrough life-changing innovation, with special attention on sustainable development and a human-centred approach.

Figure II.2 – Age-It alliances model



Source: Age-It enlarged partnership, 2022

II.3 THE ROLE OF ENTREPRENEURSHIP IN SPREADING INNOVATION

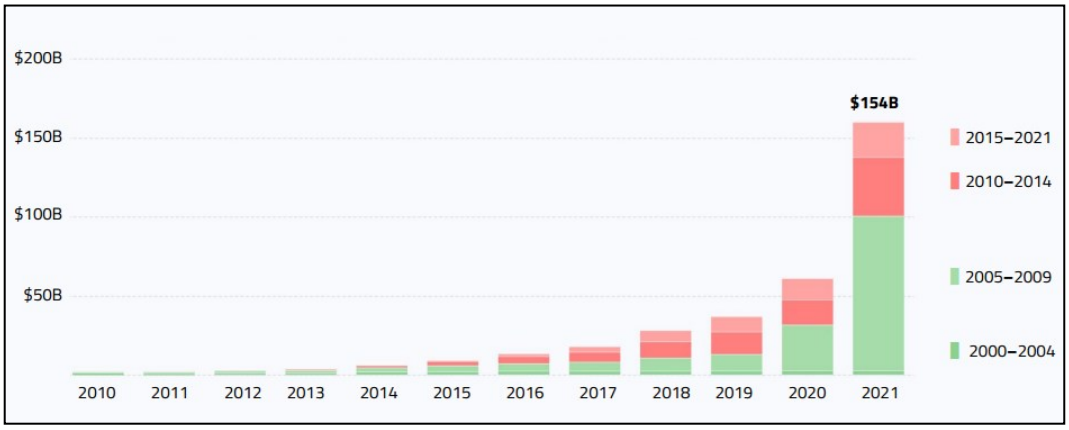
II.3.1 *The startups*

Startups are the engine of innovation. This form of business is recognised universally as a new enterprise in the form of a temporary organization, or a joint-stock company characterized by a high degree of innovation and is shaped to grow rapidly according to a scalable business model. Innovation in startups may be included in the business model itself or its products or services. What differentiates startups from classic SMEs is specifically the scalability, meaning that the solution offered has the potential to gain market share and customers in less time and with fewer resources than other types of businesses. Aiming to break into the market with new technologies or business models, a startup faces a variety of risks, that if correctly managed will lead to exponential results in terms of revenues and credibility.

Startups are usually not left alone during their journey, but they are part of ecosystems of innovation where universities, scientific partners, investors, and institutions cooperate with them to mitigate the risk of failure and accelerate their growth. The affiliations with the research world are fundamental to making the most

of micro and macroeconomic developments and increasing knowledge of the environment or sector in which they operate. In Europe, the startup ecosystem has grown exponentially in the latest years and in 2021 valued at $3 trillion. The importance of alliances is underlined by the fact that many tech startups of the European ecosystem have their roots in academia and drew early support from government grants. As Figure II.3 shows, their total value was $154 billion in 2021.

Figure II.3 – Total value of university-affiliated startups in Europe



Source: Dealroom, Supercharging the European tech ecosystem, 2021

With a market pull approach, most startups nowadays are attempting to respond to a changing consumer demand in the face of a rapid shift to digitalization. (Roy, 2022).

Innovative products and digital services are more required than ever. According to McKinsey, Europe's economic future strictly depend on innovation in terms of digital solutions and new frontier technologies, such as artificial intelligence, IoT, blockchain, high-power computing and the integration of biology and engineering (McKinsey, 2019). By exploiting these technology patterns, European startups can be the protagonists in supporting productivity and economic growth.

Usually, the first cause of startup failure is the lack of funding. This fact shows how strategic it is to receive adequate financial resources to grow solid business projects. Especially for startups in the early stage, self-financing, also called bootstrapping, is not sustainable. It is therefore necessary to establish relationships with the suitable type of investors to obtain management and financial support.

II.3.2 *The investors*

Two are the main typologies of investors: institutional or private. Institutional investors are intermediaries whose principal activity is to invest assets on behalf of other parties that are in financial surplus. This category encloses securities, real estate and speculative mutual funds, collective investment undertakings, pension funds, and insurance companies. These institutions are the dominant players in the

capital market and with their operations boost economic growth, rarely focusing on specific investment categories. They aggregate the capital needed for businesses to function and provide liquidity in the trading markets.

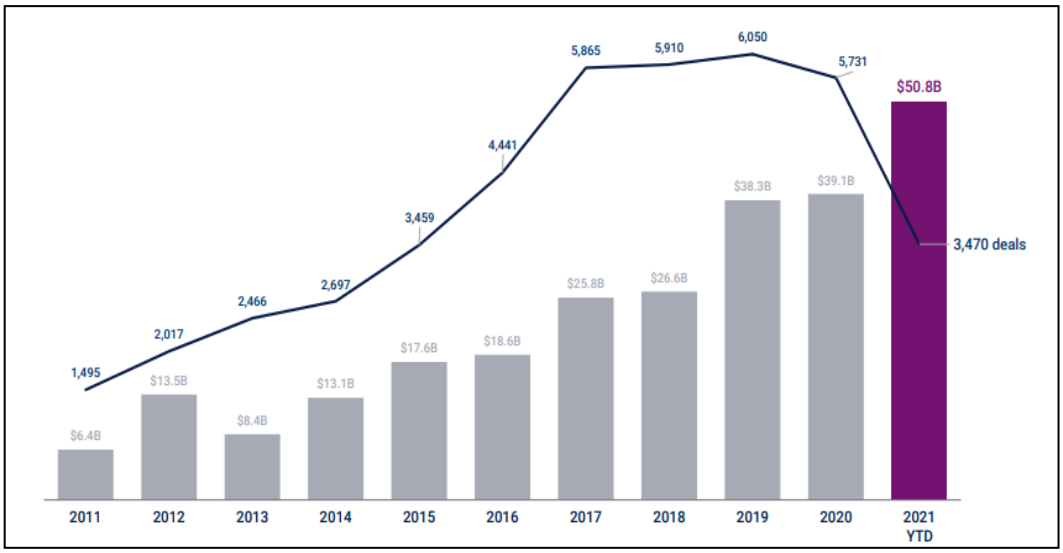
It is rare for institutional investors to take an interest in the startup world, which is fragmented and risky. That's where private investors come into play. The most active private investors can be identified in incubators/accelerators, business angels, venture capital and private equity. While in the next section the operations of a particular startup accelerator of the Silver Economy will be discussed, it is useful to focus on the role of other private investors in the startup ecosystem.

Business angels are private individuals, such as managers or entrepreneurs, who provide financial resources, networks, and management skills to startups that need to structure their business idea to consolidate their presence in the target market. Business angels generally invest no more than five hundred thousand dollars. Their most utilized form of investment is to enter the equity of companies, by acquiring shares in exchange for money. Since these investors are extremely involved in the startup's operations they invest in, hoping for exponential gains, they usually choose businesses in innovative sectors and with high growth prospects. Business angels play a key role at the beginning of innovative projects that will require further investment rounds to become established and profitable businesses.

Once the innovative early-stage startups reach a certain financial equilibrium and market share, other types of private investors help to further accelerate the growth with more consistent investment rounds. While private equity involves investment in mature companies; venture capital funds, focusing on early-stage investments, are the most active players for startup funding.

Venture capital operates in the void between sources of funds for innovation and traditional low-cost capital sources. From an innovation cycle perspective, it is rare for venture capital to invest in R&D and initial development of projects of innovation, while it has been shown that venture funds play a key role in the following steps of the cycle: when something tangible has been built, and companies begin to commercialize their innovation. Only at the end of the nineties, 80% of venture money went to building the infrastructure required to grow the business, in manufacturing, marketing and sales, but also into balance sheets providing fixed assets and working capital.

Figure II.4 – Value of venture capital deals in Europe



Source: CB Insights, State of Venture Report, 2021

As Figure II.4 illustrates, the amount of venture capital is growing steadily year after year, demonstrating the importance of these types of financing sources that contribute to nurturing innovative ideas, giving them market applicability and credibility. In Europe, the value of venture deals in 2021 was eight times higher than in 2011. In ten years, venture funding passed from $6.4 billion to $50.8. The number of venture investments has grown along with the number of new startups. A few years ago, there were relatively few resources for all the companies that were born. Today the situation seems to have stabilized, where the number of backed startups does not increase exponentially, but the available funds continue to expand.

II.3.3 *AC75 Startup Accelerator*

In many cases, incubators and accelerators represent those who carry out the first rounds of startup funding; thus, are strategic stakeholders to engage with for an early-stage company to succeed. The main differences between these two private investors involve the final objectives and the approach to startups and their equity. Incubators prepare the startup to go to market, by providing services designed to structure the company and transform ideas into something profitable. Their purpose is to furnish training and market knowledge to teams. They rarely ask for a stake in the startup's capital.

Accelerators provide sources and opportunities to boost and get the startup to the following necessary funding rounds. The services provided by accelerators are mainly mentoring, networking, and consulting. They are investors in the short time: after the acceleration programs, they monitor the backed startups for a few years and then exit the investment. It's typical for accelerators to differentiate themselves according to the sector in which they operate and to the stage of the startup accelerated. Accelerators' portfolio can be diversified if they do not focus on a single economic sector when their purpose is to finance all projects at the same lifecycle stage and with similar investment amounts.

In Italy, a national protagonist of startup acceleration activity is CDP Venture Capital Sgr, an asset management company funded by Cassa Depositi e Prestiti[2] and Invitalia[3]. This company aims to make venture capital a cornerstone of the country's economic innovation and development, by creating the conditions for sustainable growth of the venture capital and startup ecosystem. In order to widen investments, strengthen the relationships between firms, investors, and startups, and promote a modern approach to entrepreneurship, CDP Venture Capital gave rise to a national network of startup accelerators, operating in different economies.

Part of the national network is AC75 Startup Accelerator, the first accelerator in Italy specifically focused on startups in the Silver Economy. Founded in 2021, the company is pursuing several areas of development by deploying financial resources, managerial competencies and scientific collaborations with research institutes and universities.

The organization identifies specific acceleration activities for innovative startups with high market potential. In one of the main development areas, called "Business

[2] CDP is an Italian financial institution, in the form of a joint-stock company, owned by the Ministry of Economy and Finance and by various banking foundations.

[3] Invitalia is an Italian government agency established as a joint-stock company, owned by the Ministry of Economy and Finance.

Angel Partner", its role is to match valuable business projects with business angels willing to support the founders in their initiatives by granting substantial financial resources, but most importantly managerial support and a strategic mindset. In this case, the accelerator acts as an intermediary between early-stage startups with precedent market validation and experienced entrepreneurs coming from successful companies or high managerial positions. A pilot project is already active, and it involves two startups, one business angel and more than five hundred thousand euros invested.

Given the strategic partnerships with the research world, a spinoff development programme is also active, with a lab-to-market approach. A spinoff is a company founded by university researchers to enhance and apply the results deriving from their scientific and research activities. The accelerator selects teams with research ideas and competencies aimed at creating university spinoffs with potential for growth. By providing pre-seed funding, the network brings together Italian innovators from local universities, but also from all over Europe and North America.

Furthermore, AC75 is the accelerator and co-investor involved in the Next Age Program: the first acceleration program investing specifically in Silver Economy

startups. The initiative promoted by CDP Venture Capital involves other local and international investors.

The program consists of an annual selection of a maximum of ten startups at the seed and pre-seed stages, having access to structured activities lasting four months. During this time the startups receive investments, scientific validation, mentorships, and direct collaboration opportunities with research centres and companies, locally and internationally.

