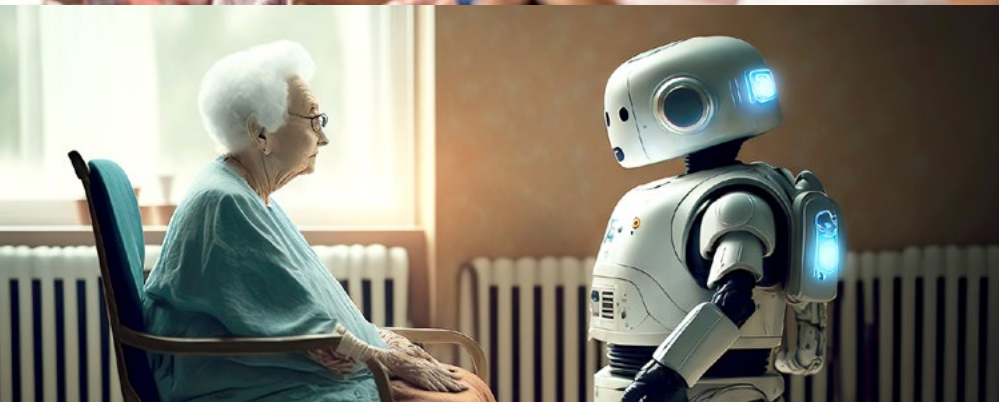


# EMPOWERCARE

EMPOWERing individuals & communities to  
manage their own CARE

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**EMPOWERCARE**

European Regional Development Fund



## Technology Blueprint

On initiatives and technology that  
support enablement at individual  
and community level



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## Literature Overview Ageing population

Globally, the population is ageing, and people are living longer. An ageing population can be defined as 'a growing number and proportion of older people and a growing number and proportion of very old people'. As there is no agreed definition of what an older person's age is, possibilities include 60 and over, 65 and over, or pensionable age.

## Impacts on the individual Physical health aspect

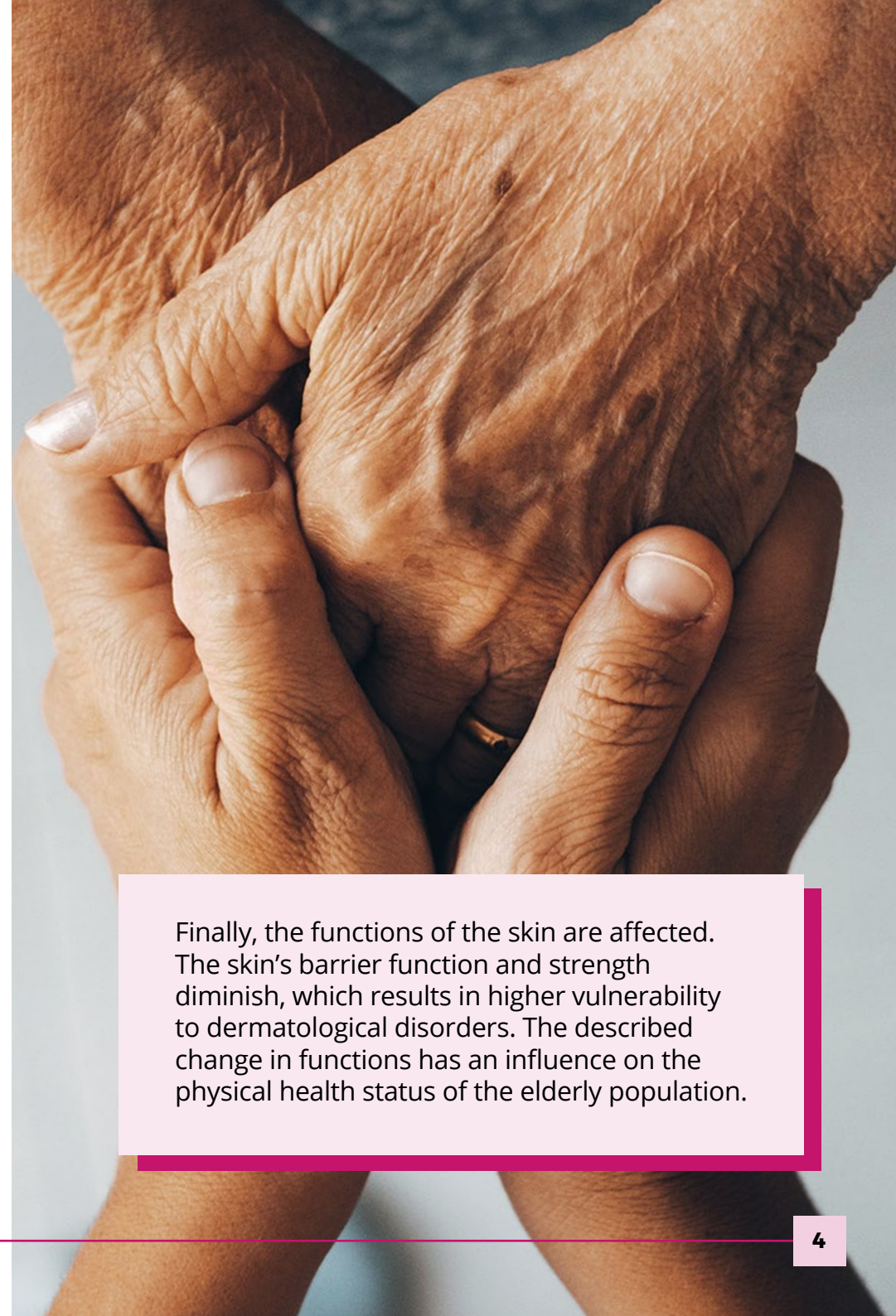
Ageing can be explained by the accumulation of molecular and cellular damage throughout the years. It results in physical health declining, the risk of diseases increasing and ultimately death. The ageing process is different for each individual. This leads to different states of physical and mental functioning in people with the same age: one 70-year-old with good functioning, whereas another needs daily support to meet basic needs. The differences can be explained by ageing being a random process, as well as the significant influence that environmental factors have. As the ageing process is driven by molecular and cellular damage accumulation, physical deterioration is accompanied with a broad spectrum of psychosocial changes in humans.

First, movement functions are affected. Muscle and bone mass decreases, and joints become stiffer and frailer as cartilage erodes. This leads to diminished strength and musculoskeletal function, higher vulnerability to fractures and susceptibility to joint pain and osteoarthritis.

Second, sensory functions diminish with older age. Both vision and hearing declines, which has a significant influence on the life quality as it can induce social isolation and dependency on others, leading to anxiety, depression and cognitive impairments.

Third, cognitive functions change in a subtle and heterogenous way. Memory, speed of information processing and the ability to deal with complex tasks requiring attention switching or dividing decrease, but abilities like maintaining concentration and avoiding distraction seem to remain the same.

Next, immune function, in particular the T-cell activity, declines with age. This leads to lower responses to new infections, also referred to as immunosenescence.



Finally, the functions of the skin are affected. The skin's barrier function and strength diminish, which results in higher vulnerability to dermatological disorders. The described change in functions has an influence on the physical health status of the elderly population.



**The World Health Organisation defines health as 'a state of physical, mental and social well-being.'**



As people grow older, the risk of health conditions increases. The World Health Organisation reports the followings health disorders to have the greatest burden of disability: sensory impairments, back and neck pain, chronic obstructive pulmonary disease, depressive disorders, falls, diabetes, dementia, and osteoarthritis. Moreover, according to The World Health Organisation reports, the following health disorders have the highest burden of mortality in the older population: ischaemic heart disease, stroke, and chronic obstructive pulmonary disease. Multiple chronic disorders can also be present simultaneously, which is referred to as multimorbidity. The World Health Organisation reports that a large systematic review of studies in seven high-income countries, as well as studies in China and Spain, describe that more than half of the elderly population is affected by multimorbidity.

Lastly, other complex health issues can occur that do not categorize under a specific disease, described as geriatric syndromes, which are consequences of several underlying factors and organ systems. In this case, the complaint does not always represent the underlying

pathological disorder. For instance, the complaint of a fall can be a consequence of drug interactions and muscle weakness, and the complaint of acute cognitive decline results from an infection. There is no consensus on which conditions are considered geriatric syndromes, but overall frailty, urinary incontinence, falls, delirium and pressure ulcers are included. Important to mention here, however, is the fact that the mere presence of a condition in the older population does not indicate someone is unhealthy. It is often observed an older person is diagnosed with a single or multiple disorders yet carries on with high functionality and wellbeing. The distinction here needs to be made between health and quality of life.

The World Health Organisation defines health as 'a state of physical, mental and social well-being, not merely the absence of disease and infirmity'. The definition of The World Health Organisation on quality of life is broader compared to the health definition: 'individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.

## Wellbeing aspect

Another important aspect that is influenced by the ageing process is the psychological wellbeing of seniors. Wellbeing is thought to be determined by more than just a person's health state, as self-reported life evaluation improves with age, whereas health usually declines. The factors that have an important impact on the self-reported life evaluation are social and family connections, social roles and activities, and the material situation.

Moreover, quality of life plays an important role in the wellbeing of seniors. When addressing quality of life, empowerment is a crucial concept. To be empowered is 'to have control over the determinant of one's quality of life'. Further, in order to achieve empowerment, individuals need the ability for autonomy, which refers to one's ability for self-governing, so deciding one's own life. A high quality of life, empowerment and autonomy subsequently lead to higher states of wellbeing.

The association between psychological wellbeing and age is not clearly established, as studies show mixed results. In rich, English-speaking countries, a U-shape of life evaluation with age can be observed, which indicates that the elderly report to have the highest life evaluation. An explanation for this might be the socio-emotional selectivity theory. This theory claims that seniors possess more emotional wisdom and thus are careful to select more psychologically pleasing activities, relationships, and experiences, leading to improved wellbeing despite a higher age. However, these U-shaped findings of life evaluation are not replicated in other parts of the world such as the Middle East, countries of the former Soviet Union and sub-Saharan Africa, where self-reported life evaluation seems to decrease with age. This can be due to the countries being in transition after losing the communistic system which gave meaning to seniors' lives and now causes distress. Psychological wellbeing can positively or negatively impact a senior's physical health status.



The negative impact is demonstrated by the increased risk of coronary heart disease, diabetes and disability following depression. However, a possible positive impact is also observed. This relatively new concept states that psychological wellbeing has a protective effect on health and even results in lower mortality and morbidity rates, by reducing the risk of chronic conditions. Even though studies show increasing evidence, there are still issues with on the one hand confounding, as the wellbeing can be coupled with other influences like education level, and on the other hand reverse causality, which implicates that the person reporting poor wellbeing might already be in bad physical health at that moment.

