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Introduction

How to cope with ageing societies is one of the grand challenges pointed out in the Lund Declaration.[1] The rapidly growing share of senior citizens in the population confronts Europe with a double demographic challenge. The ageing population's need for healthcare services increases while the access to workforce in the healthcare services declines.

By 2060 one in three Europeans will be over 65. The ratio between the employed and the unemployed will shift from today's 4:1 to 2:1 by 2060. For the EU, between 2010 and 2060, total government spending on pensions, healthcare, long-term care, unemployment benefits and education will increase by almost 20 per cent (or 4.1 percentage points of GDP), while expenditures for long-term care will double.[2]

These demographic challenges demand social as well as organisational innovations. Use of technology can be increasingly important for the society to be able to offer healthcare services at a quantity and quality that mirrors the expectations of the European population. Our society can choose different strategies for the care services, and for the introduction of new technological tools in this sector. The technology promises new opportunities, but there are challenges to be solved and ethical dilemmas to be considered: How can we best use new technology in care services, what is acceptable, what are the needs of senior citizens, and what type of options are policy makers faced with?

This report presents the results from scenario workshops conducted in 10 European countries that addressed these questions. The workshops were organised as part of an example-project conducted by the PACITA consortium, dealing with the challenges related to ageing societies, technology and innovation. The PACITA project has an overall aim of increasing the capacity for knowledge based policy making in Europe, mainly through the practises of technology assessment (TA). These practises engage

[1] The Lund Declaration, 2009

[2] The 2012 Ageing Report: https://ec.europa.eu/digital-agenda/en/news/2012-ageing-report-economic-and-budgetary-projections-27-eu-member-states-2010-2060.

different kinds of actors in order to produce input and a knowledge base to policy making on topics related to science and technology.

Definitions

There are a number of definitions used to describe technologies that enable senior citizens to live better and more independent lives. The differences in definitions are not only evident between countries, but also within countries, for example between official governmental reports and use by national stakeholders.[3] Concepts like smart house technologies, smart detectors, telecare, telehealth, telemedicine, welfare technology, care technologies, e-health and silver technologies are all used with a similar meaning.

In this report we use "telecare" when we refer to technologies that help senior citizens to be safe and manage their daily life and "telehealth" when we refer to technologies that help patients manage their health.

EU policies on technology in care

The European Union sees great potential in technology for the ageing population and has developed several strategy and policy documents on this issue. In the "Digital Agenda for Europe"[4], the Union looks to ICT's capabilities to support ageing citizens, revolutionise healthcare and provide better public services. Further, the Union estimates that the introduction of ICT and telemedicine alone will improve efficiency in the healthcare services by 20 percent. They also see great potential for industry in the realm of telecare and telehealth. The market is growing, and the Union foresees that the market will continue to grow from 7.6 to 17.6 billion Euros by 2017.[5]

The EU has developed an "Action Plan for ageing well in the information society"[6], which aims at enabling better quality of life for senior citizens, and at the same time saving significant costs in health and social care, while creating a strong industrial basis in Europe for ICT and ageing.

To spark the business-side of ICT and ageing, one of the EU's Innovation partnerships is focused on active and healthy ageing[7]. The overall goal of this innovation partnership is to increase the average healthy lifespan by two years by 2020. To achieve this, it seeks

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[3] Fitzgerald (2014) "Policy status overview". PACITA deliverable 6.3

[4] European Commission "Digital Agenda for Europe. A Europe 2020 Initiative" http://ec.europa.eu/digital-agenda/en/living-online/ehealth-and-ageing

[5] European Commission "Digital Agenda for Europe. A Europe 2020 Initiative", http://ec.europa.eu/digital-agenda/en/ehealth-and-ageing

[6] European Commission (2007) „Ageing will in the in the information society. Action Plan on Information and Communication Technologies and Ageing"

[7] European Innovation Partnership on Active and Healthy Ageing http://ec.europa.eu/research/innovation-union/index_en.cfm?section=active-healthy-ageing

to improve older people's quality of life and to make more efficient care solutions. By bringing together key stakeholders they aim at improving the European research and innovation system and, in this way, bring new and better solutions to the end users. An evaluation of the innovation partnerships from 2014 emphasised the importance of and encouraged the involvement of stakeholders in policy processes. However, it argued that stakeholder involvement could be further improved by including national support groups and make use of even broader, international involvement.[8] This is in line with how the PACITA-project on ageing has conducted stakeholder involvement.