The added value of the program is not only the extensive financial support, but the involvement of successful international accelerators, corporations involved in open innovation activities and research centres specialized in the related fields to the startups to be accelerated. The main objective for AC75 with Next Age is to develop a structured innovation hub in the Silver Economy, through the involvement of many valuable stakeholders.

III. TECHNOLOGY AND NEW OPPORTUNITIES IN HEALTHCARE

III.1 FOCUS ON DIGITAL HEALTH

As described in the first chapter, the silver economy involves many sectors and is a very cross-cutting subject. However, the largest values belong to the sphere of health. It's not a coincidence that the highest percentages of the silver economy's value are generated by the healthcare sector. Innovations in health systems and products are making healthcare more accessible to millions of older adults, introducing a modern approach to healthcare and strengthening their relationships with doctors and caregivers.

III.1.1 *Digital health definition*

New technologies are revolutionizing the healthcare sector. The convergence of technology and healthcare gave origin to the multidisciplinary subject of digital health. Software and hardware services are contributing to digitalising the healthcare industry. Telehealth, telemedicine, health applications, wearable devices, and electronic medical records are proof of how new digital tools can influence and improve such an important aspect of individuals' life.

Telehealth can be defined as the practice of providing care and medical services remotely using telecommunication technologies. It enables people who require medical treatment to communicate with their healthcare providers via smartphones, tablets, and computers from the comfort of their homes. Health-related education services like diabetes and nutrition management are included in telehealth. It is distinct from telemedicine, which more specifically relates to the virtual provision of clinical care.

Electronic Medical Records (EMR) are databases containing patients' medical data. These records include diagnoses, medications, treatment plans and all other information related to the health status of everyone. These data represent a necessary support tool for healthcare professionals who, by looking at them, can make recommendations about the patient's care.

According to the WHO*: "there is a growing consensus in the global health community that the strategic and innovative use of digital and cutting-edge information and communications technologies will be an essential enabling factor towards ensuring that 1 billion more people benefit from universal health coverage, that 1 billion more people are better protected from health emergencies, and that 1 billion more people enjoy better health and well-being"* (WHO, 2021, p.7-8).

Recent studies have shown that in recent years a growing number of healthcare professionals see a tangible advantage in exploiting digital tools, especially for the treatment of older adults. Thanks to digital health, clinical outcomes are improved, as well as work efficiency. Since 2019, the use of telemedicine and remote monitoring has almost doubled. The up-trending remote care represents a trigger for the adoption of digital tools, just as much as a reduced burnout in healthcare systems. The greatest enthusiasm has been found in tele-visits, that are increased considerably over the past four years.

Many changes in technology and innovation are reshaping the healthcare value chain and new dynamics are emerging in this field. Economic actors will have to modernize the health services provision modality, mainly by interpreting the macro-behavioural tendencies of patients and health personnel. Nowadays the dominant players are traditional innovators like pharmaceutical companies, hospitals, medical technology companies, as well as the category of the “players in charge”, such as health insurers, pharmacy-benefit managers, and single-payment healthcare systems. These categories will have to compete with “insurgent” actors like Google, Apple, and Amazon, but especially innovative startups that are creating applications, predictive diagnosis systems and new medical devices. With a high probability, this last category will be the one that benefits the most from the digitalization of healthcare.

III.1.2 *Drivers of digitalization in healthcare*

It is worth understanding what drivers are leading to an interest in the new potentialities that technology offers in healthcare. In Europe, the current situation is characterized by improved quality and quantity of care, together with a rising request for more complex and personalized services. The healthcare systems are constantly under pressure and have demonstrated weaknesses, especially in extraordinary circumstances such as the Covid-19 pandemic. Nevertheless, European countries are committed to ensuring access to health services and maintaining quality and affordability.

The first driver for thinking about changes in the healthcare system is a mismatch between supply and demand. On the demand side, there is an ageing population, coupled with a still insufficient level of healthy ageing once reached the 65 years threshold, in addition to increasing complexity of the health status of citizens. On the supply side, there is a decreasing capacity: hospital beds are shrinking, and the number of healthcare professionals shows a decreasing trend, combined with a growing number of burnout cases and mental health issues.

As well known, the healthcare industry is labour-intensive. Healthcare workers are struggling to handle the workload inside hospitals. Studies have demonstrated, for example, that in Europe most doctors declare their workload to be more difficult to

manage than some years ago, and the majority of nurses have the same opinion. Even though conditions in hospitals are becoming unsustainable, the spending on hospital staff continues to be substantial, approximately 70% of the healthcare budget is allocated to healthcare professionals (Deloitte, 2017).

The use of new technologies within the healthcare system can reduce the workload for staff and doctors, improving the effectiveness of health processes and services. Benefits will not only be on the supply side but will also involve patients who can monitor their health status autonomously, compare different treatment modalities, receive personalized services and in general have an improved experience.
It is therefore logical to think that digital transformation goes beyond technology. It involves adopting a technology-driven management process to increase benefits for doctors, patients and the broader health systems.

Another aspect to be considered for the advancement of digital health is the digital maturity of healthcare systems. Digital maturity is defined as the measure of the ability of organizations or economic sectors to create value through digital technologies. It is a key success factor for businesses embarking on a digital transformation. The World Economic Forum has provided a framework to evaluate the digital maturity in European countries, taking into consideration the heterogeneity of health systems.

Digital maturity measurement involves the assessment of healthcare initiatives, like policies and funding proposals, representing the starting point for each country to begin a digital health journey. Infrastructures are also monitored, reflecting the capacity to create modern and dynamic systems to manage big data coming from healthcare. Implementation is finally studied, representing the ability to transform data into tangible improvements using telehealth, artificial intelligence, new information systems and virtual tools.

These are the aspects to focus on to accelerate digitalization in healthcare and reach digital maturity, which will open opportunities for better population wealth management and lead to improved patient outcomes (World Economic Forum, 2022).

III.1.3 *Success cases in digital health*

A large proportion of the population is approaching telemedicine services to consult with their doctors, therapists, or other healthcare providers. Several digital health firms have thrived in recent years, creating innovative solutions that have transformed the healthcare industry. With the increased demand for virtual healthcare alternatives, especially after the pandemic, digital health startups have gained a well-deserved spotlight. The following boxes present two European startups in digital health that owe their success to the use of new technologies to improve patients' health management.

Box 1 - DocPlanner

Headquartered in Poland, DocPlanner is a later-stage startup, founded in 2012, with the global mission to transform the healthcare experience. The company creates digital applications and software for doctors, clinics, hospitals, and patients to help the health ecosystem and patient journey work together more easily.

With an estimated valuation of 1 billion dollars and total funding of 300 million provided by leading venture capital funds (Dealroom, 2022), DocPlanner is now operative in 25 countries across the globe, with a more established presence in Europe and South America. In the last two years, the

startup has doubled its number of employees to two thousand and now serves almost 70 million patients per month, thanks to an international network of almost 2 million healthcare professionals.

It provides solutions for both patients and clinicians with different sections into a unique integrated platform. Patients can book a free visit online, make use of a live chat even after the visit and leave reviews on doctors. On the other hand, clinicians can exploit the platform's tools to optimize their patients' flow and digitize the processes, to have more time to dedicate to patients, and thus improve health outcomes.

Through SaaS (Software as a Service) technologies the company is changing the way to interact with doctors as well as the way to manage and make decisions about health, resulting in improving quality of life.
To improve their technologies a Brazilian tech company has been acquired that is specialized in management software in the hospital sector. Before this deal, DocPlanner became the owner of one of the largest digital medical service platforms in Europe.

In the next years, more patients will use digital to access health services, as more practitioners will shift their focus to new delivery methods. Therefore, the company's business model has a solid structure: revenues come from subscriptions of doctors for accessing the software, while users can have free access to the platform. Nowadays the company is a market leader in 13 countries and will continue to expand and improve its services to make medical consultation and booking more accessible to everyone.

Box 2 - Kry

Kry is a digital health startup specialising in telemedicine. It was launched in 2014 with the aim of satisfying a primary need of everyone: receive care and assistance as easily as possible. Headquartered in Stockholm, rapidly became a national success, gathering trust from investors and several rounds of funding, reaching a total of €721 million. The company's value is €2 billion to date (Dealroom, 2022). It represents the biggest digital healthcare provider in Europe.

The company mission is to build better and more accessible healthcare. Being completely on the patient's side, they are working to create feelings of empowerment, inclusivity, and safeness in patients, by connecting them to doctors remotely and permitting them to express opinions and insights for improving the overall experience in the platform. Patients nowadays seek quality care and Kry can provide it by keeping certified specialists operative online, speaking different languages, and being present in different situations, from minor acute ailments to chronic conditions.

The startup has changed the way patients and doctors connect, taking advantage of new communication technologies, in addition to AI and machine learning tools, but not putting aside the human aspect of receiving assistance. In fact, if there is a need for a visit in real life the company has also set up specialized medical centres across Sweden.

Having introduced a new way of making visits with telemedicine, growth and consolidation in the national and European healthcare market was a natural consequence for Kry, which is performing a 100% growth rate year over year. The digital provision of health-related services is only at the beginning and it has not reached maturity yet. Original and scalable solutions that aim to solve the inefficiencies of the health system will still have much room for development in the next year, and Kry will be a European leader in this revolution.

III.2 THE POWER OF THE INTERNET IN DIGITAL HEALTH

III.2.1 *Digital health on the patient's side*

The relationship between patients and the way health services are delivered is changing due to the advent of the Internet and new technologies. Citizens' awareness of the care they receive increases. They no longer simply have a passive attitude towards the services provided but are willing to choose on the basis of advice and information they consider reliable. Nowadays, patients own all their health data, they are also free to choose to whom they want to share it and for what reasons.

Thanks to new technologies, patients can constantly monitor their health status and decide what type of treatment to receive, with as much transparency and convenience as possible. A fundamental factor for the increasing implementation of digital health is sufficient digital literacy, to ensure that the digital revolution brings positive outcomes in the healthcare sector and helps reduce differences in healthcare treatments.

From this point of view, it is interesting to consider that there are still substantial differences in the population's ability to use even basic digital tools. These

differences arise mainly due to problems of insufficient competencies, accessibility and connectivity. Some population groups lag far behind others in the use of digital tools, such as inhabitants of rural areas, people with disabilities or an inadequate level of education, and above all, older adults, whose condition will be explored in more detail in the next subsection.

The Internet has strengthened the relationship individuals have with their health status, making it easier to control health information. At the same time, it has created new challenges in terms of accessibility. The success of digital health will come from the ability to create a user-friendly system of online services, overcoming the digital skill gap between people of different ages and from different geographic areas.

III.2.2 *Internet use in older adults*

It is appropriate to analyse the importance of the Internet in the daily lives of Europeans over 65 today and how the usage of this tool has evolved over time. Nowadays, older adults spend more time on the Internet than in the past and they use it for several specific purposes. In this section, the focus is on online activities

for general use. Studying the use of the Internet is a starting point for understanding how much potential exists for the development of digital health,
given that at the centre of every innovative service or product there are users with specific habits, and certain digital competencies, living in different geographic areas and socio-cultural contexts.