On the contrary, medical conditions are associated with decreased psychological wellbeing. It is described that a diagnosis of diabetes, coronary heart disease, stroke, some cancers and chronic kidney disease increases the risk of a depression diagnosis. The interactions between physical health and psychological wellbeing stress the importance of societies considering both aspects when dealing with a population that is ageing.



The interactions between age, physical health and psychological wellbeing are well described. In the current ageing population, there are two other concepts which have a large impact on the senior's state of health, wellbeing and quality of life: loneliness and social isolation. Loneliness is described as a subjective negative feeling and can be either social loneliness due to lacking a social network or emotional loneliness due to lacking the presence of specific company. The definition of isolation lacks consensus, but many studies describe it as the objective lack of contact with family members, friends, or the wider community. Loneliness and social isolation do not necessarily occur simultaneously. Someone can feel both loneliness and isolation but feeling socially isolated without feeling lonely or feeling lonely without feeling socially isolated are possibilities as well. Loneliness and social isolation, often occurring in older people, have a negative impact on the physical health and psychological wellbeing of the older population. The described impact on physical health includes increased risk of cardiovascular disease and stroke, and the impact on psychological wellbeing is seen as an increased risk of conditions such as dementia, depression and anxiety.

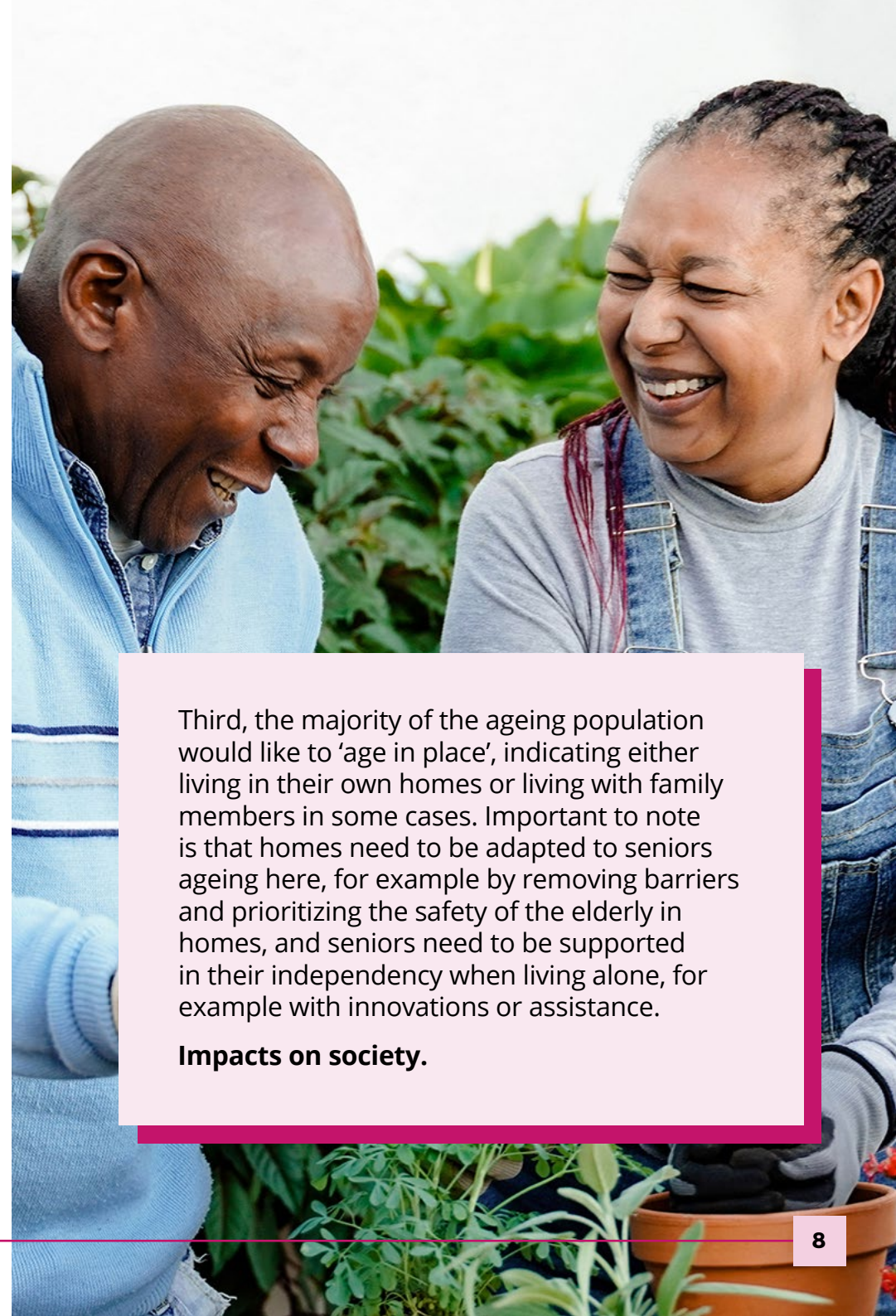
The reason why older people are at risk of social isolation and loneliness includes interacting factors on different levels, namely individual, relationship, community, societal and system level. At the individual level, certain disorders such as cancer, stroke, hearing loss and dementia can increase the risk of social isolation and loneliness.

At the relationship level, important life events that happen to older people, like retirement or losing a loved one, can increase risks of both social isolation and loneliness. At the community and societal level, some examples of factors that can result in loneliness and social isolation include transportation limitations and lacking access to digital technology. Loneliness and isolation are thus important social factors that have severe consequences for seniors' health, wellbeing and quality of life.

## Social aspect

An ageing population brings about social consequences. First, as people grow older, the stereotypes around seniors grow along. They are portrayed as the rich, egocentric, uncaring and dependent part of society. Especially in the healthcare and occupational department the negative stereotypes are observed as age discrimination. However, stereotypes have serious implications. It has been described how negative stereotypes can lead to people believing them and starting to behave accordingly, while their self-image, confidence and abilities are affected. More specifically, it has been demonstrated that older people exposed to negative stereotypes have memory issues, lower self-efficacy, and a reduced will to live. Moreover, negative stereotypes induce an increased cardiovascular response to stress, while positive stereotypes have protective effects. Stereotypes are thus an important determinant of physical and emotional health in older people.

Second, family members, mostly spouses and children, are crucial in contributing to care of older people. Especially in developing countries, families are an important category of caregivers. In the Western world, the dependency on family has declined, as governments have introduced social initiatives that financially help seniors. The family members care for the senior, but older people also have a described important role in caring for younger members of the family. Moreover, there is a possible role for older adults supporting other older adults in the form of peer-to-peer support. However, research by Jacobs et al. did not prove the effectiveness of this concept, indicating it needs further investigation.



Third, the majority of the ageing population would like to 'age in place', indicating either living in their own homes or living with family members in some cases. Important to note is that homes need to be adapted to seniors ageing here, for example by removing barriers and prioritizing the safety of the elderly in homes, and seniors need to be supported in their independency when living alone, for example with innovations or assistance.

### **Impacts on society.**





“

**The trend of an ageing population started in high-income countries, with 30% of Japan's population already aged 60 years or older.**

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## Demographic aspect

It has become the standard for most people to live even beyond the age of 60, with The World Health Organisation reporting the world's population aged 60 to rise from 900 million in 2015 up to 2 billion in 2050 (4). The Organisation for Economic Co-operation and Development reported that in 2020, the percentage of the total population that consisted of the elderly population, here defined as people aged 65 and over, was respectively 19.26, 20.56, 19.64 and 18.65 for Belgium, France, the Netherlands and the United Kingdom. For all 27 countries of the European Union taken together, 20.69 % of the population consisted of people aged 65 and over.

The trend of an ageing population started in high-income countries, with 30% of Japan's population already aged 60 years or older but is now also occurring in low- and middle-income countries, indicating for example China will experience similar changes in demography as Japan.

Many factors contribute to populations ageing rapidly. As the ageing trend is so recent, genetics alone are not sufficient to explain this trend. This can be observed in the so-called blue zones, places where people live longer and healthier than in other regions of the world. The places include Okinawa in Japan, part of Sardinia in Italy, Ikaria in Greece, Nicoya in Costa Rica and Loma Linda in the United States. As the populations do not have distinct genetics compared with the rest of the world, environment and lifestyle are essential. Environmental factors include improved quality of food, water, hygiene, housing, and lifestyle. In the medical field, increased immunisation against infectious disease, antibiotics and improved medical care have played a crucial role. Specifically for the blue zones, observed postnatal factors that play an important role in the life expectancy of these populations enclose diet, education, and physical activity, but early life factors and parental health are crucial factors as well.

## Impacts on healthcare system

The ageing population puts pressure on healthcare systems. More people grow older, but they are not necessarily healthier for longer, which results in more older people who need healthcare and not enough younger people that can provide the care. Seniors who live longer often suffer from chronic illnesses, increasing the needed healthcare and associated expenditures.

More recently, the COVID-19 pandemic has put an overall pressure on healthcare, like care unrelated to the virus. For example, it has decreased the number of breast cancer screening and increased the waiting list days for a hip replacement. Moreover, the pandemic is accompanied with a steep increase of healthcare expenditures in Organisation for Economic Co-operation and Development countries. Additionally, the pandemic highly underscores the issue of shortage of workforce, a challenge that was already known before. Formal care providers are exposed to job-related injuries such as back problems due to helping the elderly move around and carry the emotional weight of their intense jobs. On the other hand, informal caregivers struggle with mental health issues and often experience financial difficulties because of the high demand of caregiving. Reasons for this indicate that the informal carers often did not receive the appropriate training, are emotionally involved in the care process with the senior and lack infrastructure that could assist the care they are providing.

The ageing populations' mentality towards the care they want to receive has shifted. As mentioned before, more seniors prefer to age in place, defined by the 'ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level. However, when seniors cannot age in place anymore, another option is institutional care such as hospitals and residential care centres where care can be provided at any time. Most of the time, moving to a residential care institution is not a choice but a necessity, as the senior can no longer live independently.

It requires great effort to adapt to a new environment at a later age, which is why it is often described as a stressful and challenging event. In some cases, it even brings feelings of shame on both seniors and family members when the senior moves to a residential care centre. Ideally, residential care respects human values and allows as much as possible for the residents to live their life the way they did before. The quality of life should be ensured. However, in some residential care facilities, caregivers do not engage closely with seniors, often letting them wait for assistance, which does not contribute to a positive experience for the elderly. A residential care centre is thus a complex form of care. It allows for seniors who cannot live independently anymore to get continuous assistance, but as the seniors permanently live in this partly public facility, it is important that they feel at home. This can be facilitated by making the physical environment resemble their previous homes more and to grant seniors their privacy in their own space.