The PACITA project on ageing societies

Re-shaping European healthcare services to fit the demands of the future, involves several social, cultural and ethical dilemmas. Technology assessment is one way of dealing with these dilemmas, and the PACITA project on ageing has aimed at balancing the future demands, technological possibilities and perspectives of the involved actors.

When it comes to the use of technology in the health care sector, there are several groups that could be defined as end users: the seniors themselves, the care personnel and others who work in the health care sector. The same can be said about the role of providers – the technology industry, local health authorities and also the health care personnel are all involved in providing technology to the user. When dealing with such a rich ecosystem of actors, it is important that as many of them as possible are listened to. The PACITA project on ageing therefore focused on stakeholder involvement, in order to take into account the opinions of all these different actors.

A technology overview[9] made by the PACITA project shows that there are currently a variety of devices and technologies used in European healthcare services. While implementation varies from country to country, the range of technologies is increasing as their market potential has been recognized.

The varied use of technology is reflected at the policy level. Although all countries are facing the same challenge, they respond in quite different ways. Analysis of policy documents from the different countries involved in PACITA[10] and reports made by the PACITA partners shows that the use of technology in care already has a lot of attention in some countries (e.g. Norway, Denmark, Ireland and Spain), and is beginning to get recognition in other countries. However, there are large differences in the way the demographic challenge is interpreted and the level of urgency in addressing and implementing such policies.

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[8] European Commission (2014) "Outriders for European Competitiveness. European Innovation Partnerships (EIPs) as a Tool for Systematic Change. Report of the Independent Expert Group.

[9] Meidert and Becker (2013) "Telecare technology in Europe". PACITA deliverable 6.2

[10] Fitzgerald (2014) "Policy status overview". PACITA deliverable 6.3

Stakeholder involvement

There will always be actors that are affected - positively or negatively - by research, technological development and policy decisions. These actors have a stake in the issues, but are not automatically consulted or included in the decision-making process. Stakeholder involvement is one method to make policy decisions more robust and socially acceptable and is a common approach in the field of technology assessment.[11] Stakeholder involvement can also lead to better informed policy decisions and more critical discussions about the topic at hand. A variety of voices will make the discussion open to different kinds of knowledge, more perspectives and dilemmas.

The stakeholder involvement in the PACITA project on ageing was done on both European and national level. In the beginning of the project, a European stakeholder group was gathered for a workshop, identifying important policy issues to guide the project's further work. At a later stage, 340 European stakeholders were involved in national workshops in ten European countries. The stakeholders had a broad background representing the senior citizens themselves, the voluntary sector, the employees in the health and care sector, researchers and the industry, as well as local and national policy makers.[12] Figure 1 illustrates the types and distribution of stakeholders that participated at the national scenario workshops all together.