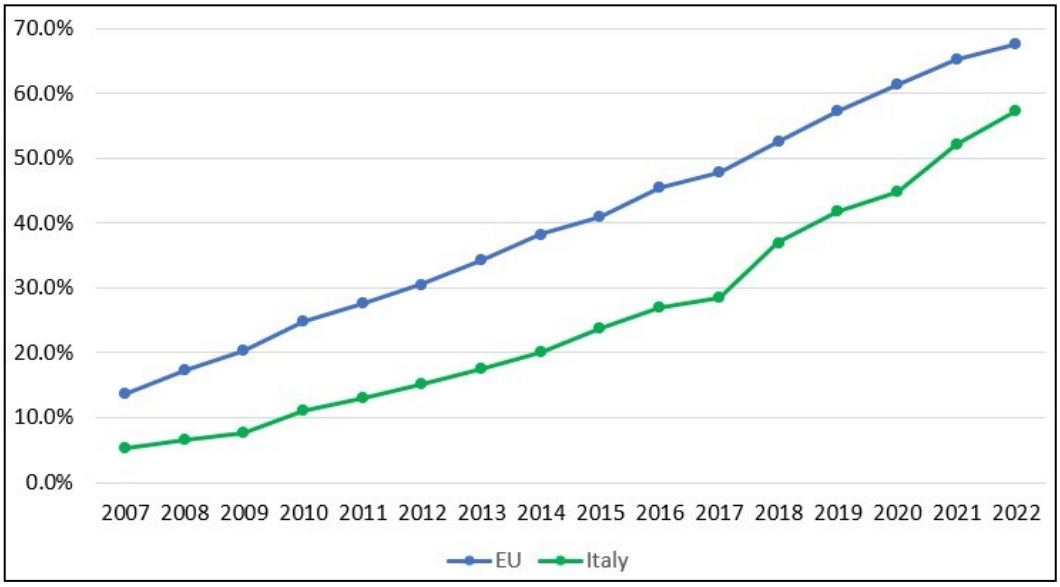
By collecting surveys created by national governments, Eurostat was able to generate estimates of the percentage of individuals in several activities performed online. The results related to the total population are obtained by random sampling from the data gathered in the surveys of each country. The results are also weighted for the variation of the country's population for each year.

The first aspect to study is Internet use by the European population between 65-74 years old. Although the definition of silver also includes individuals over 74 years, the current analysis will consider the 65-74 age range, for which a more complete and comprehensive data set is available, and which represents reliable statistics to consider when studying older adults' behaviour.

European seniors are increasingly using the Internet. Figure III.1 depicts the upward trend over a time span of 15 years, from 2007 to 2022, of the percentage of individuals aged 65-74 who make general use of the Internet at least once a week.

The data refer to the entire EU. Starting from 13.7% in 2007, the percentage increased year by year until 2022, reaching a value five times higher: 68%. Internet use by EU individuals of this age shows a linear positive trend, with an average annual growth rate of 3.6%.

Figure III.1 – Percentage of 65-74 European and Italian individuals using the Internet at least once a week



Source: own elaborations. From Eurostat data (2022)

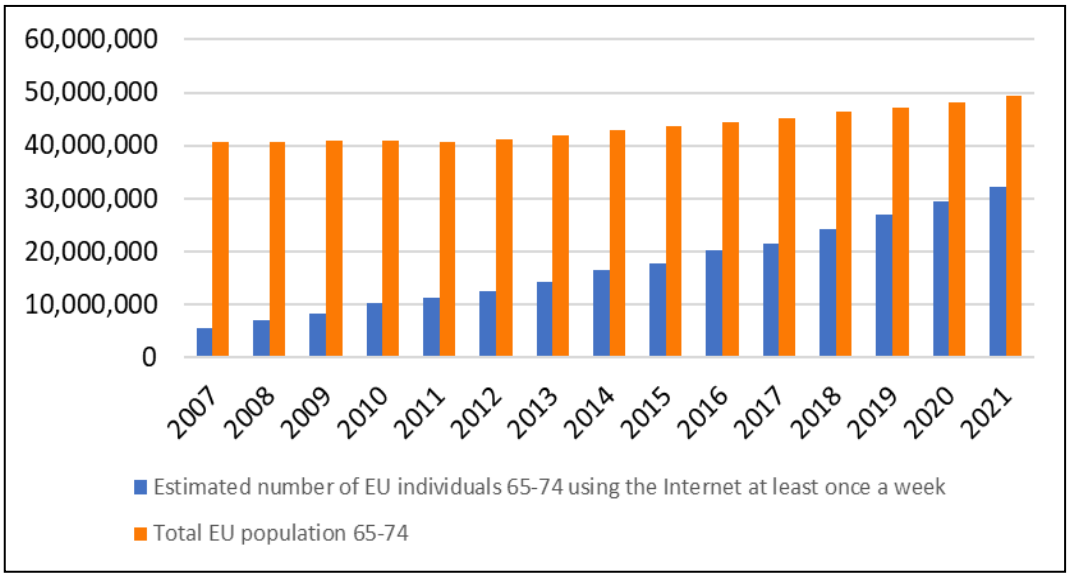
Figure III.1 also represents the Italian situation. Italian percentages (green line) have remained below the European average (blue line) for fifteen years. Although the Italian shares are below the average, they show a positive trend. From 2007 to 2017, the average growth rate was 2.3%. From 2017 until 2022, as can be seen from

the increased slope of the green line in the figure, the average growth more than doubled, with an average annual rate of 5.7%.

In 2007, there were about 6.1 million inhabitants in the selected age group, among them, just over 5% stated to have used the Internet at least once a week: this percentage corresponded to almost 320 thousand people. In 2021 more than half of individuals 65-74 in the country, corresponding to 3.6 million of a total of 6.9 million, declared themselves to be frequent Internet users.

Figure III.2 shows the estimated number of European individuals from 65 to 74 years old using the Internet at least once a week, corresponding to the percentages described above. This data, represented by the blue vertical bars, is compared to the total EU population of the same age, represented by the orange vertical bars. Due to a lack of accurate demographic data for 2022, the series shown stops at 2021. In 2007, European inhabitants 65-74 were 40.6 million, among them, 5.5 million used the Internet frequently. The number of individuals of this age has grown by 8.7 million until 2021. Internet usage has amplified significantly, getting to involve on average more than 32 million seniors in 2021, on a basis of 49.4 million 65-74 EU inhabitants. The years in which the growth of the number of Internet users has been the greatest are 2018 and 2019. In 2018, it is estimated that 24.3 million individuals used the Internet at least once a week, 2.7 million more compared to 2017. In 2019, 27 million did the same, 2.6 million more than in 2018.

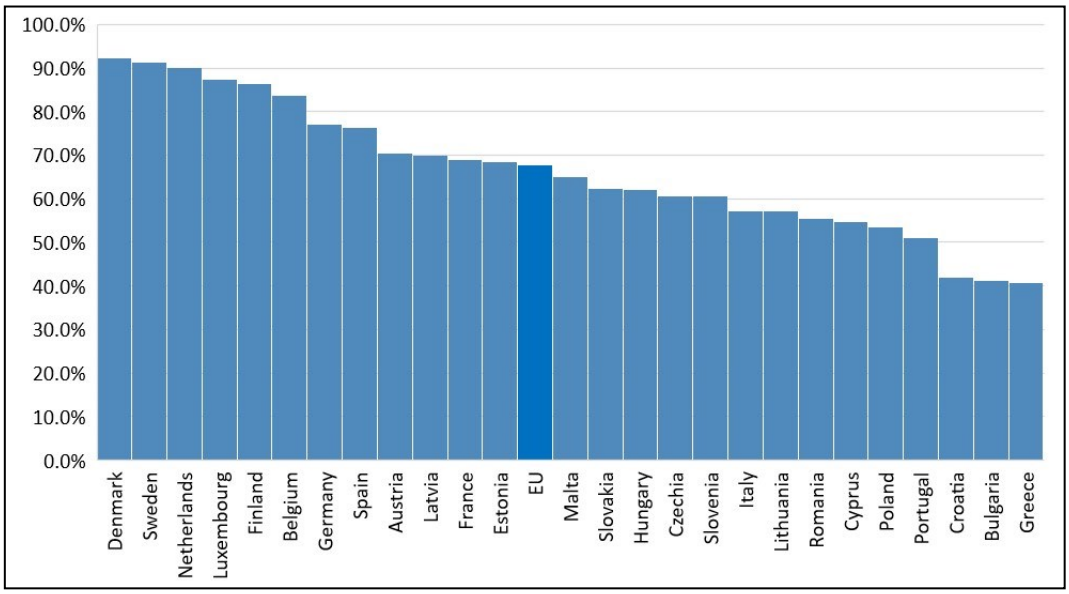
Figure III.2 – Number of EU individuals 65-74 using the Internet at least once a week



Source: own elaborations. From Eurostat data (2022)

In the EU, the differences among countries are surprising. In 2022, the first position in the ranking is occupied by Denmark, where almost the totality of the 65-74 population has been utilising the Internet at least once a week, reaching 92% of the individuals in the selected age group. The following positions are covered by Sweden with 91% and the Netherlands with 90%. In European countries where Internet use for the age 65-74 population is not so common, the percentages are very low compared to the top positions and the EU average of 68%. In Italy, 57% of individuals between 65-74 used the Internet frequently. Greece and Bulgaria with 41%, and Croatia with 42% lag far behind the European average (Figure III.3)

Figure III.3 – Percentage of individuals 65-74 using the Internet at least once a week in 2022



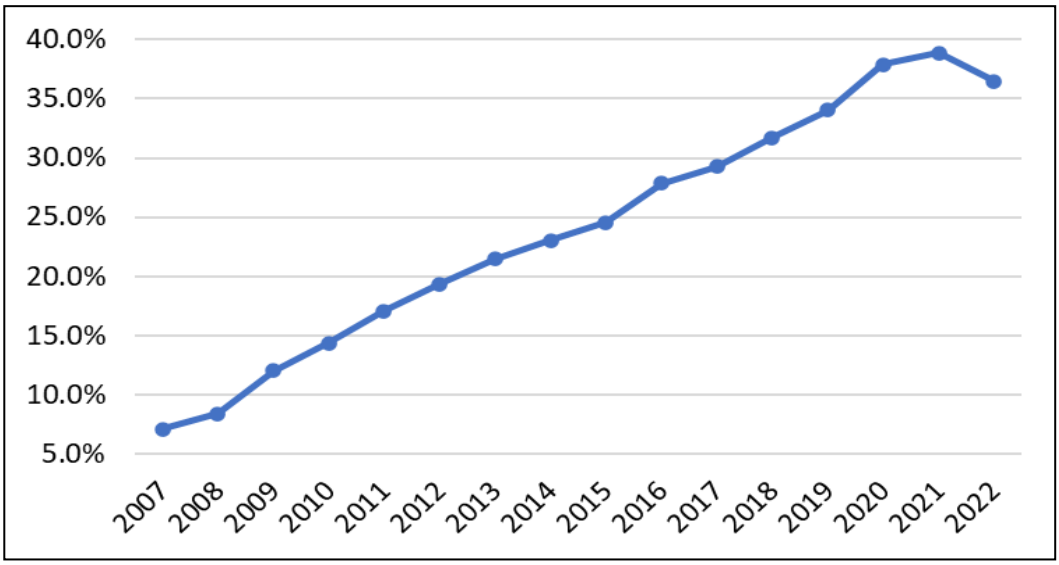
Source: own elaborations. From Eurostat data (2022)

III.2.3 *Internet use for health-related activities in older adults*

The fact that silvers approach more the Internet shows that there are great opportunities for growth in digital services for health-related matters. Seniors' main online activity concerning health management is searching for information online on search engines or in specialized interest groups platforms and government or hospital websites. The Eurostat annual surveys on ICT usage by European individuals provide data over a 15-year time span for this phenomenon, from 2007 to 2022.

The European percentages are shown in Figure III.4 by the blue line. Health-related Internet searches by seniors from 65 to 74 years show an upward trend. In 2007 an estimated 7% of individuals, used the Internet to seek health-related information, concerning injuries, diseases, nutrition, or health improvement. The percentage increased year by year with an average of 2.4 percentage points until reaching a peak of 39% in 2021. An important growth occurred in 2020 when 38% of older adults from 65 to 74 years searched for health-related information on the Internet compared to 34% in 2019. The spread of health-related queries on the web in 2020 is undoubtedly influenced by the pandemic which made it necessary to seek information online, given the restrictions and the quarantine.