The current way of providing healthcare can be described as fragmented and episodic. Contrary to these systems, integrated care has gained interest. Integrated care, also referred to as coordinated or seamless care, pursues a better patient care experience by integrating and coordinating the care services that are provided. The patient is put at the centre, and multidisciplinary collaboration ensures that the care provided is constant throughout life and that the best possible care outcomes are obtained.

The challenges associated with current healthcare systems are thus gaining interest, leading to the systems evolving towards more sustainable, people-centred approaches. However, as some of these approaches are still relatively young, they need to be investigated more extensively to fully understand the advantages. Overall, the current organisation of the healthcare system is not sufficiently adapted to deal with the ageing population, indicating that more efforts are needed to deal with this urging issue.

## Technology for an ageing population Current situation / Technology aspect

The described challenges associated with the ageing population underscore that the present situation is not adapted to the care needs of the growing number of seniors and that the healthcare system is under pressure. It has therefore been suggested that technology might play a significant role in providing sufficient care, increasing the health status, improving autonomy to facilitate ageing in place and reducing the soaring healthcare costs.

Three main categories of technology are dominating in the healthcare sector: Information and Communication Technologies, Assistive Technologies and Human-Computer Interaction technologies.

Information and Communication Technologies, as the name indicates, are technologies that facilitate communicating and informing. The technologies include options of (video) calling, use of internet and online services informing on health-related topics, such as medical records.

Assistive Technologies are designed to facilitate ageing in place, as they aim to increase the autonomy and safety. Technologies include tools that monitor behaviour, for example sensors detecting when someone is moving around.

Human-Computer Interaction technologies go further, creating interactions between robots and humans that can aid seniors struggling with mobility or cognitive functions, as robots can take on assistive roles here.

The technologies can bring along advantages for safely ageing in place, mobility issues and rehabilitation, as well as facilitating communication. Additionally, technologies can counteract the challenges carers face and instead support them, reducing the costs for care, as well as the need for trained workforce. An example of technology that could assist caregivers includes

patient-monitoring technologies, which are wearable devices and videocalls that unburden the caregiver, as they do not need to be physically present to gather information on the mental or physical state of the patient. Moreover, it reduces the loneliness and social isolation which the ageing population often deals with. Another example of technology unburdening the caregivers includes relational agents, which are also referred to as carebots, robot caregivers or social robots. They mentally support the senior and perform physical care tasks, which significantly reduces the burden on carers who often suffer from mental and physical discomfort during their job. Important is, however, that assistive healthcare technologies are reimbursed, as the technologies can lower overall costs, increase the standard of care, and prevent or improve certain health impairments. It is thus important to create a service delivery system that will ensure accessible, available, safe, and effective assistive technology. However, as the role of technology in senior healthcare is gaining importance, the ethical debate on the technology use has opened.

Research describes the ethical issues that need to be addressed relating to the use of technology in elderly care support. Sundgren et al. found 'the need to balance between the benefits of using technology and the basic right of older people' and 'technology as a risk of insecurity for older people. Felber et al. report how robotic assistance in elderly care raises ethical concerns and suggest a concept of social dignity to oversee these issues. Current technologies in healthcare are described as 'cold' and 'smart', instead of 'warm' and 'caring. MedTech Europe, the European trade association representing the medical technology industry, put forward six key principles for efficient and sustainable funding and reimbursement of medical technologies. As the principles concern funding and reimbursement, they are aimed towards technology developers and manufacturers.

The principles concern transparency, predictability & consistency, stakeholder involvement, access to care, supporting & rewarding innovation, and seamless care. The end-user is thus not centralised in this model, and the use of warm and caring technologies is not encouraged. This initiative illustrates the use of smart technologies in healthcare instead of caring technologies. Within the European Union, medical technologies follow strict regulations to get the CE mark, which indicates that the product complies with the applicable rules within the European Economic Area. In Flanders, Belgium the project mHealth establishes standards and principles in relation to the implementation and procurement of mobile health apps. The aim is for apps to have the highest quality and safety. This indicates that the current use of technology in healthcare is regulated, albeit that the regulations focus on the quality and evidence-based aspect of technology (i.e., the regulations are meant to verify whether the claimed health effects of the use of technologies are supported by sufficient scientific evidence), and do not provide any guidance on designing the technologies in such a way that the end-users' care needs are given a central space.

Aside from the current regulations, there are 'soft law' initiatives that address the ethical issues associated with technology use in healthcare. Beauchamp and Childress' model of four principles for biomedical ethics, including respect for autonomy, beneficence and non-maleficence for the patient, and justice for patients to be treated similarly in similar positions, already focused on the patient, however it is not specific for technology use. However more recently, in 2022, the French Presidency of the European Union announced 16 European Ethical Principles for Digital Health, divided into four blocks. The principles clearly focus on end-users, as the first three blocks concern: placing digital health within a framework of humanist values, enabling people to manage their own health data digitally, and developing inclusive digital health. The principles do not concern security and interoperability aspects, however.





The aim of the ethical principles is to have a framework for the future European regulation on the European Health Data Space. Moreover, not all initiatives centralise the end-user, such as the six key principles of MedTech Europe. The guiding principles orienting the global strategy 2020-2025 towards the appropriate and sustainable adoption of digital health technologies that The World Health Organisation puts forward have a broad scope as national health strategies, nonetheless, the third principle indicates that the global strategy promotes the protection of people, populations, health care professionals and systems against misinformation and the misuse of information, and inappropriate use of health data, among others. The guiding principles in this initiative were developed as part of the global strategy and are thus high-level principles. Initiatives on healthcare technologies thus pay attention to end-users, but not all initiatives mention it as straightforwardly. Contrary to these initiatives, the Welfare, Public Health and Family Support Centre in Belgium has put forward an ethical framework for the evaluation of technological health innovations that encompasses different ethical issues, such as e.g. human rights, dignity, data collection and transparency. Besides this initiative, there is no current other initiative to our knowledge that combines the human-centred approach with other aspects, such as quality assurance, governance and implementing responsible innovations. Lastly, the initiatives, such as the European Ethical Principles for Digital Health, are not incorporated in regulations. Therefore, they are not taken into consideration when a technology gets the CE mark or gets reimbursed.



## Future role caring technology.

Current guidance on technology development and regulations falls short on combining a broad range of ethical aspects, such as the importance of designing and implementing technologies that centralise humans, ensuring their empowerment and autonomy, assuring quality and implementing a responsible innovation. The technologies do not consider the complex interactions between the technology itself and the end-user with regards to empowerment in a social environment, assuring quality and including the ethical framework.

Technology can be extremely relevant in providing care for an ageing population, however on the condition that it is human-centred and not focused on increasing efficiency and reducing costs in the organisation it is implemented in. For example, when cameras are used in residential care centres simply to substitute the human workforce, the technology can meet with resistance. The use of the technology is only well-grounded and a clear added value for the health and wellbeing of the ageing population when the camera is installed and actively supported by seniors because they understand that it is in their best interest, thus creating a safer environment for them. Different terms are used to describe these two opposing types of technology development and implementation.

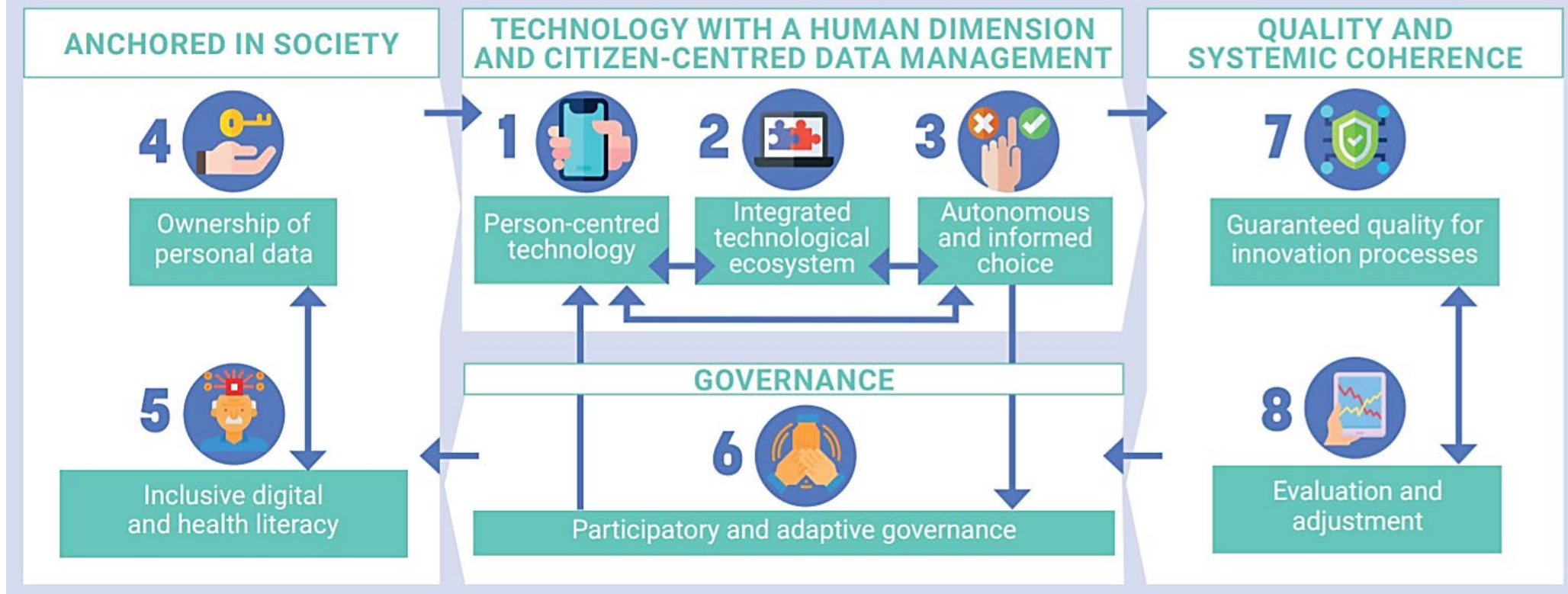
Ijsselsteijn et al. describe it as 'warm' technologies, opposing to 'cold' technologies, and work on designing these so-called warm technologies for patients suffering from dementia. According to them, warm technologies aim at 'improving quality of life by supporting and enhancing human potential, social connectedness,

dignity, and self-reliance. Warm technologies hereby centralise the end-user more, instead of the technology itself.