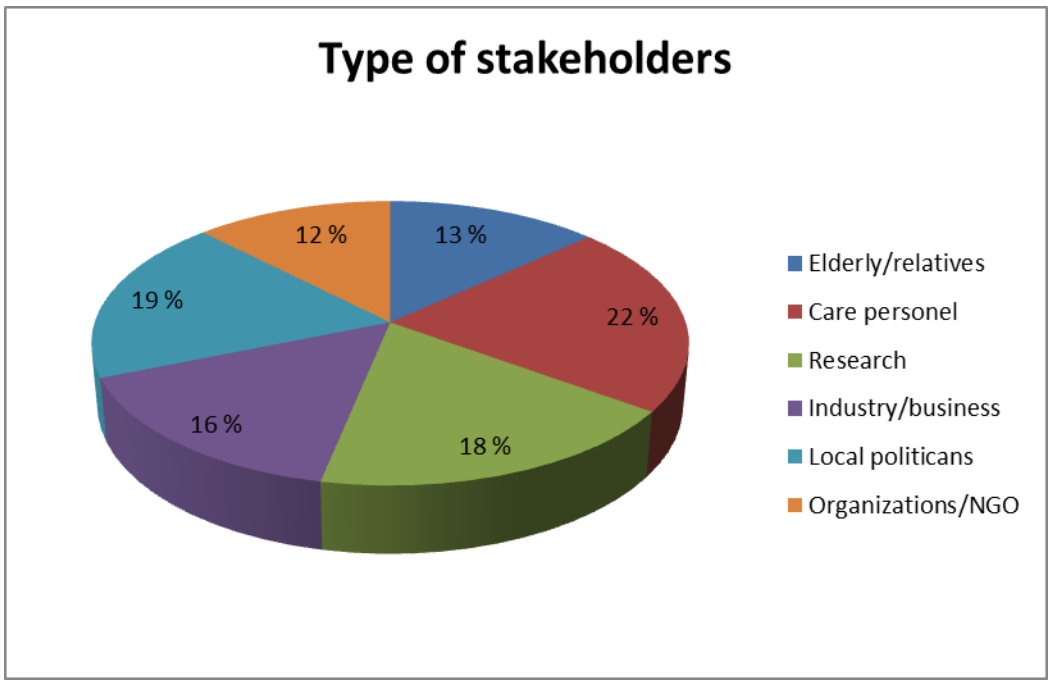

Figure 1: Different types of stakeholders participated in the national scenario workshops

[11] Barland (2013) Scenario workshop method description. PACITA deliverable 6.1

[12] The European Stakeholder group as well as the national stakeholder grups are given in Appendix B.

Scenario workshop

The scenario workshop is a method aimed at facilitating forward-looking discussions and identifying policy options. The method was developed by the Danish Board of Technology, and is now frequently used by several practitioners in the field of technology assessment.

To create awareness of the possible consequences of political choices, the PACITA-project developed three future-oriented scenarios that describe how technology can be used in the elderly care in 2025.[13] They differ with respect to which degree public and private players are providing future elderly care and how the seniors and other groups in the society organise themselves in order to meet their needs for care.

The PACITA scenarios on the future of ageing

"One size fits all" is based on the assumption of lack of labour in the future, and describes a large-scale governmental initiative using technologies to make people more self-reliant. Everyone in need of care is offered a standard "care kit" consisting of different assistive technologies. Seniors are encouraged to live at home as long as possible.

"Freedom of choice" is based on a new political system where incentives for care go directly to the user. This scenario furthermore describes a society where you can buy a great variety of healthcare services and technology from the open market. Everyone in need for care is entitled to incentives and financial support depending on their individual health condition.

"Volunteering community" is based on volunteers as the key resource for the community and each other. This could include the senior citizens themselves, their relatives, organisations, neighbours, school kids etc. The authorities' main responsibility is to mobilise coordination of the volunteers.

At the scenario workshops, the scenarios were used as a starting point to provoke discussions on how one can meet the needs and face the challenges of the rising number of older adults in the European countries. They discussed pros and cons of the scenarios, and potential barriers and solutions in the healthcare system were identified.

The next step of the workshop aimed at producing input to policy makers, based on the participants' own background and real-life experiences. The participants were asked to produce visions for the kind of care services and living environment they want for senior citizens, and policies envisaged achieving these visions.

[13] Lovett (2013): "Scenarios on Ageing Society". PACITA deliverable 6.4

The PACITA project conducted scenario workshops in Austria, Bulgaria, Czech Republic, Denmark, Hungary, Ireland, Norway, Spain, Switzerland and Wallonia (Belgium). Ten national reports summarised and analysed the results of the national scenario workshops held during spring and summer 2014.[14]

Policy options and recommendations

The visions and policy recommendations from the ten national workshops are synthesized in this policy report. Five main policy issues structure the report:

- Support individual needs, self-determination and autonomy
- Provide basic care for everyone
- Participation in society and voluntary work
- Public-private collaboration
- Organisation, regulation and education

The visions and policy recommendations from the national workshops all touched upon these issues, and were considered important when assessing both possibilities and challenges related to the introduction on technology in health and care services for senior citizens in Europe.

When relevant, this report refers to existing projects and best-case examples from around Europe, to show some of the initiatives that have already been made in the healthcare sector. The examples are written in text boxes, and serve mainly as inspiration to policy makers and are thus not part of the recommendations.

[14] All national reports are available on http://pacitaproject.eu

Support individual needs, self-determination and autonomy

Adaption to individual needs will be an important element in providing a functional and acceptable healthcare service in the future. Health authorities should focus on meeting individual needs and at the same time maintain self-determination and autonomy for senior citizens. This entails that health authorities should not only focus on technology, but also on social and organisational innovations in the healthcare service.

In the coming years, and as life expectancy rises, there will be an increasing amount of seniors with complex illnesses. Two out of three people who have reached retirement age will have had at least two chronic conditions[15]. Healthcare services and measures must therefore take into consideration the status of each individual and their specific needs.