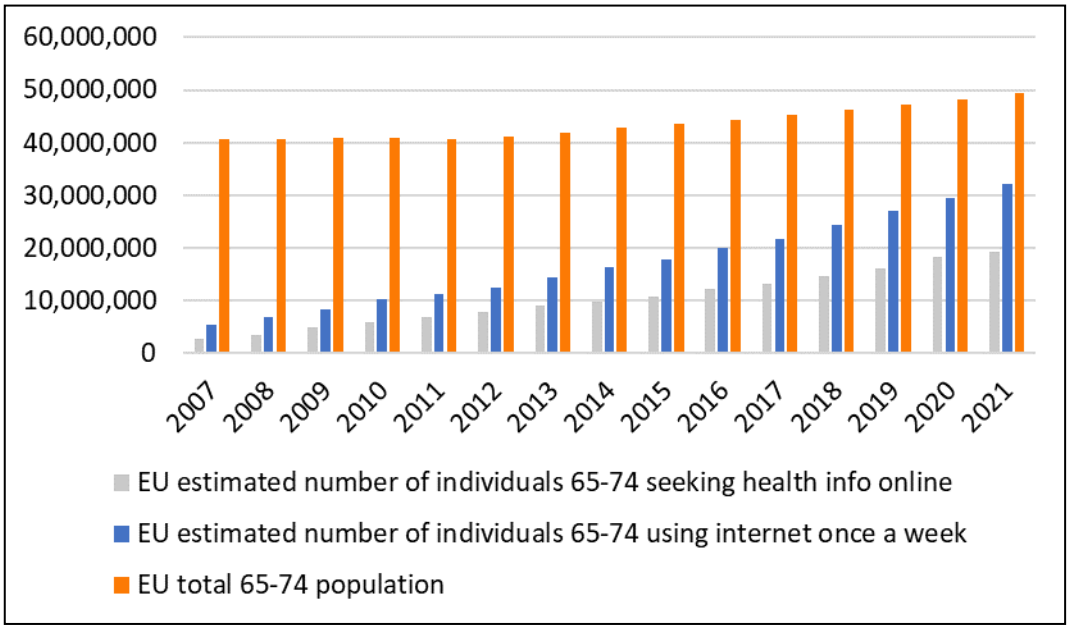
Figure III.4 – Percentage of 65-74 EU individuals seeking online health info



Source: own elaborations. From Eurostat data (2022)

The importance of the phenomenon of the diffusion of health-related Internet research can be better understood by identifying the absolute values corresponding to the percentages described above. Figure III.5 shows the proportion of how many older adults are estimated to have used the Internet frequently, and among them, how many have searched for health-related information.

Figure III.5 – Number of 65-74 EU individuals seeking online health info

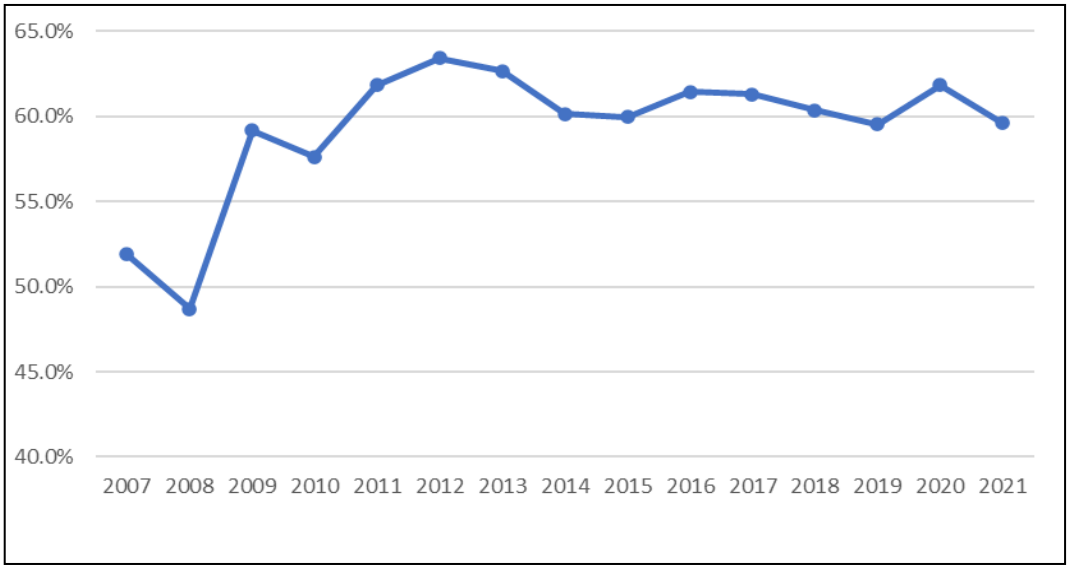


Source: own elaborations. From Eurostat data (2022)

In 2007, out of 41 million seniors in the EU, 5.5 million are estimated to have used the Internet at least once a week, among them, more than half (around 2.8 million), have sought health topics. During the last 15 years, the numbers of frequent Internet users and of health queries have risen faster than the number of people aged 65-74, leading to great diffusion of online health-related queries. In 2020, when there was the fastest acceleration of this type of online activity, out of 29.5 million frequent senior Internet users, 18.2 million (62%) typed requests on health. In 2021 the numbers continue to be consistent.

It is interesting to represent the evolution of the percentages from 2007 to 2021 of European individuals 65-74 who searched for health information online, out of those who use the Internet frequently. As can be seen from Figure III.6 the most important growth (by almost 10 percentage points) occurred between 2008 and 2009. In the last 10 years, among senior Internet users, about 60% each year used this latter to search for health information. With a peak in 2012 at 63% and in 2020 at 62%.

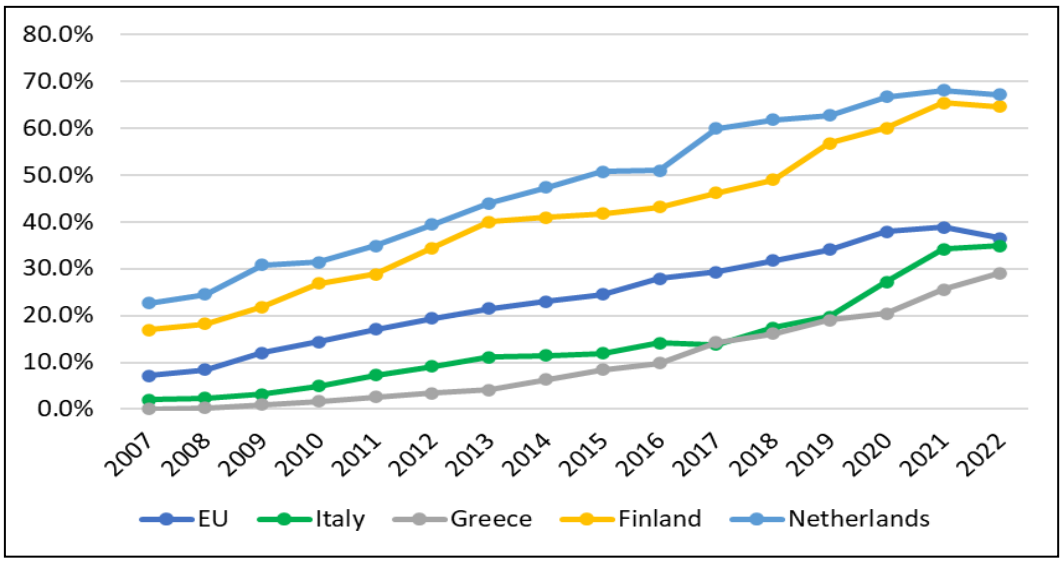
Figure III.6 – Percentage of 65-74 EU individuals seeking online health info out of frequent Internet users



Source: own elaborations. From Eurostat data (2022)

Focusing on differences between countries, there are some that have performed better than others. The choice of countries to be compared is based on specific characteristics that may influence the use of the Internet for health by silvers. The first is the number of seniors: Italy, Greece and Finland are respectively the first, the second and the third country for the highest shares of citizens over 65 in the total population, while the Netherlands is one of the "youngest" countries (Statista, 2022). But at the same time this latter, together with Finland is on the top ten countries with the best healthcare system and the highest level of digital skills among the total population. Greece and Italy hold the last positions for the digital maturity of citizens.

Figure III.7 – Percentage of 65-74 individuals seeking online health info, international comparison



Source: own elaborations. From Eurostat data (2022)

Figure III.7 shows the performances of the selected countries as a percentage of individuals in the age range 65-74 seeking health information online. In the last fifteen years, Dutch and Finnish (light blue and yellow lines) respondents were the ones who are estimated to have searched for more health information online.

It is interesting to point out that the Netherlands, despite having one of the lowest shares of senior people in the EU, has the highest percentages of Internet use for health reasons in the selected age group. This means that Dutch seniors often navigate the Internet and are more interested in finding online information related to their health status than other older Europeans. In 2021, in the Netherlands, 68% of 65-74 older adults (1.3 million) sought online health information, while the EU average was almost 40%.

In Finland, the percentages are also historically above the average. As early as 2007, Finnish seniors were already getting much more information on the Internet than the rest of the EU, the percentage of those who did so was already more than double the European average. The shares in Finland continued to rise during the following years, with the greatest intensity in 2019. A peak occurred in 2021 with 65.4%, equivalent to more than 400 thousand older adults in the country.

On the contrary, Italy and Greece performed below the EU average. Despite being the two countries with the highest shares of silvers, the diffusion of Internet use for health information remained low, demonstrating insufficient digital skills or lower

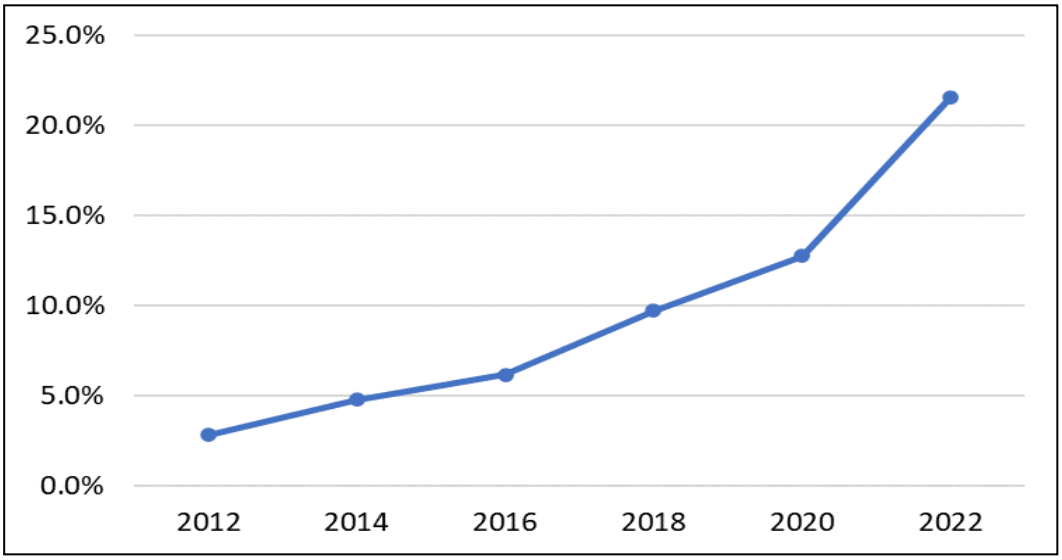
interest in navigating the web for health issues on the part of the 65-74 population. In both these countries, the percentages of older adults searching for health information online did not exceed 20% of the total until 2020, whereas in Finland and the Netherlands, this percentage was already recorded more than ten years earlier.