The Fund Dr Daniël De Coninck and the King Baudouin Foundation in Belgium describe the opposing types of technology as 'smart' and 'caring' technologies. Smart technologies focus almost entirely on the technology itself and the solutions it can bring for the healthcare sector. The focus does not lie with concerns that might arise from, for example, data collection. For instance, many technologies collect data concerning identity, health parameters and behaviour, but what happens with this information? To create a clear framework responding to the ethical issues associated with technology use in elderly care, the Fund Dr Daniël De Coninck and the King Baudouin Foundation brought different stakeholders together. They developed a framework with eight guiding principles that are applicable to caring technologies, which are technologies that focus on health and care management, as well as the empowerment of selfcare, considering quality, governance and ethical standards.

The principles are referred to as the eight Caring Technology Principles and can be used to develop, implement and evaluate a caring technology (Figure 1). Compared to existing initiatives only concerning certain ethical issues, the Caring Technology Principles encompass a broad range of ethical aspects. They focus on the implementation of a technology with a human dimension and citizen-centred data management, anchored in society, and with quality and systemic coherence.

## 8 CARING TECHNOLOGY PRINCIPLES



**Figure 1: The eight Caring Technology Principles**

**The guiding principles were developed by participants brought together by the Fund Dr Daniël De Coninck and King Baudouin Foundation and are applicable to technologies relating to personal healthcare and support.**

As valuable information is involved in healthcare, it is crucial that the autonomy of citizens is ensured by providing transparent information, which results in the citizen or patient having ownership of their personal data. The eight Caring Technology Principles are further described.

As the wording of the principles is important in the interpretation and as a lot of effort has been put into it, the descriptions match the original ones brought out by the Fund Dr Daniël De Coninck and the King Baudouin Foundation.

## Promote humane technology and citizen-centred data management

### 1. Person-centred technology

Ensure that the role of technology and use of data always facilitate and support people and that they remain at the service of people and society. Maximise opportunities for citizens to make their own decisions based on their care needs, support requirements and health-related wishes.

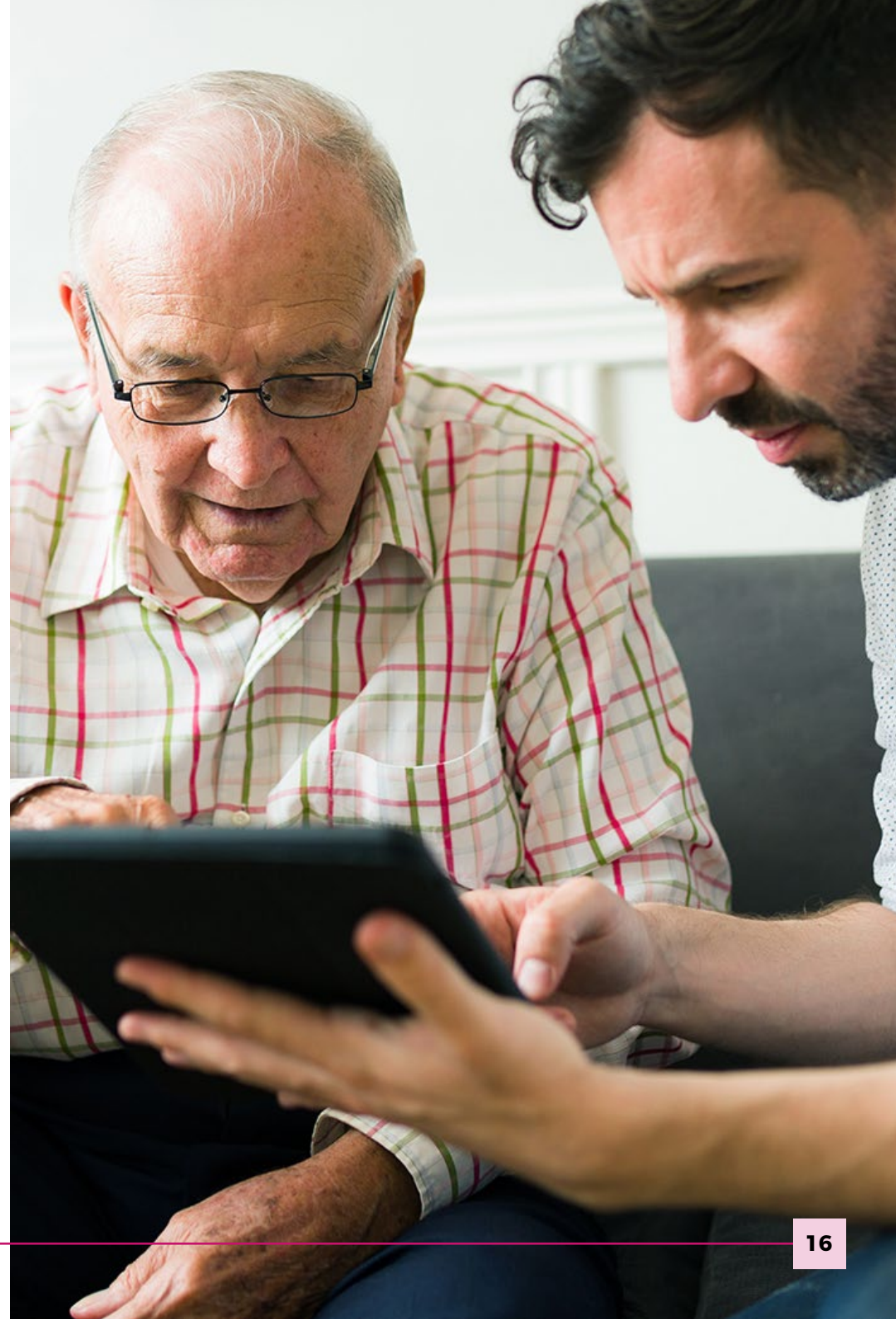
### 2. Integrated technological ecosystem

Encourage ongoing collaboration among all the actors involved, through the creation of an integrated technological ecosystem in which interoperability, standardised protocols and open-source (basic) technology are all self-evident. Support patients and citizens to allow them to participate optimally in the development and adoption of this ecosystem.

### 3. Autonomous and informed choice

Provide honest, reliable, transparent and easily understandable information about innovations in care and health. Make sure people are able to make choices in a truly informed and independent way (true consent) by objectively representing the usefulness, scope, pros and cons of innovations so that people can have confidence in the products they choose.

**Anchored in society.**







#### **4. Ownership of personal data**

Improve trust between people and organisations in regard to the use of data and data-driven innovations, by allowing them to have ownership of their own data. Support citizens to share these data safely and use it to leverage their own personal well-being and promote the public interest.

#### **5. Inclusive digital and health literacy**

Promote technological literacy, health skills and participation among all citizens. Make lifelong learning for all a goal. Ensure that no-one is left behind, including vulnerable and underprivileged people and those needing special attention. Innovation should be focused on reducing both the digital gap and the health gap rather than further widening them.

#### **Governance**

#### **6. Participatory and adaptive governance**

Develop participative and adaptive governance for the innovation system. Encourage citizens and stakeholders to participate actively in this. Make flexible but effective adjustments to policy on the basis of new data, experience, evidence and growing expertise.

#### **Quality and systemic coherence**

#### **7. Guaranteed quality for innovation processes**

Develop quality assurance systems for the whole innovation trajectory, i.e. cover the periods before, during and after the development and deployment of technology and the use of data. There must be controls on the content, safety, transparency of information, and on its traceability, usefulness and effectiveness. Knowledge gained through experience must have a place alongside scientific evidence. Introduce quality labels to communicate the results of these controls and assessments.

#### **8. Evaluation and adjustment**

Monitor and evaluate to ensure that the actions taken remain coherent with health and care goals within wider frameworks of prevention, ethics and sustainability. Integrate sustainability objectives and appropriate ethical principles (e.g. human rights) in the innovation growth pathway.

## Technology Blueprint Developmental approach

The report discusses the steps followed for the development of the Blueprint as an online interactive tool. The Blueprint is the Output 3.1 of the EMPOWERCARE project. Led by the University of Brighton and supported by Vlaamse Instelling voor Technologisch Onderzoek, partners identified and piloted technologies with groups and individuals within the target groups, that included people aged 65+ or 50+ with at least one chronic condition, healthcare professionals and the wider workforce, including formal and informal carers. Having identified what technology is currently being used successfully (including existing partner technology such as University of Brighton's Digital Health Living Lab's tested technologies, Vlaamse Instelling voor Technologisch Onderzoek BIBOPP), partners worked in a

coproduction approach with the target groups to identify gaps and fill them. Individuals and groups were then invited to test technology in the venues, including University of Brighton's Digital Health Living Lab skills lab and Solidarity University's Zeeland living room.

EMPOWERCARE partners provided their input in a series of workshops and focus groups (Figure 2).

Workshops with external organisations were organised in order to reduce bias, broaden the scope of the collected opinions and not be limited to the perspectives of EMPOWERCARE partners.