Many stakeholders emphasised that the use of technology must be voluntary. Seniors who do not want to use technology should not be forced to do so.

Policy options and recommendations

Enable seniors to live independently and securely at home

Most stakeholders argued that seniors should be able to live securely at home as long as possible. Autonomy and independence are vital values in European societies, and being able to live at home will increase quality of life for many senior citizens. Technology can contribute to make living at home safer, and further adapt living arrangements to individual needs. For patients with chronic diseases, telehealth and self-monitoring of health indicators can increase quality of life. On the other hand, the Austrian stakeholders argued that the introduction of self-measurements could also lead to more concerns.

At the Swiss and Austrian workshops, there were discussions about new forms of living arrangements, for example when one spouse needs more care than the other can provide. New forms of living arrangements can make it possible for a couple to live together, even if one partner requires residential care. Technologies can be linked to the living situation, so that architecture and assistive technologies are more effectively combined – for the benefit of the senior citizen. Housing and living environments should have a flexible design so that they provide generational flexibility and support during the various phases of ageing.

[15] European Union (2012) eHealth Task Force Report: „Redesigning health in Europe for 2020“

At the Danish workshop, the stakeholders argued that welfare technologies must be considered when planning new residential areas, nursing homes etc.

A Swedish research project has developed a robot that resembles a giraffe, with a screen attached to a tall neck. Through this screen, seniors can communicate via video with family, friends or healthcare personnel in an easy way. The giraffe has wheels and its movements can be controlled by the user himself or remotely by family or healthcare personnel. This can be useful should an incident occur. Studies indicate that participants enjoy the experience and families report that the Giraff offer the opportunity to reduce social isolation.

Chronic conditions cause many hospital admissions, both long and short, for senior citizens. Many re-admissions can be avoided by a facilitated monitoring at home, with the help of technology. Some Danish municipalities have been testing a home-kit to monitor chronic obstructive pulmonary disease (COPD) at home. Using the kit, the patients monitor their own vital signs, and report key measurements to the GP (General Practitioner) or nurse regularly. Simple questions are answered through digital communication by the health care personnel. The equipment makes the patient more in control of her disease, and helps medical personnel follow the day-to-day development of symptoms.

Promote informed decisions

Seniors should be able to make informed decisions about care services, technologies and tools. In order to do so, providers of technology, healthcare personnel and/or other actors must provide information and guidance on available solutions, non-technological alternatives and financing, comparative costs of each suggested solution taking the state and insurance systems into account.

All stakeholders mentioned the need for some form of support services and -centres for senior citizens, which are places they can turn to in order to get information and learn how to use care technology. Support services should also be available through home-visits, so that the user can learn to use the technology in the right context and environment.

The Czech stakeholders emphasised that support also should include legal services, so that seniors are aware of their individual rights.

In Norway, "Alma's House" is an example of a furnished apartment that shows how surroundings, facilities, telecare and telehealth can make life easier and safer for people with cognitive impairment or dementia, whether they live in their own homes or in institutions. "Alma's House" is open to visitors, and they can look at and try different solutions, and thereafter make decisions related to technology in their own living arrangements.

Ageing literacy: prepare seniors for ageing well

In most of the workshops it was emphasised that in order for seniors to make informed decisions about their future, they need to prepare for their ageing process, and take early decisions on how and where they want to live, what kind of technology or service they would like to use etc. Several issues are important to discuss while seniors are able

to give full consent. One area of care technology that most stakeholders address as problematic is the use of tracking technology like GPS for people with dementia who are not competent to give consent.

The Czech stakeholders called for a promotion of healthy lifestyles and preventative work through public broadcasting (for example on television) with programs about, for and with seniors.

In Denmark a set of guidelines has been developed by The Ministry of Children, Gender Equality, Integration and Social Affairs. The guidelines address different considerations citizens have to make related to the use of tracking systems for patients with dementia.

Introduce a system for assessing individual needs

Technology and healthcare services should be adapted to individual needs. In order to achieve this, a system for assessing these needs should be introduced. Such a system must be transparent, and the development of the system should involve a broad group of actors, like the seniors themselves, their relatives, NGOs, health care workers, researchers as well as the industry.

The Austrian stakeholders argued that such a system should aim at identifying needs at an early stage, so that preventive measures could be introduced together with appropriate assistive technology.