In Italy, from 2007, the shares have risen by an average of 2.5 percentage points. The maximum value was reached in 2021, with 34%, equalling 6.9 million individuals. The online searches for health in Greek older adults has always been below the European and Italian average, with an important growth of 4.4 points in 2017 the value of 14.3% became close to the Italian ones. Greece is the only selected country that did not experience a decrease in percentages after 2020, in fact, in 2022 it came close to the European average with 29%.

Other types of data are also available concerning online health management by European individuals between 65-74. According to Eurostat data, European silvers are increasingly using online tools to book medical appointments. The information has been collected every two years for the last ten years, from 2012 to 2022. In 2022, an estimated 21.6% of EU citizens in the selected age made use of the Internet to book medical appointments, compared to 2.8% ten years ago. By looking at the blue line in Figure III.8, it is possible to state that the share of older adults making use of the Internet to book appointments with practitioners has been increasing for

ten years. The most significant expansion occurred from 2020 to 2022: in two years, almost 9 percentage points more, from 12.8% to 21.6%.

Figure III.8 – Percentage of 65-74 EU individuals using the Internet to make an appointment with a practitioner

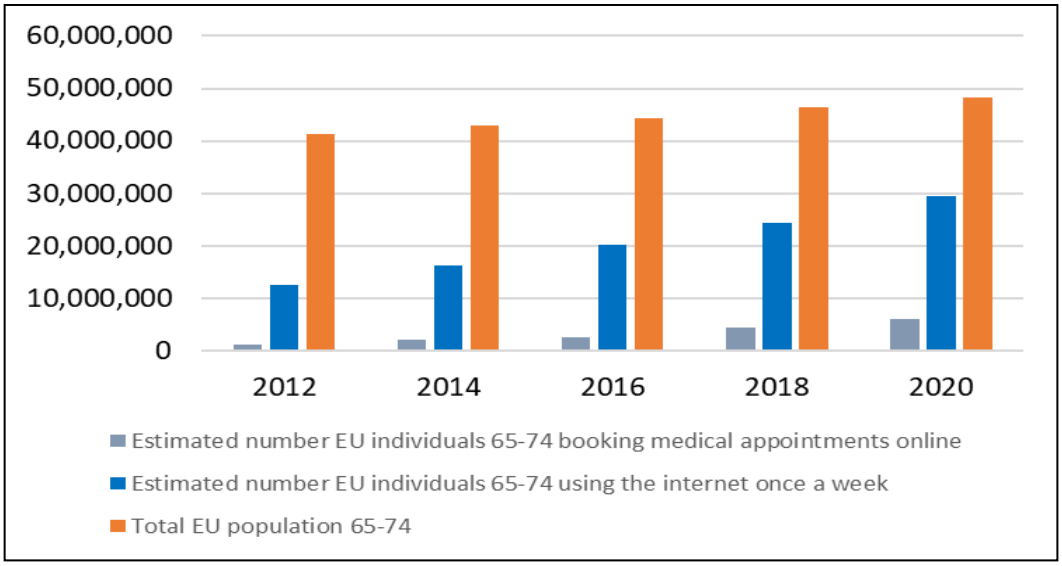


Source: own elaborations. From Eurostat data (2022)

Focusing on absolute values, Figure III.9 shows a comparison of the trend in the number of individuals booking medical appointments online versus the number of frequent Internet users. The number of European older adults performing online medical booking was just over 1 million in 2012, the 2.8% of the total EU population 65-74 of more than 40 million, and the 9.2% of the number of frequent Internet users of 12.5 million individuals. In two years, up to 2014, the value of users booking online almost doubled to 2 million people. The diffusion of online

medical booking accelerated in 2018, involving more than 4.5 million senior Europeans, out of approximately 24.3 million who used the Internet at least once a week. The last data available for this type of trend is referred to 2020: on 48 million older adults, 29 million were frequent Internet users, and among them, around 6 million (21%) performed an online booking to see a practitioner.

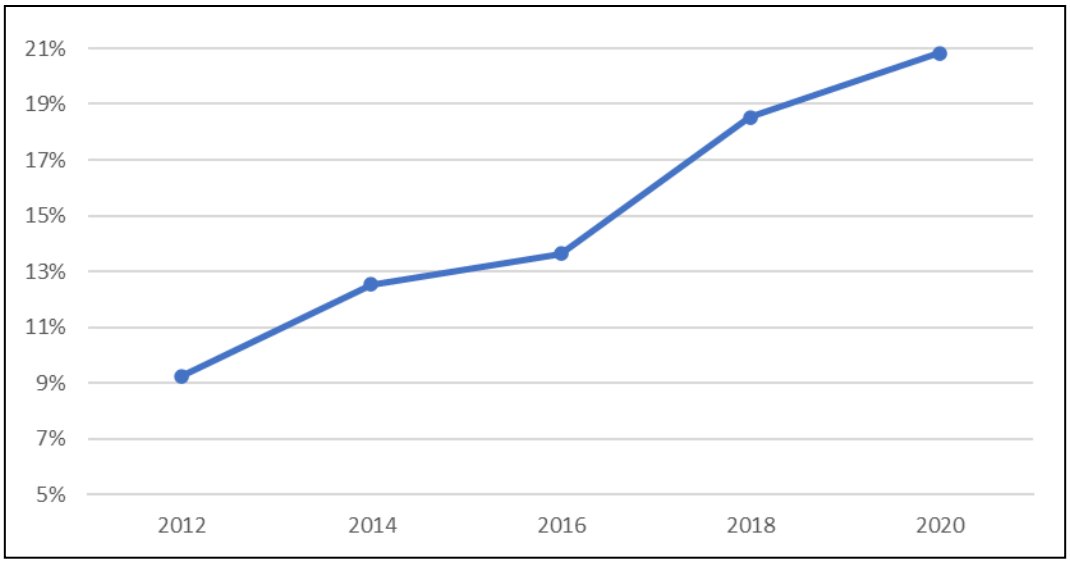
Figure III.9 – Number of 65-74 EU individuals using the Internet to make an appointment with a practitioner



Source: own elaborations. From Eurostat data (2022)

Also in this case it is possible to represent the percentages of those who booked a medical appointment online, among European seniors frequent Internet users. The percentages for this phenomenon show a linear positive trend, rising from 9% in 2012 to 21% in 2020. With an average growth of 3% every two years (Figure III.10)

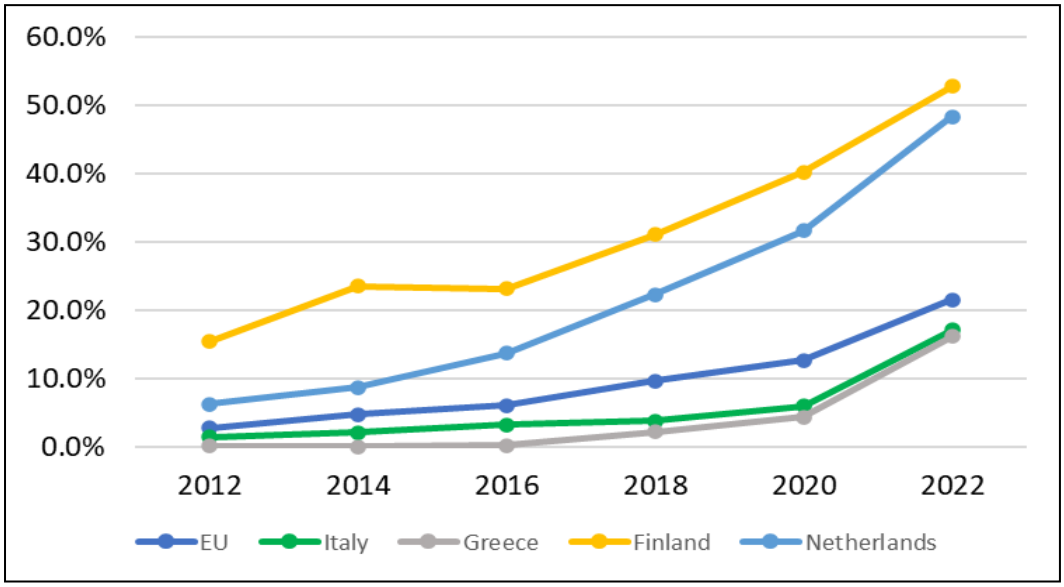
Figure III.10 – Percentage of 65-74 EU individuals booking medical appointments online out of frequent Internet users



Source: own elaborations. From Eurostat data (2022)

Figure III.11 shows the trends of the last ten years in the online booking of medical appointments by seniors 65-74 in Italy, Greece, Finland, and the Netherlands, compared with the trend of European percentages. Finland and the Netherlands (yellow and light blue lines) remain among the best-performing countries also in this area. Older adults in both these countries prove to be more competent in digital skills applied to the health management field.

Figure III.11 – Percentage of 65-74 EU individuals using the Internet to make an appointment with a practitioner, international comparison



Source: own elaborations. From Eurostat data (2022)

In Finland, the shares rise in ten years from 15.5% in 2012 to more than 50% in 2022. After a downturn from 2014 to 2016, the share of Finnish seniors booking online medical appointments grew significantly on average by 10 percentage points every two years.

In the Netherlands the percentages are above the EU average as well, nowadays 48.4% of 65-74 individuals book medical appointments online, compared to 6.3% ten years ago.

The percentages of Italy and Greece (green and grey lines) are below the EU average since 2012. However, several countries registered lower shares of seniors

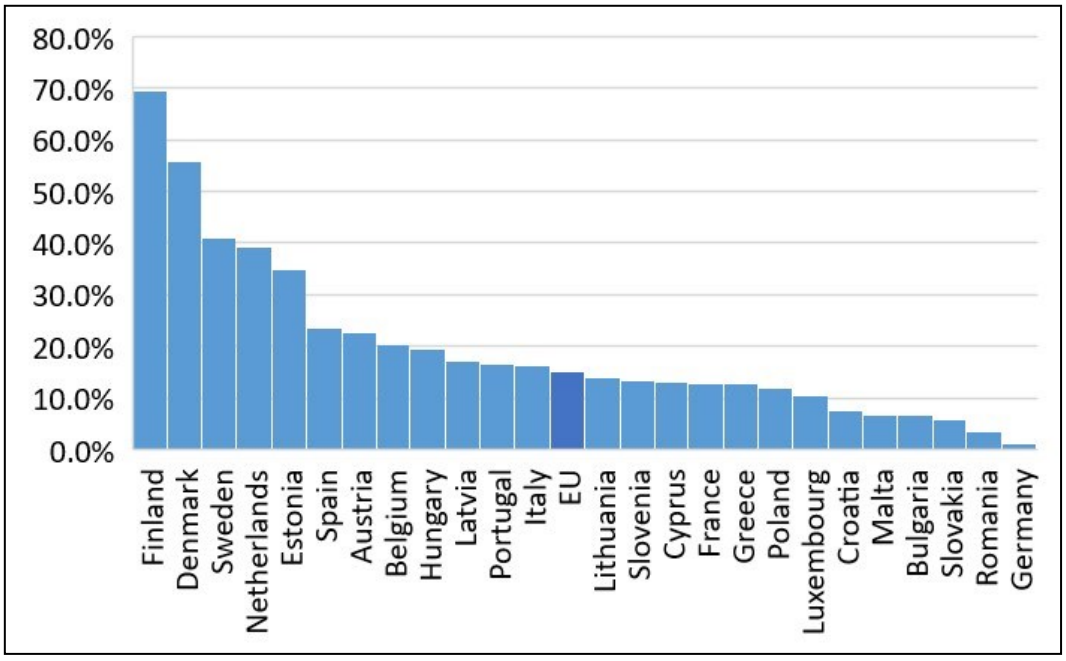
booking visits online, such as Poland, Slovakia, but also Austria and Portugal, among the worst performers (Eurostat, 2022). Until 2018, Italy and Greece performed poorly with percentages below 4% for Italy and below 2% for Greece. Only from 2020, they started to approach European performances: a remarkable growth of 12 points to 16.3% in 2022 for Greece and more than 10 points until reaching 17.2% in 2022 for Italy.