**Figure 2: Visualisation of the data collection process.**

**PPs: participants were project partners within the EMPOWERCARE project.**

**EOs: participants were external organisations.**

**Workshop 1 refers to the EMPOWERCARE Annual Event workshop.**

**Workshop 2 refers to the workshop organised with the care network in Zeeland.**

## Questionnaires with EMPOWERCARE partner organisations

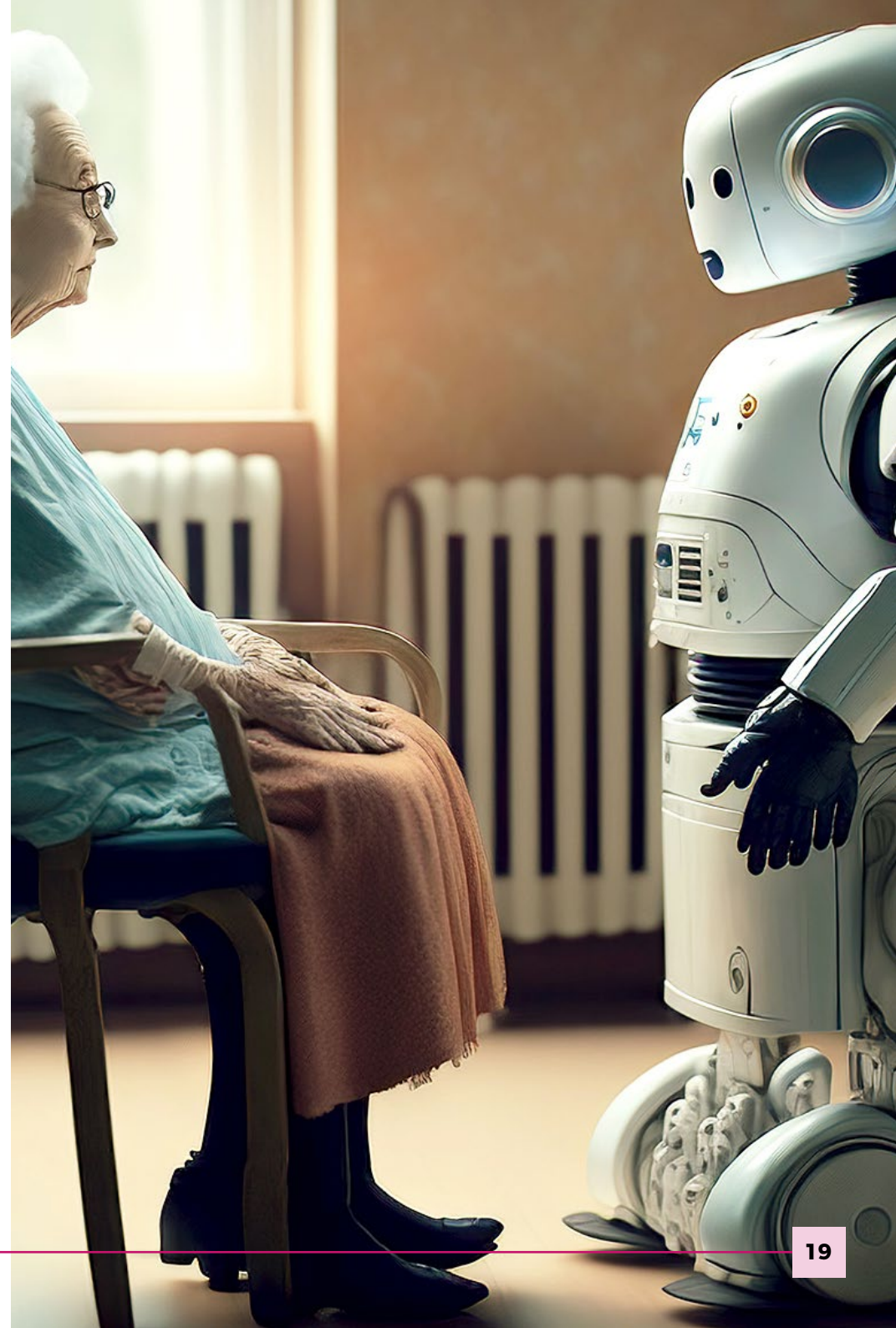
To develop a guideline on how to implement a caring technology in elderly care, a questionnaire was sent out to the EMPOWERCARE partners to evaluate the current use of the Caring Technology Principles in the healthcare practice, specifically the current use in their technology trial. Additionally, the results of the questionnaires were used to ask tailored questions to the participants of the in-depth interviews, based on the scores that were given in the questionnaires.

The questionnaire, in the form of a Microsoft Word document, was sent out to the different partners. To make the principles more concrete while filling in the questionnaires, they were converted into five thematic fields:

- 1) Designing, implementing, and using human-centred technology.
- 2) Citizen empowerment in technology interactions.
- 3) Quality assurance.
- 4) Democratic and participatory governance and,
- 5) Responsible innovation.

## In-depth interviews with EMPOWERCARE partner organisations

After filling in the questionnaires, an online, semi structured in-depth interview was conducted with the EMPOWERCARE partners via Microsoft Teams. The interview's aim was to determine how the Caring Technology Principles were relevant for or used by the different stakeholders, what the important aspects were that should be considered or added to the guideline for a Technology Blueprint, how an implemented or completed technology trial could contribute to the guideline and lastly, how the region of technology implementation could influence the use of principles or implementation of the technology.





### **EMPOWERCARE Annual Event workshop (09/11/2021)**

Next, an online workshop was organised during the EMPOWERCARE project's Annual Event to collect participants' perspectives on what the guideline should look like. During the workshop, not only EMPOWERCARE partners' perspectives were gathered, but the standpoints of external organisations were included as well to reduce the possible bias from EMPOWERCARE project partners.

During the first workshop, the participants were first given a PowerPoint presentation to elucidate the current issues of the ageing population. Next, some questions were asked using the online tool [Mentimeter](#).

Participants were asked to link three values with the term 'caring technology', which principle was most relevant for their organisation, which principle they would like to learn more about and what advice the guideline should provide.

### **Workshop with care organisations from Zeeland (18/11/2021)**

As with the first workshop, the aim for the second online workshop was to collect participants' perspectives on what the guideline should look like and broaden the scope of participants outside of the EMPOWERCARE project in order to reduce bias.

The second workshop was organised with an EMPOWERCARE partner from Zeeland, the Netherlands, whereby organisations within their care network were invited. The workshop was attended by 23 participants in total: 15 participants from care organisations, 3 participants from governments, 2 participants from research organisations, 2 intermediates and 1 expert.

During the second workshop, participants were introduced to the subject and related issues with a PowerPoint presentation. Next, the participants were divided into two breakout rooms, with one room collecting the policy makers and innovation managers and the other collecting the care providers in the field. The separate groups worked in the online tool [Padlet](#). Participants were asked to note down any difficulties or barriers, good practices or regulations, and any other questions or thoughts related to the Caring Technology Principles, while some points were orally discussed during the session.



## Focus groups with EMPOWERCARE partners and partner organisations

A series of focus groups were planned and undertaken online using Teams facilitated by the University of Brighton. All partners participated and discussed findings following technology testing allowing partners to discuss experiences in their different settings and discover the over-arching themes of technology needs and preferences informing the approach to the caring principles.

### Focus Group 1

The primary purpose of initial Focus Group 1 was to gather a wide range of experiences linked to specific activities that partners were committed to and engaged in. This ranged from digital day care, overcoming mobility problems in the pandemic, facilitating older people with varied digital resources, examples of incorporation into more formal health care and with healthcare professionals, technology loan schemes and tools to help older people stay living at home. Also, evidence gathering for local population health needs planning. The discussion focused on progress, anticipated and unanticipated challenges in the pilots to date the major findings that emerged from the initial scoping focus group concerned dealing with transitions, sustainability, financial hurdles, loss of engagement in interventions, importance of social innovation context; investment needed in already formed relationships between organisations and the role of stakeholders. The areas aired in this focus group were then used to inform the content of the subsequent focus group.

### Focus Group 2

Focus group aimed to gather experiences and build further detail about themes from above by focusing the discussion of example transitions and sustainability, role of stakeholders and a variety of threats, hurdles and challenges to be conscious of and ways of addressing the perceived challenges. Findings reflected experiences across pilots generally and then some discussion linked to caring principles from the blueprint development and work. Key areas that had emerged which were deepened in the discussion centred on sustainability, transparency, supports for older people using technology, role of peer support and challenges pilots were currently navigating. A specially focused group was held (Focus Group 3) specifically to build on the blueprint development and the conceptual 'layers' in the blueprint model.

### Focus Group 3

The Blueprint model, conceptual framework of contextual layers and underpinning caring principles formed the substance of the in-depth discussion in this focus group. This focus group specifically focused on the frameworks underpinning the blueprint development, their relevance, application and accessibility. Participants included all those in Work Package 2. The participants engaged with the developmental stages of the blueprint, and gave feedback using a group posterboard online, each participant was able to select a) where their perspective was located in a continuum to deepen the caring principles ideas b) to test the application of the framework and 3) group steps to assess readiness of the blueprint caring principles to facilitate engagement and to explore feasibility and ease of use of the applied theoretical ideas. The Blueprint offers one model to address many of the areas that arose from previous data collection concerning sustainability more widely and it was underlined that the Blueprint had the added benefit of conceptual connections to caring principles. These were found to be easy to use and very useful. The value of the Blueprint in many domains was the focus of the findings that emerged, and these were able to be used in refining the Blueprint content.

### Focus Group 4

The focus group comprised representation from partners running pilots and included all Work Package 2 participants. Areas explored included the push factors and pull factors relevant to the context of each pilot. Participants reported if they had tapped into an energy or appetite for technology use by older people that has already been there and if this had been effective or not and in what ways. Areas surfaced and explored at depth included: 'Thinking about the pilot'.



## Key findings from the Work Package 2 focus group process:

Recordings from all focus groups were transcribed and analysed using generic thematic analysis, each group informed the areas to probe further in subsequent groups. The analysis aimed to draw out discussion content and synthesise feedback reporting, examples given, descriptions offered in light of the questions and reflections into thematic areas as follows:

### 1. Readiness of engagement in digital technology

#### Pull and Push factors

General societal climate that is passive (pull), impacts of the pandemic and forced top down technology interventions that are active (push). 'Tap into the energy that is already there' linking digital technology offer to domains in life for older people and in local context. Technology almost 'arriving overnight, somewhat forced undermines trust in digital supports. The context of the technology introduction, i.e. why it was being introduced and as part of what specific innovation, its precise purpose, closeness to fit with initiative needs and speed of the intervention/ introduction were all important challenges.



#### Support for the technology uptake and role of peers

Peer support emerged as a concept but none of the pilots used a mutually supporting peer support model of older person to older person. The support for technology uptake and skills support for older people reflected a more distributed model of a range of supports, some formal, some informal, some intergenerational. Some were planned and some commonly opportunistic. A continuum of 'peer' support emerged which includes local/ geographical; nature of local context and community; formalised and informal supports that emerged or were purposively introduced; supports relevant to conceptual layers within blueprint, neighbourhood groups and health care or social care initiatives with governance and formal demands. Therefore, continuum ranges from the informal to varied planned interventions with training such as – digital day care, digital ambassadors, technology facilitators, team awareness raising to promote digital solutions in social care, application of a 'digital toolbox'. Range and variation according to context of older people and the local innovation or initiative, but not much emphasis on ready-made tools, more often bespoke and loosely personalised examples.

Peers were most often drawn upon in informal arrangements and professional health care facilitation was frequently cited as part of the range of supports on offer. Discussion circled informal versus formal approaches including governance and structures, both have strengths in enhancing older person engagement, both have some problems as experienced by pilots.



## **Continuum of Informal family through to top down formal supports**

Commonly informal supports were intergenerational, young people 'fighting the digital gap' in planned or inadvertent ways. Informal peer supports through family and grandchildren are commonplace and vital for some of the pilots. Family or friend support in informal or planned ways was very widely cited. EMPOWERCARE approaches to 'peer support' within pilots are wider than everyday definitions of older person peers and include cross section of ages and roles embedded in communities and older persons social circles, often whom acted as advocates in addition to technical or information supports. Targeted peer support with end goals in mind such as reducing isolation of older people emerged as important and a 'meta' approach with technological support within that.

## **Advocacy and advocacy roles**

Contextual structures such as living lab, varied community meetings and structural activities, health care professional led initiatives and local health care initiatives gave rise to roles that underlined advocacy. Within these advocacy activities 'reluctant experts' emerged as an area to explore further---seen as experts because they have some knowledge or grew up with technology but are not formal experts and this is seen as a personal tension for technology advocates who informally came into role to support someone they knew or an initiative they valued.