The Walloon stakeholders suggested that the existing care and service centres can be strengthened by offering senior citizens the possibility to meet with healthcare intermediaries and professionalised social workers who could identify their needs, and advise them on how to choose among available services or technologies.

Provide basic care for everyone

The demographic changes happening all over the world will challenge the goal of providing high quality care services for everyone in need. The European Union points to technology as an important component in solving the resources challenges.

The stakeholders argued that technology should not only be seen as a means to save money, but as a way to create better healthcare services for citizens and could allow care personnel to work smarter. Technology should not replace social contact with healthcare personnel, or substitute tasks that have to be done by people. The introduction into healthcare services must be done in a responsible way.

Policy options and recommendations

Develop long-term strategies that responsibly introduce technology and ensure basic care

All stakeholders agreed that basic healthcare services should be available and affordable for all citizens. It must be the responsibility of the health authorities, either governmental, municipal or regional, to guarantee that all citizens receive high quality care, that urban and rural areas are treated equally, and that the same services are offered to all citizens, regardless of their financial situation.

The Czech stakeholders emphasised that there is a need for legal frameworks that define the minimum standards of social care and healthcare. The Hungarian stakeholders agreed to this, but emphasised that regulations should not be too strict – flexibility would allow local authorities to organise care services in a way that is best suited for their local conditions. The Walloon stakeholders called for a balance between the public sector and the free market interventions, and argued that the private sector should not be given too much leeway, and that the public sector should be given a regulatory role.

In order to deliver healthcare services to the entire population, the Danish stakeholders argued that the long-term strategy should include implementation of high speed broadband all over the country. They suggested that the government should invest a lump sum that initiates a long-term development in infrastructure.

The Spanish workshop introduced the concept of "5P", a set of principles that should guide governmental strategies. The five P's represent Prevention, Participation, Pro-activity, Personalisation and Prediction.

In Norway and Austria, a basic set of technologies, or a "Life Quality Package" was suggested as a way of introducing technology responsibly in care services. The Norwegian stakeholders describe a set of basic assistive technologies that are easily adjusted to individual needs, such as a personal security alarm, products for controlling heat, light and alarm and services for tracking people using GPS. The Austrian

stakeholders' suggestion also involved counselling concerning the use of technology and mapping of the senior's specific needs.

In order to secure a high quality, the Swiss stakeholders discussed the possibility of a registered label for assistive technologies which meet patients' requirements for quality, specific utility and safety.

Create arenas and networks for knowledge exchange

Most stakeholders saw a need to establish arenas and networks for knowledge exchange between stakeholders when implementing technology in healthcare services. These arenas should be established on European, national as well as on regional levels.

The stakeholders pointed to cross-sectorial arenas, such as the stakeholder involvement in the PACITA project, and networks as an important part of developing a sustainable healthcare sector.

The Danish stakeholders suggested a national research centre for telecare and telehealth that would involve a broad spectrum of actors in research and development of new technology. Such a centre could also act as an educational arena, where decision makers, healthcare personnel and users could get training in the use of these technologies.

The Bulgarian stakeholders emphasised that a cooperation between NGOs, public and private institutions should be encouraged, in order to create a broad knowledge base for seniors.

Introduce means for prevention of unacceptable consequences, like loneliness and isolation

When introducing technology in care services, all stakeholders emphasised the importance of being aware of, and actively respond to, unwanted consequences such as loneliness and isolation. Even though technology can replace some tasks previously done by healthcare personnel, it is important to ensure that it does not reduce social contacts between senior citizens and healthcare personnel.

At several workshops, the stakeholders proposed to engage volunteer networks and the local community to interact and socialise with senior citizens. This could contribute to a productive division of tasks between healthcare personnel, and the local community.

Participation in society and voluntary work

The volunteer sector will become an important resource in creating sustainable healthcare services in the future. All the European stakeholders agreed to this, and identified technology as an important tool to coordinate volunteer work.

With scarce societal resources, senior citizens themselves will be an important actor in society, also after retirement age. Participation in society should be encouraged, both inside and outside the care sector.

Online services and social networks can in a dynamic way map the needs and available resources in the community and coordinate volunteer efforts.

Policy options and recommendations

Establish a mentality and culture for volunteering

All stakeholders pointed out that a culture and mentality for volunteer work is crucial, but also missing in most countries.