Online medical appointment booking among seniors seems to have a wide scope in the EU, especially in countries with a high rate of old age and with still many older adults not exploiting the Internet for health purposes, such as Greece or Italy, countries where the rapid acceleration of online medical bookings has just begun a few years ago.

As previously described, patients today can analyse their health information by accessing their electronic files. This practice has developed recently so that data have been collected only for the last two years. In the EU, in 2020, 6.9% of the 65-74 inhabitants had access to online personal health records, equal to 3.3 million in a total of 48 million. In two years, the share rose by 8 percentage points, reaching a value of 15%.

Figure III.12 represents the percentages of private access to electronic health records among seniors 65-74 in the EU. Due to a lack of data, it is only possible to identify percentages for 2022. The minimum corresponds to 1% in Germany, and the maximum to 70% in Finland. In 2022, almost 70% of Finnish patients from 65 to 74 years had accessed their electronic health records. The highest shares of the Eurozone are found in Northern Europe, including the Netherlands (39%). Italy exceeds the European average by one percentage point. Greece, with 12.7% is below the average, along with most of the countries from Eastern Europe.

Figure III.12 – Percentage of 65-74 EU individuals accessing personal health records online



Source: own elaborations. From Eurostat data (2022)

At the European level, three phenomena were analysed that are changing the way the health of the older population is managed. The data show positive trends in the use of the Internet as a medium for health information, but also for simplifying relations between doctors and patients.

The spread of technology and web applications has a lot of potential and is also spreading rapidly in the silver group, showing that the problem is not only the digital maturity of the population, which is demonstrating to be ready, especially in recent years, to use new technologies and new forms of digital communication, but especially the development of coordinated solutions in digital systems for health management.

IV. STAKEHOLDERS IN THE SILVER ECONOMY

IV.1 DEVELOPMENT OPPORTUNITIES

In this chapter, the attention is shifted from the socioeconomic perspective of the previous chapters to an approach more related to public policies and to the role of stakeholders in the dissemination of the broad and intersecting concept of the Silver Economy.

The Silver Economy can be defined as an economic system that, like the others, is constituted and regulated by rules, laws, and rights defined by institutions and regulators that shape its functioning. Through dynamics of competition between players and cooperation between internal and external organizations, the structure of this system is shaped.

Some regulatory systems have been deliberated regarding this type of economy. Each of the proposed models includes various assumptions regarding selected areas, problems, entities, tools, and styles of implementing solutions to problems. Moreover, various international and national actors compete in promoting their ideas for the implementation and development of the selected economic system.

Various interpretations as ideas also differ in terms of scope and inclusiveness, for example, linkages to sectoral policies and stakeholders (Klimczuk, 2021).

A great deal of the discussion on the Silver Economy emphasizes regional and local policies. This happens because of the attempts of the EU institutions to revitalize areas being negatively affected by the phenomenon of population ageing. By leveraging local and regional authorities the EU seeks to spread centralized interventions more effectively. On the other side, local and regional governments contributed to disseminating the Silver Economy's concept by aligning strategic operations to fixed middle-term goals at the central levels.

From an EU perspective, proposals for the development of this economic system mainly came from the European Commission, which issued some recommendations for Silver Economy's growth and all the involved sectors in its report in 2018. Regarding the digital revolution in the healthcare sector, the following recommendations have been made:

a) Provide training to caregivers to permit them to work with new technologies for silvers: digital health solutions often represent a barrier for practitioners and patients, however, as seen in the previous chapter, there are suitable preconditions for technology usage in healthcare. To take a step forward in

this field, careers must be trained and helped to shift their approach towards new services. Additionally, healthcare technology companies must be sustained, to create new products and services to provide to health institutions.

b) Support the development of scalable ICT solutions and their applications throughout Europe: helping the creation and diffusion of new technology-integrated products that can exploit new business models and opportunities in the growing silver market in order to reduce costs associated with healthcare operations, with the final aim to increase life quality. Coordination of care through online reliable platforms will be a fundamental action for the development of cross-operational and centralized systems in electronic health.

c) Improve the understanding of data protection and privacy and support open data records without compromising the patient's rights: with new technologies privacy data risks not being safe, and protection measures need to be applied in a coordinated manner by all users of the new digital services and products. Furthermore, updated legislation is fundamental for strengthening processes and the protection of data.

The Commission also introduced development opportunities starting from the promotion of healthy ageing in Europe:

a) Raise awareness of a healthy and active lifestyle for silvers and shift the attention to prevention policies instead of treatment-related ones. The Silver Economy would not exist if the healthy and active ageing conception was not so influential, because with this latter the lifestyle of silvers changes and it must be supported at a central and local level by developing suitable institutional programs and innovation practices.

b) Disseminate initiatives for healthy and active ageing in the EU: currently, initiatives in this field are scarce and scattered in different geographic areas. Knowledge of how to spread ideas and actions on healthy and active ageing must be developed, to create coordinated ecosystems and exploit all the opportunities in this field to generate economic growth.

A portion of European suggestions is concentrated on the issue of silver mobility:

a) promote and support mobility packages adapted to an older population, also exploiting mobile health solutions. At the moment there are barriers to travelling for older adults, in fact, there are specific requests for more supportive transport infrastructure and facilities, especially in the areas where silver tourism is becoming an affirmed market.

b) Support research and development activities for driverless cars and public transport targeted at older adults. Older users' confidence in autonomous driving and new forms of mobility should be increased. Governments should focus their effort on creating new overall transport mobility plans aiming at making the user experience as safe and reliable as possible.

Reforms must also be introduced to ensure that silvers continue to participate in the labour market because they represent a strategic resource given the skills and knowledge acquired during the working years.

a) Firstly, it is necessary to give support to learning institutions for adult education for upskilling or reskilling practices. It's important to maintain the employability of seniors, trying to eliminate institutional constraints related to lifelong learning that would not allow them to participate in work longer. There are different initiatives to support education for older adults at national levels, but more space must be left for practical learning and less for theoretical lessons.

b) Disseminate awareness on successful senior entrepreneurship: older adults are afraid of being self-employed, because they do not consider it a viable option for their career, and they do not have an entrepreneurship-friendly

culture. Governments would disseminate older entrepreneurship by building policies for sharing best practices and study cases on successful senior entrepreneurs, other than by facilitating networking, meetings, and European initiatives in this field.

c) Contribution to the creation of improved workplaces for older workers. It is a key aspect for national regulators to identify factors that might negatively affect seniors' work and act for creating better working conditions and suitable work environments.

According to the EU Commission, another key aspect on which action should be taken is the innovation in products and services targeted to older people to permit them to live in a more autonomous way. The proposals in this field are:

a) Develop standards in products and services that will be understood and followed by all the producers and users. Standardization in smart home devices and in wearable devices will facilitate operations and will permit the creation of domestic common markets specifically focused on silvers.

b) Increase awareness about positive experiences of smart home solutions for seniors. When new products and services are launched into the market, they

need time to acquire consumer trust. In the case of the silver market, this process is more difficult because of the relationship that seniors have with technology. It is, however, worth considering that future generations of older adults are going to be more confident with new technologies and accept them more easily. Keeping into consideration this trend, increasing visibility and credibility of new solutions should be on the radar for local and regional players.

c) Provide funding to finance smart home projects for seniors. Local authorities are recommended to adopt funding schemes for constructions dedicated to the independent living of older adults, which is making room in public opinion and will gain attention in the coming years.

As seen, the development of the Silver Economy does not provide for a unique path. It is therefore appropriate for regulators to understand the different modalities of institutionalising this type of economy. Such modalities may include primarily categorization in geographic countries and regions, in addition to social and cultural diversity, social categories of older adults, diverse networks among public and commercial entities, non-governmental organizations, and informal groups.

European dispositions on the Silver Economy issued by different types of organizations refer to regulatory systems that intersect labour law, commercial law, customs law, and medical law. There are also many links to public policies in the field of health, labour market, trade, innovation, in addition to industrial and regional policies (Klimczuk, 2021).

IV.2 POLICY RECOMMENDATIONS

The interpretation of the Silver Economy, beyond the purely economic aspect usually given to this concept, is evolving at the same time as the policy recommendations that institutional stakeholders are expressing on the subject, even showing heterogeneity in the dispositions concerning this economy, depending on the institutional role they play.

Hence, public policy bodies, as well as older adults, who are proactive towards consolidation of key actions for reaching positive outcomes when dealing with ageing challenges, are encouraged to take part in the construction of the different definitions of the Silver Economy.

IV.2.1 *Policy models*

As previously described, the ageing phenomenon does not only produce demographic effects but also creates outcomes that influence socioeconomic aspects within countries. These latter are fundamental for the consolidation of the Silver Economy.

The premise is that the expansion of this economy necessitates an intensification of policy coordination, collaboration between top-down and bottom-up initiatives, coherence of strategic documents, multilevel governance, development of statistical indicators, integration and reorganization of public services in co-production with citizens, and the development of structures and forms of community-administration dialogue (European Parliament, 2008).

Studies have shown that there are differences in the models provided for developing this type of economy in the various European countries. The description of the models derives from clusterisation depending on the culture and typology of capitalism of countries and the types of welfare states they adopt. Some countries focus on privatizations, for example pension reforms, others in more social policies.

According to Klimczuk in his comparative analysis of the Silver Economy in the EU, by combining business practices and social services in European countries, four

main approaches can be identified: 1) liberal, 2) coordinated, 3) hybridised, and 4) dependent (Klimczuk, 2016).

1) The liberal Silver Economy reflects the presence of liberal welfare regimes in European members. It is characterized by competitive market structures and inter-firm relations. The market equilibrium in this kind of system is achieved through demand and supply and hierarchy. Other main features are direct product competition, complete and formal contracting, freer handling of inputs, shorter contracts for workers with specific skills, full-time employment in cases of general skills, wage bargaining at the firm level.

The liberal system is usually constituted by policies focused on deregulation, antitrust and tax reductions. The policies related to Silver Economy focus on the labour market, on healthcare and on reducing negative attitudes toward ageing. This approach is present in countries like US or UK, where in social security and healthcare there is more individualism; the social benefits depend on income level, and care services are commercialized.

2) When describing a coordinated Silver Economy makes sense to refer to social-democratic and corporative regimes. In these countries the economy is assumed to be based on non-market relations, strategic relationships between firms and economic actors that create market equilibrium, niche production, informal

contracting, monitoring institutions. Equal income distribution and incremental innovation are other two main features of the coordinated Silver Economy, as well as comparative advantage in manufacturing.

Public policies in this system usually encourage firms to develop strategic collaborations. Actors in the coordinated approach promote anti-discrimination and flexible work for seniors, free support for companies applying ageing policies and financial resources for activities aiming at reducing ageing effects on the population demographic. In the coordinated approach, healthcare is provided by public bodies and the state.

3) The third model of the Silver Economy, defined as hybridised, reflects features attributable to the social economy and to the familistic welfare systems. In this model, the Silver Economy is in part connected to opportunities in rural areas like tourism, recreation, leisure, and rehabilitation. Self-organization is the key idea when developing solutions and markets. In the general corporate finance field, there is non-market coordination. Concerning labour relations, liberal arrangements are followed.