**Older people who actively decide to avoid adoption are under researched.**



## 2. Digital Literacy

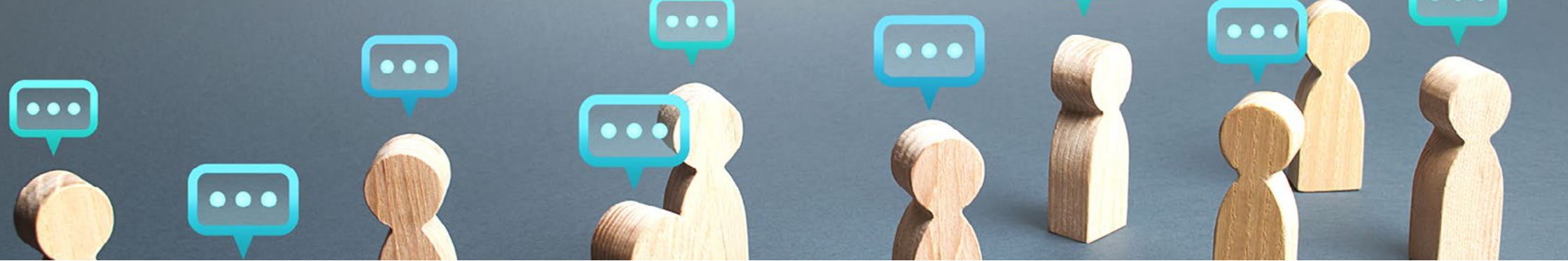
Literacy development through everyday engagement with something helpful in everyday life, iPads, online information sources, video doorbell for increased security as some examples. 'Natural next steps' through opportunities to try something new. Digital literacy development linked to end goals in mind such as enriched social connections, or enhanced security, or access to information, or health records and assessment.

Literacy barriers including values and personal knowledge, high demand for skills to function in the digital era and speed of change and speed of adaptations needed. Temporal challenges are a major consideration. Ongoing demanding skills development and skills gaps with a rapidly changing technological offer. The experience for older people was reported as an active struggle, not passive knowledge absorption and cumulative skills development. Also added difficulties include sharing benefits of some new innovation older people have not yet tried or experienced. This how and by what process to manage entirely new technological offers for older people when it is not possible to personally imagine the benefits requires some thinking and development of process.

Digital reticence can be an active choice non-adopters may be knowledgeable, aware of opportunity but consciously decide not to use digital tools or take up technologies. Older people who actively decide to avoid adoption are under researched.

## 3. Trust, privacy and transparency

A 'threshold that has to be overcome' by older people to trust and also further work is needed to expose and understand the management of complex boundaries, some of which have not yet fully emerged, some of which are obvious. Further work to understand these thresholds and how to manage the boundaries effectively. This includes the more straightforward questions of "What happens to data that is collected?" through to privacy and security and linked to peer roles and boundaries. This is further complicated regarding boundaries in health and social care, for example in mental health and boundaries for peer supporters in health issues. There are very many questions and issues to be overcome, EMPOWERCARE can share knowledge gained and promote best practice, but the pilots and overall project are at the early stages of this complexity.



## 4. Sustainability and Attrition

Importance of brokerage and value of investing time in existing relationships, this is with a range of entities such as developers, community relations and key organisations in the locale, existing formal structures and organisations, voluntary sector and varied community groups all of these were varied and in context of the pilots and their mission, aims and local relationships. These varied organisations and stakeholders often brokered introductions or facilitated engagement with older people.

Attrition of volunteers and ways to formalise engagement for benefit of peer supporters, for example young peoples' input to be recognised, marked formally so beneficial for them and CV/ career experience.

Attrition in less formal approaches compared to approaches in health care has different considerations, how to sustain engagement in informal approaches for older people and tech supports, facilitators.

Nature of training which naturally varied and sustainability of training is complex. Scoping of training underpinning the pilots will add to new understandings.

Sustaining relationships with stakeholders including organisations and formal partners takes time and it a vital component of ongoing work. Examples of how relationships are sustained will

add to shared understandings for longer term work beyond EMPOWERCARE.

Exchange mechanisms of developing concepts and learning, e.g. learning shared from digital ambassador training will benefit new understandings.

Lastly, after processing the data gathered from the questionnaires, in-depth interviews and both workshops, a first version of the guideline was drafted. Online focus group were conducted with EMPOWERCARE partners to gather feedback on the developmental progress of the guideline as it was planned under the project's deliverables activities.

The first version of the guideline was presented to the EMPOWERCARE partners during a focus group. The participants' feedback was gathered in the online tool [Miro](#). First, participants were asked who they considered to be the most relevant target group. Next, feedback was gathered on the process guide including three main steps of guideline structure: 1) Analysis of the current healthcare practice, 2) Analysis of the future healthcare practice and 3) Planning and evaluation. Lastly, participants were asked about the functionalities and widespread use of the guideline.

## Questionnaires with EMPOWERCARE partner organisations

To investigate the current use of the Caring Technology Principles of the 8 EMPOWERCARE partners, questionnaires were sent out with the question to rate the relevance of the different thematic fields. To make the principles more concrete while filling in the questionnaires, they were converted into five thematic fields:

- 1) Designing, implementing and using human-centred technology.
- 2) Citizen empowerment in technology interactions.
- 3) Quality assurance
- 4) Democratic and participatory governance and
- 5) Responsible innovation.

The thematic field 'Designing, implementing and using human-centred technology' was perceived to be the most relevant thematic field, followed by thematic fields 'Responsible innovation', 'Democratic and participatory governance' and 'Citizen empowerment in technology interactions'. The thematic field 'Quality assurance' was scored the lowest, which indicates that this subject was the least relevant for the partners and the fifth choice for a learning objective in their technology trial. The results display how relevant the thematic fields are and how they are currently used by EMPOWERCARE partners. However, important to note here is that the number of partner organisations participating is only 8, indicating it is not possible to draw conclusions from the classification. The questionnaires were merely conducted in preparation of the in-depth interviews to discuss the participants' view on the ranking and the relevance of each thematic field.

## In-depth interviews with EMPOWERCARE partner organisations

In a next step, in-depth interviews with 10 representatives of 8 EMPOWERCARE partners were conducted to investigate

- 1) The relevance or use of the Caring Technology Principles in their practice.
- 2) Important aspects to be considered or added to the Technology Blueprint.
- 3) The contribution of implemented or completed technology trials to the Technology Blueprint and lastly,
- 4) The influence of the region (Flanders vs. UK vs. The Netherlands vs. France) of technology implementation on the use of principles or technology implementation. The results of these research questions are further discussed.





## Relevance or use of Caring Technology Principles

To investigate in more detail the relevance or use of the Caring Technology Principles for participants in their practice, the participants were questioned during the in-depth interviews on their perspectives of the classification of the five thematic fields based on relevance, resulting from the questionnaires.

### **1. Designing, implementing, and using human-centred technology**

The first thematic field that was discussed was also the one ranked the highest by the EMPOWERCARE partners in the questionnaires.

### **2. Quality assurance**

The participants were not as familiar with the topic of 'Quality assurance' compared to the topics 'Designing, implementing and using human-centred technology' and 'Citizen empowerment in technology interactions', but indicated the necessity of moving the focus of attention from the first two thematic fields to this thematic field instead.

### **3. Democratic and participatory governance.**

For the third thematic field 'Democratic and participatory governance', the clear consensus on relevance is not the same as for the first two thematic fields, but participants were also not as unfamiliar with the topic as with 'Quality assurance'.

### **4. Responsible innovation**

Overall, relating the topic of 'Responsible innovation', participants reported similarly as to thematic field 'Quality assurance', namely that too much attention is paid to the thematic field 'Designing, implementing and using human-centred technology' and that more attention should be paid to the thematic field 'Responsible innovation'.

## Contribution of implemented or completed technology trials

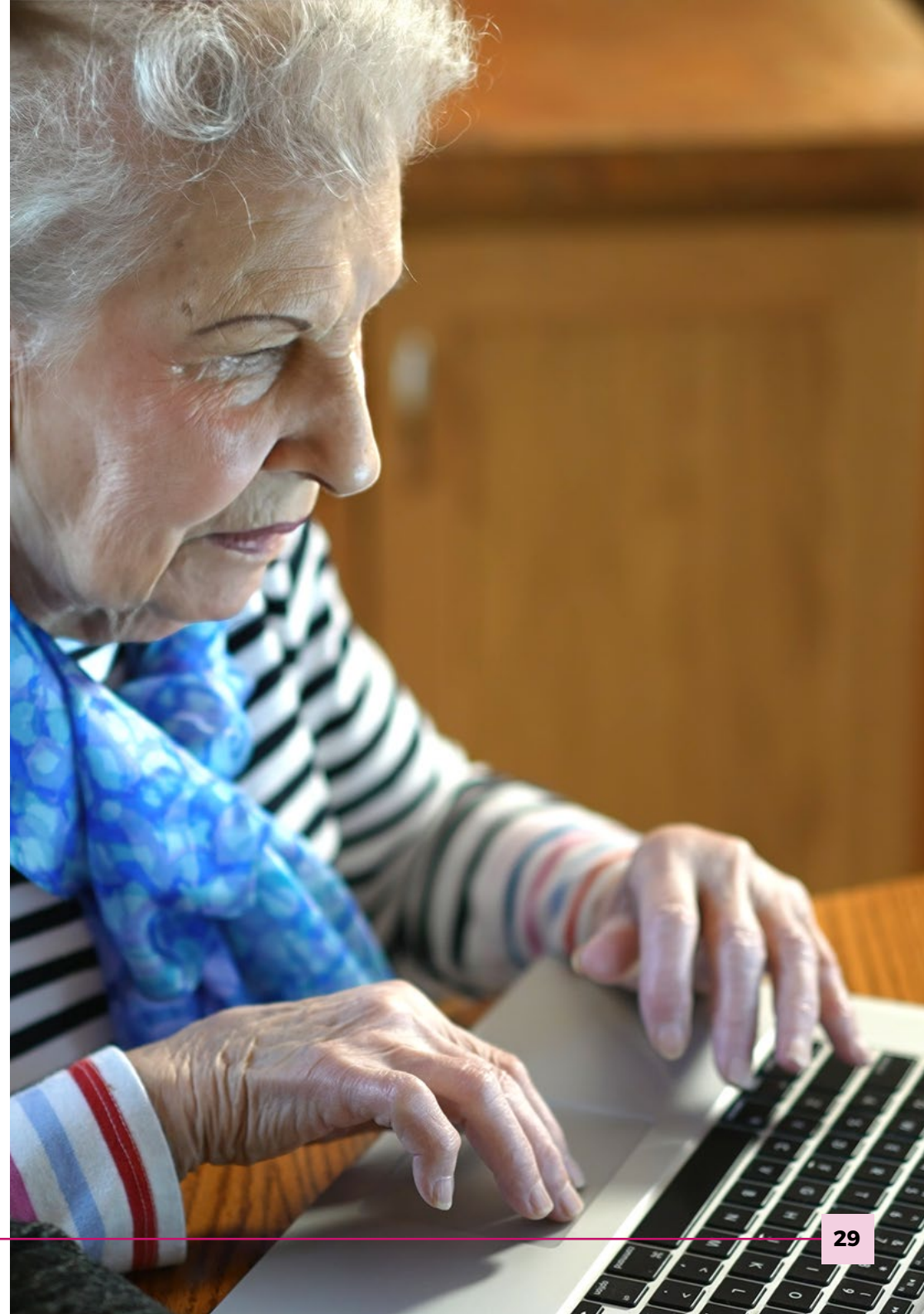
To investigate the way in which implemented or completed technology trials within the EMPOWERCARE project can contribute to the Blueprint, the participants were asked during the in-depth interviews about good practices they experienced in their technology trials. As the guideline is based on the Caring Technology Principles, the good practices were arranged by Caring Technology Principle instead of the thematic fields that were used before.