Training and education is necessary to promote volunteer work and collaboration among seniors. This is believed to be the most important measure to provoke a change of mind-set, together with coordination of volunteer networks and organisations. At several workshops, the stakeholders suggested that actors or networks that already organize volunteer work, such as non-profit organisations, churches or networks in the local community, should engage in knowledge exchange and broadening of their activities.

Volunteer work can be psychologically hard, especially when related to the healthcare sector. How to deal with patients that have serious illnesses should be included in the training of volunteers if there is a probability that they will meet tough situations.

The Hungarian stakeholders suggested that volunteers also should have the opportunity to get psychological support if needed. Volunteers and charity workers can also be the ones offering physical and mental assistance to those in need.

Define tasks and establish trust for participation in care

Health authorities should clearly define the types of tasks that are appropriate to hand over to volunteers, and what should remain the responsibility of dedicated healthcare personnel.

Assurance of liability, reliability and privacy is important when care tasks are distributed among several actors. All stakeholders agreed that the life and wellbeing of seniors must

never depend solely on volunteers. It will be crucial to find the right balance between the work load of the volunteers and the employees in the care service.

Some stakeholders feared that too many tasks were given to volunteers, especially to close relatives of senior citizens. They feared that the close relatives would be overburdened with care work. On the other hand, many stakeholders also addressed concerns for senior citizens who do not have close family or relatives to assist them.

The Walloon stakeholders argued that a coordination of the volunteer practices is needed. If non-professional networks of volunteers bypass the associative sector, there would be a risk that the quality of care may decrease. Therefore, policy initiatives should ensure productive collaboration between networks.

Provide incentives for volunteering

Introducing incentives for establishing and motivating volunteering work is an important factor. However, this does not necessarily have to be monetary incentives. A system for incentives could include an overview of services being offered and received by people and a calculation of credits earned. This could be managed through online services, and organized by existing actors in the field of volunteering.

Many people will start as providers of voluntary work and gradually transfer to be the receivers of such help. This should be reflected in the incentive system. One example could be to include "voluntary credits" for later use, when the need is there.

However, Walloon stakeholders stressed that the system should not be only based on a "give and take" principle. People who are less able to help others, like demented or disabled persons are among those who might especially be in need of much care, and they should not be excluded or blamed even if they have not equally been contributing to the system.

Stakeholders at the Spanish workshop suggested using tax-incentives to promote volunteerism, and stakeholders in Austria suggested that the time used for care and assistance could be credited as time for the pension.

See senior citizens as active contributors in society

Many senior citizens are in good physical condition, and can continue to play an active role in supporting others after their retirement. They should be encouraged to participate in local community, and specifically in taking care of and assisting other seniors, either in part-time jobs, or through the incentive-based volunteering system (as described above).

One proposed way of fostering inclusion and social participation of seniors is to facilitate meaningful work and a social function in their local community. The Walloon stakeholders proposed to give seniors the option of continuing to work if they want to, without losing their pension rights, in order to enable a transfer of skills and knowledge.

The Hungarian stakeholders suggested that recently retired seniors should be offered (part-time) jobs in the care sector, with a modest pay. This would increase resources in the care sector, and make use of qualified manpower in the community.

In Wallonia, the stakeholders also emphasised the societal wide mental shift that is necessary in order for us not to consider seniors as less able by essence (e.g. blaming them because they take much more time than usual to do simple tasks), but rather to praise them for what they are actually able to do. This will ensure human respect for all and self-confidence among elderly people as well as fostering active inclusion of senior citizens in their own choices and actions.

Public-private collaboration

Our ageing populations and the increasing use of technology are seen as drivers of economic growth in most countries. Most stakeholders agreed that there is a need for some means to stimulate the market for healthcare technology nationally and regionally as well as on EU-level, to promote innovation, research and development.

There was a general agreement among the European stakeholders that the collaboration between the public health authorities and the healthcare industry is essential to succeed with development and implementation of technology and adequate services in elderly care. All stakeholders emphasised that the end-users and their needs must be at the centre of any technology development.

Policy options and recommendations

Stimulate service innovation, research and development in telecare and telehealth

Stimulation of the local market was seen as a means to ensure that the needs of the citizens are better taken care of, as well as a business opportunity to become a leader in telecare and telehealth technologies and -services. Some stakeholders, like in Bulgaria, argued that encouraging development of telecare technologies on a national level is important for ensuring the availability of technologies, which suit the needs and preferences of their senior citizens. Others, like Ireland, focused on the opportunities to become an international frontrunner in provisioning of care technology.