The policies in familistic systems focus on providing services, increasing the independence of older adults, and reducing incentives for retirement. Fewer resources are provided for family policies and social caring issues are often not balanced in the relationship government-family.

4) The dependent Silver Economy is the result of welfare systems in transition. It can be recognised in CEE countries. In these countries almost every type of economy is market dependent, meaning that firms are transnational, receive foreign investments, and are controlled by western headquarters.

Generally, transition systems are poorer and the economies are dependent on direct aid from governments. Public policies in the social field give attention to interpersonal solidarity. In addition, public investments are usually focused on granting at least the basic services, for example, the modernization of hospitals, old housing resources, and transport infrastructures.

IV.2.2 *Public stakeholders*

Over the last two decades, the focus of policy responses to ageing has broadened to include a wide range of policy fields. This is how the concept of the Silver Economy started to emerge. Active ageing has drawn attention to the need for governments to reduce the social and healthcare costs generated by older adults. In this regard, the World Health Organization has expressed itself by providing guidelines for governments regarding the dissemination and application of the Active and Healthy Ageing concept.

The framework provided by WHO considers operations in three areas of society: health, participation, and security.

Its position in the health theme is that individuals will enjoy both a longer quantity and quality of life, remain healthy as they age and be able to manage their own lives, and require less expensive medical treatments together with care services if the risk factors (both environmental and behavioural) for chronic diseases and functional decline are kept low, while the protective factors are kept high. In addition, access to health and social services should be granted to those in need, especially to women and men as they age.

In the field of social participation, according to the WHO framework, citizens are expected to continue to contribute positively to society in both paid and unpaid activities as they age, if the labour market, employment, education, health, and social programmes support their full participation in socioeconomic, cultural, and spiritual activities in accordance with their fundamental human rights, capacities, needs, and preferences.

Additionally, according to what is expressed in the third discussion area of security, older adults are guaranteed protection, dignity, and care in the event that they are unable to sustain and protect themselves when laws and programs address their

social, financial, and physical security requirements and rights as they age. The efforts of families and communities to care for their elderly members are encouraged (WHO, 2002).

Since the dissemination of this clear position of the WHO on Active and Healthy Ageing, new areas of discussion have arisen, and this concept has been joined by complementary ones such as technological development, new products and services, promotion of new lifestyles, education, R&D, new job opportunities, gerontechnologies and social innovations.

In the past, population ageing has often been treated only as a 'pensions and care' issue, but there is growing awareness that it is critical for policies related to economic growth, employment, and social cohesion.

Positions on the Silver Economy have been presented in recent years by public institutions as the United Nations Economic Commission for Europe (UNECE), the World Economic Forum (WEF), the G20, and the Organization for Economic Cooperation and Development (OECD).

These public bodies are collaborating with researchers, universities, regional and national governments, and other public institutions to make it clear that, as stated by the OECD '*Attaining the Silver Economy as a pathway for growth is possible, but not inevitable. It requires critical public policy changes to make working later*

in life more attractive as well as new norms that transcend geographies, governments, and industries. For businesses, this will mean that workforce policies will need to support life course adaptation as promoted in the World Economic Forum's Global Agenda Council on Ageing principles for an age-friendly workplace' (OECD, 2014, p. 4).

With the aim of overcoming all the challenges of the Silver Economy, there are common threads in the recommendations of the stakeholders mentioned above.

The first set of actions and improvements concerns the recognition of the potential of older adults. The concepts extrapolated from the policy bodies' recommendations follow in more detail those provided by the WHO in the context of the participation of seniors in society. This goal is explained in the Lisbon Declaration of Ageing: '*Empowering individuals to realize their potential for physical, mental and social well-being throughout their lives and to participate in and contribute to society according to their capacities, needs, and desires'* (UNECE, 2022, p. 4).

Several countries in Europe updated their national strategies dedicated to the ageing phenomenon and started to recognise the potential of older adults as something to be developed and not suppressed. The main action to reach this goal is mainstreaming ageing by creating common mechanisms and frameworks to

develop awareness about the subject, together with the application of new regulatory impact assessments, in order to address seniors' issues and needs across different countries. Afterwards, governments' actions have to achieve a reduction in the feeling of isolation and an increase in the social participation of older adults, as well as pursue financial and economic strategies to be able to use their life experience in different contexts.

It is also fundamental to spread into societies a positive image of silvers, also recognised by other generations, in such a way that they can participate in decision-making processes and be involved in the design and improvement of goods and services, opening opportunities to more accessibility and age-friendly features.

In this regard, the G20 expressed itself as follows: *'Acting against the digital divide and developing new policies involving seniors as a source of innovation and developing age-neutral products and services that offer value to elderly people while also attracting younger customers'* (G20, 2015, p. 2).

Another major discussion arises concerning the position of seniors in the work environments. All operations suggested by policy bodies involve the implementation of favourable situations for the creation of job opportunities for older adults. In this area, WEF recommendations are more comprehensive than other documents.

Policymakers must ensure decent job creation for senior workers, including universal coverage and equity in access to the necessary services. To ensure that there should not be discrimination in the recruitment process, insurance, loans, or refusing medical treatment because of age. There must be equal pay for equal work, otherwise, the life independence of senior workers would be mined. Working institutions should help in finding work within companies, locally, and internationally. Evasion and avoidance of payments must be assessed within social protection systems, as well as income support healthcare and long-term care (WEF, 2016).

UNECE intervenes by delving into different aspects of the work field for seniors. There is evidence that European countries are implementing measures to promote the integration of older workers into the labour market. To make this happen, a life-long learning approach and the development of new skills also need to be disseminated. Governments are also acting against unemployment with mechanisms such as subsidies, supplements, training, and counselling. Another factor to be considered is old-age poverty, a widespread phenomenon that affects social and labour participation.

In addition, a set of measures is focused on making pensions adequate and sustainable in the long term, reflecting a defined common goal: to maintain intergenerational fairness as well as the viability and adequacy of pension systems,

planning and enacting pension reforms that, to the extent that they have not already been done, take into consideration the rising longevity and the expansion of working lives (UNECE, 2022).

The G20 on the topic: '*Promoting inter-generational solidarity through sustainable pension systems and integrating older people in all spheres of social life, allowing them to make a greater contribution to the economic social and cultural development of our societies in line with their experience and potential*' (G20, 2015, p. 1)

A critical area of policy improvement is social protection for silvers. Governments are invited to extend their social protection systems, especially in pensions and health. Adequate benefits in these fields are necessary to grow or at least maintain consumption patterns. Social spending is too low and should be increased to better address issues deriving from ageing and all its negative consequences. International aids are the basis for social protection, particularly in lower income countries Therefore international organizations are suggested to develop programmes to allow sufficient returns of investments into the purchasing power of older adults. (WEF, 2016)

Social protection policies involve human rights, dignity, discrimination, ways of living, long-term care themes and all the correlated sub-themes. In the EU there is

growing awareness of the importance of these features for maintaining well-being while ageing. In particular, the human rights of older adults and their autonomy have drawn more attention, and numerous European members announced policy objectives in these areas that are being implemented in practice. The greatest attention was given to self-determination at the end of life and to reforms in legal guardianships.

Seniors should also be protected from abuse and violence that undermine human dignity. Many of the dignity's recommendations concern the health and social care sector, to make sure that adequate care services are provided professionally or informally, on a physical level and psychologically (UNECE, 2022).

All the mentioned provisions, if implemented, have the common goal of generating growth and jobs in the Silver Economy. Following the G20 Principles on Silver Economy and Active Ageing, the World Economic Forum identified general key actions taking into account all the common threads mentioned above: EU regional and national institutions are encouraged to implement reforms aimed at improving long-term care and health services for senior citizens so that they can help create inclusive economic growth, deriving from acceptable working conditions, flexible work schedules, and responsive business opportunities.

IV.3 BARRIERS TO THE DEVELOPMENT OF THE SILVER ECONOMY

Although there is growing attention towards the Silver Economy and the opportunities arising in this area, there are major dilemmas and limitations that risk hindering its development. Some barriers at a national level can be identified, but also at the international level, because of the presence of common problems to overcome, involving the entire Silver Economy ecosystem.

The first barrier can be found in the fact that there is not a defined and precise target group of individuals involved in the Silver Economy. In other types of economies, the target audience of consumers and users of certain products and services is well-identified, leading to more effective operations, strategies and coordinated actions. The same highly cross-cutting nature of this type of economy, which is often interpreted as a complex feature, but at the same time advantageous, can also represent a negative factor.

For instance, a universal definition of the concept of older age still does not exist. There is confusion in identifying a homogeneous population group of citizens, in terms of age, to be included in this economy. Policymakers have differing theories on what threshold should be considered to define an individual as silver. As described earlier in this work, several interpretations have been provided.

Moreover, the development of an economy dedicated to silvers presupposes that there is sufficient purchasing power at the base. However, the reality demonstrates that social differences exist, even within the same consumer group, showing that purchasing power cannot be taken as granted.

The risk is that the Silver Economy will only satisfy the needs of wealthy older adults. As happens in many areas where novelties are introduced, the first to enjoy them are the individuals who are part of more affluent social systems. In fact, as will be seen later in this section, several factors influence the purchasing power of individuals. Economic power is a factor to be reckoned with because it risks keeping out the mass of people with less disposable income. In the worst case, it would exacerbate already existing social inequalities. Therefore, it will be a key role of the totality of actors in this economy to induce a development path that is as non-discriminatory as possible and based on principles of universality. Furthermore, it has been shown that there are migration trends towards rural regions in retirement and in general in older age. On the other hand, silver products and services are often implemented in urban areas that are richer in services and have better infrastructures. This is another aspect to analyse when considering how to make all the solutions offered accessible to the majority of silver citizens.

In addition, it is of absolute importance to recognise how resources are distributed, what instruments will be chosen, and what mechanisms will permit them to achieve

results. Strategies that are not effectively designed will not mobilise older adults, employers, volunteers, and every other involved community to further promote active ageing initiatives. The risk is that lack of coordination from public, social and commercial bodies can lead to the development of a confused vision of what is necessary for reaching the common goal of improving the quality of life of older adults.

Public interventions must succeed in improving the use of technology, other than creating regional and innovation systems and cooperation networks between economic and scientific actors. Otherwise, the risk is that the concept of Silver Economy will be underestimated and developed companies and organizations focused on this area will be lacking, as well as market information and marketing instruments.

Several limitations can be identified in policy implementation for the Silver Economy. First, a lack of political support leading to the dissemination of ideas, the acquisition of resources and the concentration of human resources. Secondly, insufficient in-depth research into the condition of ageing countries and their demographic problems, social services, housing, health care and the labour market. Thirdly, the financial autonomy of governments: its absence can limit the independence of actions, the choice of instruments and resources to implement the

strategies. Fourth, lack of clarity in the assessment modalities: a detailed assessment of the effects of the implementations could lead to further work to improve the credibility of the government for stakeholders, and existing and potential private sector partners.

An additional influencing factor is the consumption pattern of seniors. Their consumptions derive from their spending capacity. Everyone's income is the sum of spending and savings. The relationships among these three factors change according to life stages. According to the life-cycle model, most individuals tend to accumulate wealth at a younger age and during their working years, increasing their income and their savings. Once they reach retirement age, which often coincides with a later stage of life, the tendency is to withdraw savings to maintain a balanced level of consumption. This condition indicates that silvers potentially have a greater spending capacity to enjoy an ideal composition of goods and services that most suits them because their accumulated wealth is greater than other age groups. The life-cycle hypothesis is confirmed at the European level, in fact, it was registered that net wealth was higher in households where the referent was an individual aged 55 to 74 years (Eurostat, 2020).