### 1. Person-centred technology

For the first Caring Technology Principle, reported good practices focused on centralising the end-user of the technology, such as conducting intake conversations and intermediate meetings with end-users and their family to gather input on the user experience. Moreover, a reported good practice was the co-creation approach with end-users throughout the entire stage of design. Lastly, the community-approach was reported, thus involving the community to help the senior instead of counting only on the professional workforce.

### 2. Integrated technological ecosystem

The second Caring Technology Principle is set to establish an integrated technological ecosystem, for example taking into account interoperability issues due to variation of devices and required connections in each different home, by testing and evaluating technology in the end-user's own home. Additionally, a partner indicated to only work with trustworthy partners that are already operating in the ecosystem.



### 3. Autonomous and informed choice

Next, the third Caring Technology Principle focuses on ensuring an autonomous and informed choice, for example by providing information leaflets for family members of the end-user and by offering live demonstrations and installation of the technology at the end-user's home, 'in the end-user's language'.

### 4. Ownership of personal data

For the fourth principle, 'Ownership of personal data', adhering to the ethics framework of the institution regarding data sharing and privacy can ensure any activity is safeguarded for the end-user.

### 5. Inclusive digital and health literacy

The fifth principle encompasses inclusive digital and health literacy and numerous good practices were in use in the partnership. They can e.g. be obtained by using trained volunteers to help people improve end-user's digital literacy.

### 6. Participatory and adaptive governance

In order to fulfil the sixth principle, 'Participatory and adaptive governance', residents' councils and family councils can be conducted.

### 7. Guaranteed quality for innovation processes

For the seventh principle, to guarantee quality for innovation processes, technologies can be first tested in small scale technology trials before rolling it out in a larger part of the organisation.



### 8. Evaluation and adjustment

Lastly, for the eighth principle 'Evaluation and adjustment', regular meetings can be organised with care managers, innovation officers and the department to evaluate the technology and process and, if needed, make the right adjustments.



## Cross Border and Geographical Influence of technology implementation

To study the influence that the region of technology implementation (Flanders vs. UK vs. the Netherlands vs. France) could have on the use of the principles or implementation of the technology, the participants of the in-depth interviews were asked if there was a certain regulation, context or macrosystem present that they needed to consider in their technology trial. Moreover, they were asked which thematic fields were relevant or less relevant in their technology trial taking into account the presence of certain regulations, a certain context or the macrosystem, as the participants are located in different regions and thus different macrosystems.

Lastly, participants were asked whether the regulations, context or macrosystem influence the implementation of technology or the use of the thematic fields. Table 4 displays the description of the regulations, context or macrosystem, and the influence on the use of the thematic fields or technology implementation. Overall, the regulations that participants are subject to can be divided into external and internal regulations. Participants follow external regulations, such as the General Data Protection Regulation, regulations from the government and ethical standards.

Moreover, internal initiatives can be present in organisations, such as a data officer within the organisation. A participant indicates to work with an eHealth platform which ensures quality, cybersecurity and interoperability when sharing the data with for example general practitioners, which corresponds to thematic field 'Quality assurance'. Moreover, as governance is structured in local authorities, one participant reported that it leads to focus on 'Democratic and participatory governance'. There are regulations on the European, national, and organisational level, but this did not seem to have an influence on the use of principles or implementation of technology in the different regions.

## **EMPOWERCARE Annual Event workshop (09/11/2021)**

As the questionnaires and in-depth interviews were conducted with 10 representatives from 8 EMPOWERCARE partner organisations, we aimed with the first online workshop to include perspectives on the practical use of the Caring Technology Principles and 'translation' into a technology guideline from external organisations as well.

15 participants were present in total with 6 participants from care organisations, 5 participants from (local) governments, 3 participants from research organisations and 1 technology developer.

Participants were asked:

- 1) To link three values with the term 'caring technology'.
- 2) Which principle was most relevant for their organisation.
- 3) Which principles they would like to learn more about.
- 4) What advice the guideline should provide.

### **Values linked with 'caring technology'**

Participants were asked 'Which three values do you link with 'caring technology?' The values that were reported included person-centred, inclusion, respect, dignity, connection and easy use, among other values.

### **Most relevant principle**

Participants were asked 'Which principle is most relevant for your organisation? Out of the fifteen participants, six reported the principle 'Inclusive digital and health literacy' to be the most relevant for their organisation.

### **Acquire knowledge on which principle**

Next, participants were asked 'Which principle would you like to learn more about?'. The responses are visualised in Figure 6. In line with the reported most relevant principle, seven participants indicated they would like to learn more about the principle 'Inclusive digital and health literacy.

### **Advice guideline should provide**

Lastly, participants were asked what advice the Blueprint should provide. Several participants indicated they would like advice on integration: how to integrate technology solutions with care pathways or in the existing system.

## **Workshop with care organisations from Zeeland (18/11/2021)**

As for the first workshop, the aim of the second workshop was to broaden the scope of perspectives on the Blueprint outside the EMPOWERCARE project.

### **Difficulties, barriers and general problems**

1. Policy makers and innovation managers
2. Care providers in the field





## Focus group with EMPOWERCARE partner organisations (25/02/2022)

The data gathered from the questionnaires, in-depth interviews, focus groups and two workshops were processed and used to draft a first version of the Blueprint. The draft was presented during an online focus group organised with 9 representatives of EMPOWERCARE partner organisations, with 4 participants of research organisations, 3 participants of care organisations and 2 participants of (local) governments. The aim was to receive feedback on three different areas:

- 1) Who should be the target group of the Blueprint.
- 2) The process guide.
- 3) The general set-up of the Technology Blueprint.

Participants were asked to report on:

- A) methods they use in their own organisation.
- B) Our proposed method.
- C) Any good practices used in their or other organisations.

### General set-up

Finally, participants were asked to comment on the general set-up of the proposed Blueprint providing input on:

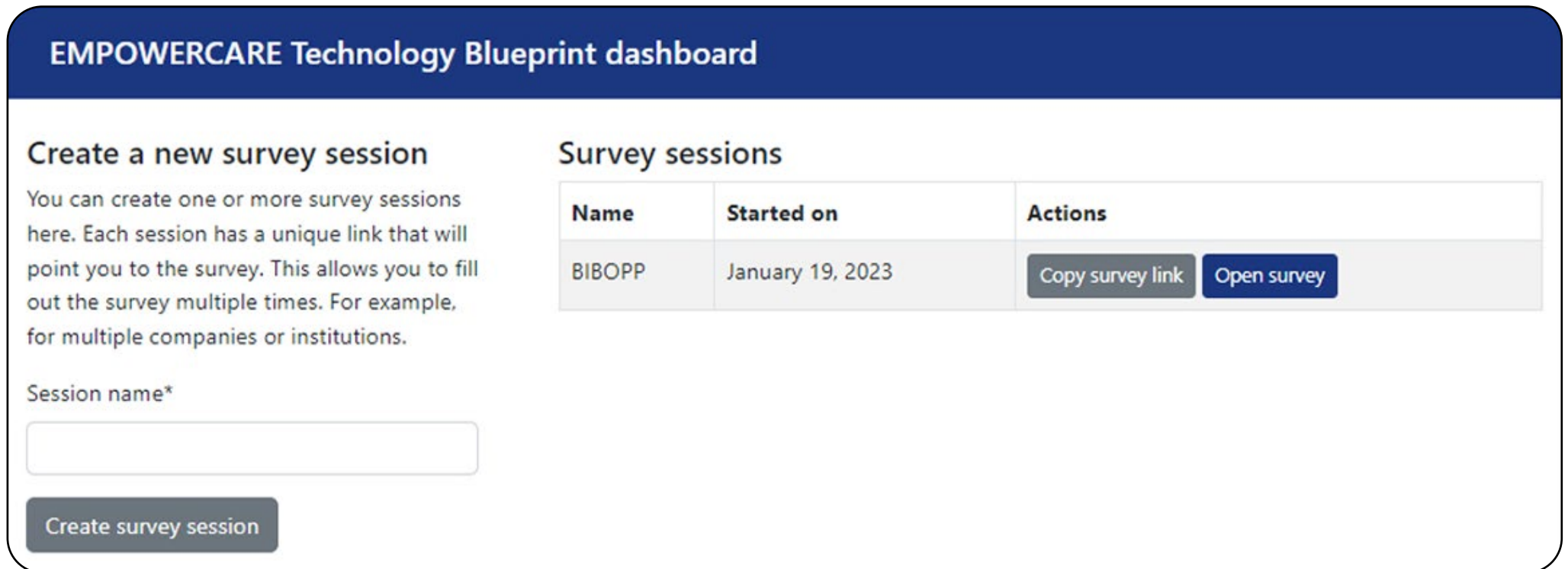
- Functionalities
- Ensuring widespread use after project

## The translation of results into the Technology Blueprint

The results from this research, obtained by in-depth interview participants, EMPOWERCARE Annual Event workshop participants, Zeeland workshop participants and focus group participants, were used to inform the development and evaluation of the Technology Blueprint.

[Click here to link to the online Technology Blueprint](#)

Below there is a series of snapshots of the online Technology Blueprint, giving the user an overview of the approach and concept.



**EMPOWERCARE Technology Blueprint dashboard**

### Create a new survey session

You can create one or more survey sessions here. Each session has a unique link that will point you to the survey. This allows you to fill out the survey multiple times. For example, for multiple companies or institutions.