Bulgaria and Hungary advocated a need to establish supportive environments for companies willing to invest in research and innovation in this area.

Knowledgeable procurers are necessary to assure support of technology development that suits user needs in the best possible way. At the Norwegian workshop, there was a concern whether the procurers have the right competence to buy as well as to initiate research and development of care technologies and -services.

At the Walloon workshop, the stakeholders stated that distribution of resources for research and development should be shifted from the medical sector (where the focus is today) to the care sector.

In Ireland, the stakeholders argued that the government should incentivise companies to create innovations in this space using initiatives like the R&D tax credit. In addition, companies should be encouraged to apply for funding, such as the Horizon 2020 program to seek opportunities to meet the grand challenge of ageing.

Define infrastructural means and standards

In order to develop and implement telecare- and telehealth services, there should be certain requirements for infrastructure and standards.

To avoid problems with interoperability of solutions from different vendors and to avoid lock-in of a few vendors, requirements for using open standards should be developed at an early stage. European as well as national policymakers should establish guidelines so that appropriate standards exist both for telecare- and telehealth services.

Standards for reliable implementation of healthcare services are also called for by the Norwegian and Swiss stakeholders. A reliable implementation of emergency calls is needed.

> The Norwegian Directorate of Health has recently published recommendations for the transformation to fully digital solutions for the use of telecare solutions. They recommend all municipalities to choose IP (Internet Protocol) as the main communication carrier for telecare solutions. Fixed and mobile Internet are equivalent. Further, they specifically recommended the use of the Swedish standard Scaip and standards according to Continua framework.

Require universal design in all services and products

Ease of use of the services and the involved technologies is crucial for the implementation of telehealth and telecare. Principles for user friendly solutions and universal design are important for making homes and surroundings suitable for people with reduced functionality. This will also be important for less tangible issues like services and software for telecare and telehealth.

Many stakeholders call for the authorities to define requirements for universal design for all telehealth and telecare services and products (e.g., ICT, buildings and assistive tools). Requirements for universal design should also be incorporated in all standards for services and products related to telecare and telehealth.

In Austria, the stakeholders emphasised the importance of high usability (user friendliness) and good haptic of technologies and the need to cover all the person's needs (e.g. if they suffer from cognitive impairments). Additionally they stressed that support and maintenance need to be ensured if technology is used. Furthermore best practices must be made visible (e.g. through word-of-mouth advertising).

Swiss stakeholders require products to be designed in such a way that people are familiar with them before using them (well-known principles of operation). Technology should be acquired when the person is still healthy in order to be at the patient's disposal when faculties are beginning to be lost (e.g. dementia).

Stimulate and ensure user-participation in R&D

There was a general concern from many of the stakeholders that the technology would not meet the users' actual needs. User involvement in research and development of new

technology was seen as reassurance, and several suggestions were put forward to guarantee that the end-users' needs are properly included. There were also several suggestions of a feed-back loop, where the users evaluate and give feedback to producers, also after the technology is implemented. This would give input to further improvements and adjustments.

The Swiss stakeholders proposed that funding for technology development projects should only be granted if user-participation is included.

The Danish stakeholders called for new methods for citizen involvement, and saw the innovation happening among the citizens in their utilisation of new technology as something that should also be addressed.

Organisation, regulation and education

The healthcare sector will experience increasing pressure in the future. The organisation of work must be adapted to this, so that basic care can be guaranteed. This involves rethinking the competence of healthcare personnel, adjusting regulatory and legal frameworks, as well as creating safeguards to avoid corruption and fraud.

Policy options and recommendations

Protect privacy

All stakeholders expressed concerns about privacy. They stated that there must be clear, legal frameworks on how to regulate data collected through the use of technology in the healthcare sector. Although the healthcare sector has strong privacy protection in many countries, as well as on EU-level, the stakeholders argued that many legal frameworks would be challenged by further introduction of technology in healthcare.

There was a broad agreement that the right balance between privacy protection and usefulness of data is crucial. In order to achieve this, health authorities should establish a set of principles and guidelines that protect the privacy of the elderly on storage, usage, sharing and re-use of data. These guidelines should be clearly communicated to citizens, healthcare personnel, volunteers and to the industry and technology developers, and will be of great importance in order to ensure privacy for senior citizens and usefulness of data for the healthcare personnel. Protection of privacy was seen as an area where joint European efforts are important.