Income and wealth are affected by socio-economic characteristics such as age, level of education, occupational status, and geographic area of residence. Taking Italy as

an example, a survey of the Bank of Italy demonstrates how influential are these factors on the economic conditions of households. The two elements to consider are disposable income and net wealth. The disposable income is the cash flow generated by working activities, capital, company shares, or yields. The wealth is the value of movable and immovable assets owned at the time of the survey. Both items are calculated by subtracting taxes and contributions. In 2020 the disposable income of those who had a university degree or higher level of education was on average 79 thousand euros, almost 40 thousand euros more than those who had only a diploma and 50 thousand more than those who had only a middle school license. In addition, the net average wealth was 810 thousand euros for graduates, 354 thousand for those with a diploma, and 194 thousand euros for middle school license owners.

Concerning occupational status, the highest average income and wealth are those of self-employed workers, compared to dependent workers and unemployed individuals. The highest values are 70 thousand euros for average income and 933 thousand euros for average wealth.

The Italian data shows that geographical areas of residence also weigh on wealth and income. The inhabitants of the central-northern area of the country had on average 45 thousand euros of disposable income and 419 thousand euros of net wealth, against 27 thousand euros of average income and 187 thousand euros of net wealth in southern Italy.

In addition, the statistics show how, according to the life-cycle model, from 55 to 64 years there is a peak in average income and wealth values, while from 65 onwards these values decrease, as a result of a higher propensity to consume and a reduction in work activity. In 2020 the average disposable income of individuals aged 55 and over was estimated to be about 48 thousand euros against 46 thousand for those over 45, 40 thousand for those over 35 and 32 thousand up to 34 years.
Also the average net wealth was estimated to be the highest for those over 55, with a value of 502 thousand euros. The over 65 age class shows a lower average disposable income than the other age groups, with a value of 31 thousand euros, while their net wealth is still higher than individuals up to the age of 44 (Banca d'Italia, 2022).

Having clarified the influencing factors, it is important to understand the composition of older adults' income that affect their spending capacity and consumption patterns. It has been studied that, at the European level, about 60% of retired seniors' income is generated by pensions. The remaining part is due to returns on investment from moveable and immovable assets.
The adjustment of the pension system is certainly the most important factor that allows older adults to maintain a decent quality of life. In the EU, almost 25% of the inhabitants receive a pension and this value is similar in Italy, where it generated a public expenditure of 312 billion in 2021. The biggest problem will therefore be

to find solutions that counteract the increase in pensions' weight and on the other hand the decrease in the number of pension contributors. It will be the government's responsibility to act on pension systems to make them more sustainable for an ageing population, so as to maintain the financial security and as consequence, adequate consumption patterns of older adults.

CONCLUDING REMARKS

The ageing phenomenon is having transversal effects on the economic, social and political systems.

This thesis was focused on exploring and understanding which contexts are most affected by it. Starting from the definition of the new Silver Economy, it has been analysed how innovation, new technologies and new forms of entrepreneurship became the development engine for new markets and business opportunities.

Considering that no form of innovation can be disseminated without strategic coordination between stakeholders, it has been shown how these latter own the responsibility to shape the socioeconomic system centred on silvers, through dedicated policies, special projects, and exchange of knowledge and tools.

The study of new trends affecting older adults' everyday life illustrates that they are willing to accept changes related to new technologies as far as these latter contribute to improving their quality of life and well-being. Especially in the healthcare field, which most attracts the attention and the resources of the adult segment of the population, it has been shown that, since the beginning of the century, there is a positive tendency in the use of the Internet and new forms of digital communication. There is great potential for simplifying and making health management operations

more accessible for older adults, who often have limitations and need for constant support.

Despite barriers in the development of the Silver Economy expressed in the last chapter of the work, attempts have been made to present new solutions' disseminating modalities that might help silvers to remain active and healthy, by supporting them socially and financially, without undermining the stability of financial and social systems in the long-run.

This thesis can be considered a contribution to the consolidation of the Silver Economy and the emerging innovation ecosystem surrounding it.
Just as the habits and lifestyles of silvers are constantly changing, so should key players continue to shape their way of innovating as society changes. There will be future developments in the Silver Economy, and the chances to implement them increase by persisting on the right principles and values at the basis of a longer-lived, but more balanced and equal society.

References:

- ACCENTURE (2021) Digital adoption in healthcare: Reaction or revolution?, Experience Survey US findings, Accenture Health and Life Sciences department
- BANCA D'ITALIA (2022) Indagine sui bilanci delle famiglie, Roma, Banca d'Italia Eurosistema
- BEKHOR S.S., REIS A., DOERKSEN D.B., et al. (2022) Is telemedicine the future of global health?, *Trends Telemed E-Health,* Volume 3 – issue 2
- CONFINDUSTRIA (2020) L'economia della terza età: consumi, ricchezza e nuove opportunità per le imprese, Roma, Centro Studi Confindustria
- CENTRO STUDI E RICERCHE ITINERARI PREVIDENZIALI, (2022) Silver Economy, una nuova grande economia, Milano, Osservatorio sulla spesa pubblica e sulle entrate
- DELOITTE (2017) Time to care -Securing a future for the hospital workforce in Europe, London, Deloitte Centre for Health Solutions
- EDMONSTON, B. (2021) Population Ageing in Europe: Demographic Lessons, *The Demographic Crisis in Europe,* Charlotte*,* Information Age Publishing
- EPRC (2006) Regions for all ages: The implications of demographic ageing for regional policies, Glasgow, European Policy Research Centre
- EUROPEAN COMMISSION (2018) The Silver Economy - final report, Brussels, Publication office of the European Union
- EUROPEAN COMMISSION (2021) Promuovere la solidarietà e la responsabilità fra le generazioni*, Libro Verde sull'Invecchiamento Demografico,* Brussels*,* Publication office of the European Union
- EUROPEAN PARLIAMENT (2008) Shrinking Regions: a Paradigm Shift in Demography and Territorial Development, Strasbourg, Publication Office of the European Union
- EUROPEAN PARLIAMENT (2015) The silver economy - Opportunities from ageing, Strasbourg, Publication office of the European Union
- EUROSTAT (2020) Ageing Europe, Luxembourg, Publication office of the European Union
- FORMOSA, M. (2014) Active ageing in the fourth age: The experiences and perspectives of older persons in long-term care, *Geopolitical, Social Security and Freedom Journal,* Volume 2 Issue 1
- G20 (2015) Principles on Silver Economy and Active Ageing, Istanbul, Annex VI
- KLIMCZUK, A. (2011) Strategic Responses on Population Ageing in Regional Policy, *Theory of Management, The Selected Problems for the Development Support of Management Knowledge Base,* Chapter 4*, EDIS*
- KLIMCZUK, A. (2016) Comparative analysis of national and regional models of the silver economy in the European Union, *International Journal of Ageing and Later Life,* 10(2)*,* The Author

- KLIMCZUK, A. (2021) The Silver Economy as a Constructive Response in Public Policy on Aging, *Strategic Approach to Aging Population: Experiences and Challenges,* Strossmayer University of Osijek
- LIKOTHANASSIS S., VOTIS K. (2022) Machine Learning and Big Data in Remote Health Care, *Trends Telemed E-Health*, Volume 3 - Issue 4
- MCKINSEY (2019) Reviving Innovation in Europe, McKinsey Global Institute
- MORRISON, E.E. (2020) Telemedicine/E-health and the Soul of Medical Practice, *Trends Telemed E-Health*, Volume 2 – Issue 2
- OECD (2014) The Silver Economy as a Pathway for Growth, Oxford, University of Oxford Press Office
- POSTE ITALIANE (2020) Silver Economy technology and ageing, Milano, Osservatorio Senior
- ROY, A. (2022) How Digital Startups Are Taking the Lead In Innovation, *Entrepreneur Asia Pacific*, Irvine, Entrepreneur Media Inc.
- RUGGIERO A., FATIGATI T. (2022) Silver Economy & Technology*, Tendenze nuove,* Numero 2, Università di Napoli Federico II
- SHAKARE A.V., SHARMA A.K. (2022) Transforming Perspective in Healthcare with Artificial Intelligence and Robotics, *Trends Telemed E-Health*, Volume 2 – Issue 1
- UNECE (2022) Synthesis Report on the implementation of the Madrid International Plan of Action on Ageing in the ECE region between 2017 and 2022, Geneva, United Nations Economic Commission for Europe
- WEF (2016) The Silver Economy: How 21st-Century Longevity Can Create Markets, Jobs and Drive Economic Growth, Geneva, World Economic Forum
- WEF (2022) How can countries achieve digital maturity in healthcare?, Geneva, World Economic Forum
- WEST J., VANHAVERBEKE W., SALTER A.J., et al. (2014) Open Innovation: The Next Decade, *Research Policy*, Volume 43, Elsevier BV
- WHO (2002) Active Ageing: a policy framework, Geneva, World Health Organization
- WHO (2020) Decade of Healthy Ageing 2020-2030, Geneva, World Health Organization
- WHO (2020) Decade of Healthy Ageing: Baseline report, Geneva, World Health Organization
- WHO (2021) Global strategy on digital health 2020-2025, Geneva, World Health Organization
- ZSARNOCKY, M. (2016) Innovation challenges of the Silver Economy*, Vadyba, Journal of Management,* Vol. 28

Web references:

https://ec.europa.eu/eurostat/cache/digpub/ageing/

https://www.cdc.gov/

https://www.decadeofhealthyageing.org/

http://www.aal-europe.eu/

https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-2020_en

https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/europes-start-up-ecosystem-heating-up-but-still-facing-challenges

https://eit.europa.eu/sites/default/files/03_EIP_on_AHA_EIT_Information_Day.pdf

https://www.docplanner.com/

https://app.dealroom.co/companies/docplanner

https://www.startupbusiness.it/digital-health-docplanner-si-rafforza-nello-scenario-europeo/109923/

https://startupitalia.eu/109044-20190515-miodottore-raccoglie-80-milioni-euro

https://www.economyup.it/life-science/la-startup-polacca-docplanner-raggiunge-46-milioni-di-finanziamenti/

https://www.kry.se/sok-vard-digitalt/

https://app.dealroom.co/companies/kry

https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-2020_en

https://www.who.int/data/gho

https://platform.who.int/data/maternal-newborn-child-adolescent-ageing/ageing-data

https://osservatoriosenior.it/2021/06/nuove-tecnologie-e-nuovi-comportamenti/

https://www.silvereconomynetwork.it/2019/10/21/il-valore-della-silver-economy-in-italia/

https://www.censis.it/sites/default/files/downloads/Sintesi_29ottobre.pdf

https://www.silvereco.org/en/

https://www.statista.com/statistics/1228066/adoption-of-telehealth-services-in-europe/

The impact of demographic change in Europe | European Commission (europa.eu)

https://www.insperity.com/blog/strategic-business-partnerships/

https://www.mckinsey.com/featured-insights/innovation-and-growth/reviving-innovation-in-europe

https://population.un.org/wpp/Publications/Files/WPP2019_

https://ec.europa.eu/eurostat/databrowser/view/ISOC_CI_AC_I__custom_3598493/default/table?lang=en

https://www.unifi.it/art-6082-pnrr-partenariato-guidato-dall-unifi-selezionato-dal-mur.html

https://www.statista.com/statistics/1105835/share-of-elderly-population-in-europe-by-country/#:~:text=In%202021%2C%20Italy%20was%20the,Portugal%20followed%20in%20the%20ranking.

https://www.cbinsights.com/research/report/venture-trends-2022/

https://europeanstartups.co/reports/supercharging-the-european-tech-ecosystem