Session name\*

Create survey session

### Survey sessions

Name	Started on	Actions
BIBOPP	January 19, 2023	<a href="#">Copy survey link</a> <a href="#">Open survey</a>

A screenshot of the online webpage EMPOWERCARE Technology Blueprint dashboard.

### From 'smart' to 'caring' technologies - The EMPOWERCARE Technology Blueprint



#### Why?

Finding ways to reconcile the advantages offered by technology with the care needs of your patients is challenging for healthcare organisations. A lot of different challenges need to be addressed, including issues of digital literacy, patient empowerment, data management, interoperability, etc.

The EMPOWERCARE Technology Blueprint helps you to clarify and address these challenges. It reduces complexity by providing practical examples and tools that can help you take the first steps in implementing technological innovations in a responsible way.

#### How?

The Technology Blueprint offers step-by-step guidance tailored to the innovation needs of your organisation.

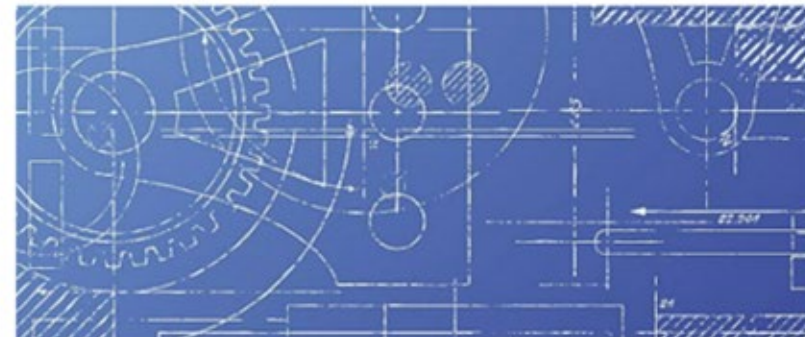
#### What?

Technology is increasingly used in healthcare services. However, current technology support in healthcare is often focused on improving the efficiency of care delivery in view of pressing issues such as workforce shortages. A shift from 'smart' to 'caring' technologies, which puts the patient's care needs at the forefront, is needed.

With this guideline, we want to help innovation managers in discovering, exploring, or implementing caring technology innovations in accordance with the [8 guiding principles for caring technology](#).

As innovation manager, you could be:

- A responsible for the innovation strategy of your organisation
- A middle manager, responsible for a team of care providers
- A consultant, specialised in supporting healthcare organisations in the implementation of technology
- A procurement officer, responsible for the acquisition of technological support tools
- A healthcare innovation researcher



## EMPOWERCARE Technology Blueprint

Introduction and setup

1. Introduction



2. Selecting guiding principles and values



3. Process guidance

### Selecting principles and values: results

Based on your input, the 8 Caring Technology Principles were prioritised as follows. The scores on the right reflect your answers on the importance of the different statements for your innovation. A low score does not necessarily mean that the principle in question is not important for your organisation, but only that addressing this principle in the context of your technological innovation is not an immediate priority.

By clicking on the boxes next to each principle, you can choose to retain that principle as concrete guidance for the further selection, implementation or evaluation of caring technology innovations. As default option, we use the top three principles.

Please choose the principles to retain.\*

	Principle	Score
<input checked="" type="checkbox"/>	Promote technological and health literacy	14
<input checked="" type="checkbox"/>	Develop an integrated innovation ecosystem	14
<input checked="" type="checkbox"/>	Promote ownership of data	14
<input type="checkbox"/>	Use a person-centred approach	9
<input type="checkbox"/>	Respect wider ethical concerns	8
<input type="checkbox"/>	Aim for true informed consent	6
<input type="checkbox"/>	Develop participatory governance	5
<input type="checkbox"/>	Implement quality controls	4

Go back

Click here to continue

EMPOWERCARE Technology Blueprint, selecting guiding principles and values screenshot.

**EMPOWERCARE Technology Blueprint** Show summary report

A. Setting goals and direction ▶ B. Planning and design ▶ C. Implementation and evaluation

1. Introduction ▶ 2. Brainstorming ▶ 3. Goal setting ▶ 4. Summary

### Brainstorming (results)

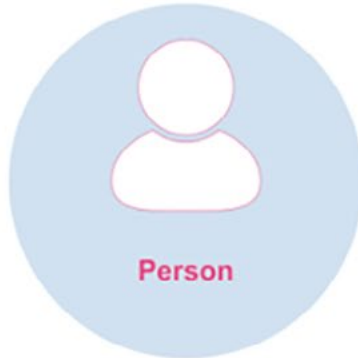
Here you can record the outcomes of the brainstorming workshop.\*

feasibility	<p><b>HOW</b></p> <p>Record your outcomes here...</p>
	<p><b>WOW</b></p> <p>Healthier lifestyle, self-management, community, possibility to inform GP, user-friendly, evidence-based --&gt; Online health prevention platform (BIBOPP)</p>
	<p><b>NOW</b></p> <p>Record your outcomes here...</p>
	<p><b>originality</b></p>

A screenshot of the EMPOWERCARE Technology Blueprint, Setting goals and direction, brainstorming webpage.

Now describe for each of the 4 circles of the care model what will have changed in the future in case of successful implementation of your innovative idea, and this taking into account the caring technology principles you found most important.

First, collect insights from the participants in the workshop about what a successful implementation means for each of the 4 circles of care.



In the interaction between people and the technological innovation:

Health promotion activities



In the network of family and informal caregivers:

Health promotion activities



In the interaction with your community or care organisation:

Inform GP  
Increase community feeling



In the interaction with the wider healthcare system:

Link with EHR

At the end of the exercise, it might be a good idea to summarize your findings in an inspiring storyline of about 1-2 pages. The story looks at each of the 4 circles of care in turn, and tells what has been achieved in this particular area upon successful implementation of your idea. This story can be used for internal and external communication.

[Go back](#)

[Click here to continue](#)

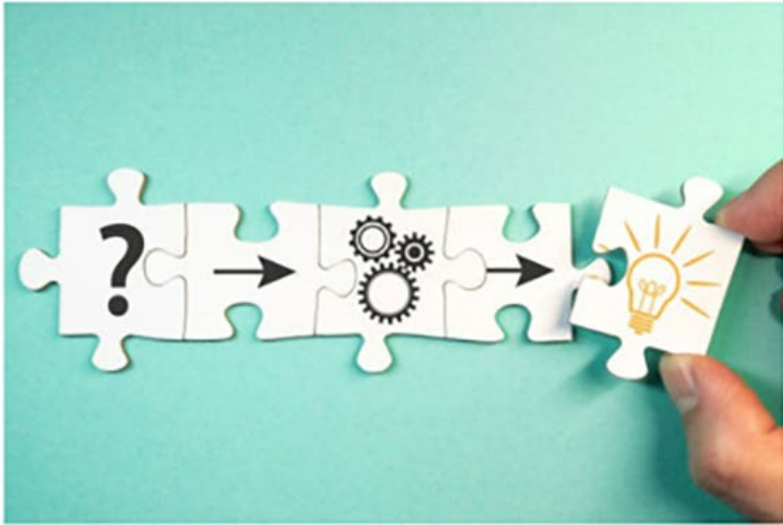
A screenshot of the EMPOWERCARE Technology Blueprint webpage data collection exercise.

## Setting goals and direction (summary)

Print this page

### Congratulations!

You have now set your innovation goals and vision in line with caring technology principles. See what your organisation came up with...



### How you ranked the 8 Caring Technology Principles of relevance to your idea:

Principle	Score (max. 15)
Promote technological and health literacy	14
Develop an integrated innovation ecosystem	14
Promote ownership of data	14

### The innovative idea you chose to work with:

Online health prevention platform (BIBOPP)

### What this means in practice in an integrated person-centred care model:

- In the interaction between people and the technological innovation:**  
Health promotion activities
- In the network of family and informal caregivers:**  
Health promotion activities
- In the interaction with your community or care organisation:**  
Inform GP  
Increase community feeling
- In the interaction with the wider healthcare system:**  
Link with EHR

Setting goals and direction summary screenshot from EMPOWERCARE Technology Blueprint.

A. Setting goals and direction

B. Planning and design

C. Implementation and evaluation

1. Introduction

2. Challenges and opportunities

3. Milestones and activities

4. Summary

## Planning and design (summary)

[Print this page](#)

### Congratulations!

You have now completed the planning and design of your innovation in line with Caring Technology Principles. See what your organisation came up with...



### How you ranked the 8 Caring Technology Principles of relevance to your idea:

Principle	Score (max. 15)
Promote technological and health literacy	14
Develop an integrated innovation ecosystem	14
Promote ownership of data	14
Use a person-centred approach	9
Respect wider ethical concerns	8
Aim for true informed consent	6
Develop participatory governance	5
Implement quality controls	4

### The innovative idea you chose to work with:

Online health prevention platform (BIBOPP)

### The challenges and opportunities you identified for implementing your innovation:

Values & norms [^](#)

Technology & infrastructure [^](#)

Webpage showing the Planning and design summary of the EMPOWERCARE Technology Blueprint.



## EMPOWERCARE Technology Blueprint

Show summary report

Thank you for completing the EMPOWERCARE Technology Blueprint survey.

The link below points to the summary report of your survey. You can print the report or save the link if you want to return to the page later.

<https://demando-staging.vito.be/ecblueprint/summary-report?p=0&r=259&t=%242a%2412%24jgw89fb3bYmLNW4NcgluG.FD.W9SVNVAIOk2uObN921k6ILBHa2cK>

We are inviting you to complete our survey to provide us your feedback on the Caring Technology Blueprint. It will only take you 2 minutes, but helps us enormously to improve the tool.

Open the feedback survey



This tool was developed in the Interreg2Seas EMPOWERCARE project.

© 2023

Screenshot of the EMPOWERCARE Technology Blueprint highlighting a link to summary report of your survey.

## Preliminary Evaluation

In general, the Technology Blueprint is an added value compared to existing initiatives, as it is based on the Caring Technology Principles, and as it includes functionalities such as a process guide, good practices and workshop format. The challenge that participants reported, relating to the use of the Caring Technology Principles, was the theoretical aspect of the principles and the inability to directly apply them in practice. This was especially true for the workforce in the field. The Technology Blueprint responds to this challenge by providing a step-by-step process guide on how to implement a caring technology in practice, based on the Caring Technology Principles. Other functionalities of the Blueprint include providing good practices and encouraging the target group of innovation managers to organise workshops with different layers within an organisation to include their perspectives from a bottom-up approach. As there is, to our knowledge, no current initiative that is both based on guiding principles and provides a process guide for the practical implementation, the Technology Blueprint that we propose is an added value for warm technology implementation in healthcare.



# Further Reading

## Literature Overview Ageing population

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