The Irish stakeholders argued that a protocol developed to offer guidelines on these procedures needs to be developed, in particular addressing the question of storage and access. Should the data be stored on company servers or should there be a national database where the government takes ownership and stewardship of the data?

Include technology in education and training of healthcare personnel

The education of healthcare personnel must reflect the new reality in care services, and introduce technology as part of educational programs. Personnel already working in the healthcare sector should be offered supplementary training on a regular basis, in order to integrate the use of technology in their everyday work whenever relevant and more productive to do so.

Continuous competence building might increase the status of healthcare workers. This will be important to ensure sufficient recruitment to this profession in the future.

The healthcare sector should also be accentuated as a possible career opportunity for engineers and technology developers.

Open up for new roles in the health sector

In many countries and regions, the introduction of technology in the healthcare sector will create tasks that need new forms of manpower or staffing. Therefore it might be a need for new roles in the healthcare sector.

The Norwegian stakeholders suggested introducing a "digital janitor" in the healthcare services. This janitor would help "clean up" in the diversity of technologies, help to choose the right technology for its purpose, and make sure the technology is maintained properly.

The Walloon and Austrian stakeholders discussed the possibility of a "social assistant" that helps seniors make the right choices based on their specific needs.

In Spain and Wallonia, the stakeholders stressed the importance of user-involvement, not only in technology development, but in the re-organisation of care services. Seniors should be listened to, not only being told what kind of help or assistance they need.

Focus on dialogue and transparency

For most countries and regions, the introduction of technology in the healthcare sector will be a huge change and in some ways a re-arrangement of care services. Therefore it will be important that policy, strategies and implementation is characterised by dialogue and transparency.

In several workshops, for example in Bulgaria, Austria and the Czech Republic, stakeholders expressed concerns about the possibilities of fraud and corruption, when the healthcare sector is more closely connected to the technology market and service providers. Transparency is one suggested way of dealing with this concern, making sure that all information is available to all interested stakeholders.

Concluding remarks

The European Union looks to technology to solve many of the challenges related to the ageing societies. The general results of this TA study show the need for multi-dimensional governance and a new orientation of care in the society, and the involved stakeholders recommend a broader approach than a sole focus on technology. Use of technology can be increasingly important for the society to be able to offer healthcare services at a quantity and quality that mirrors the expectations of the European population, and our societies can choose different strategies for the introduction of new technological tools in and re-organisation of the healthcare services for the future.

The issues raised and the proposed recommendations from the ten national scenario workshops indicate the status of how the participating stakeholders perceive the opportunities, but also emphasize the challenges and ethical dilemmas that have to be carefully considered. The stakeholders agreed on the aspect that technology for care can only serve as support and not as a substitution for professional care. These are important issues that policy makers need to address at regional, national and European level in order to implement technology in the healthcare services in a responsible way.

The discussions at the workshops reflect the organisation and quality of the healthcare services in the respective countries, in combination with political and social culture. Even with this multifaceted picture, there is a consensus that the issues and the recommendations that are highlighted in this report are important and relevant for all the involved countries.

Use of technology is in the plans of most European health authorities. Almost all stakeholders supported this, but emphasized the need to work on a broad level, and also look at the possibilities for social and organisational innovation in the healthcare sector. The five main issues and recommendations to deal with these issues are summarized in the table below.

Issues	Recommendations
Support individual needs, self-determination and autonomy	Enable seniors to live independently and securely at home. Promote informed decisions. Ageing literacy: prepare seniors for ageing well. Introduce a system for assessing individual needs.
Provide basic care for everyone	Develop long-term strategies that responsibly introduce technology and ensure basic care. Create arenas and networks for knowledge exchange. Introduce means for prevention of unacceptable consequences, like loneliness and isolation.
Participation in society and voluntary work	Establish a mentality and culture for volunteering. Define tasks and establish trust for participation in care. Provide incentives for volunteering. See senior citizens as active contributors in society.
Public-private collaboration	Stimulate service innovation, research and development in telecare and telehealth. Define infrastructural means and standards. Require universal design in all services and products. Stimulate and ensure user-participation in R&D.
Organisation, regulation and education	Protect privacy. Include technology in education and training of healthcare personnel. Open up for new roles in the health sector. Focus on dialogue and transparency.

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