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Impact of digitalisation on social services

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European Foundation for the Improvement of Living and Working Conditions

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Author: Daniel Molinuevo

Research manager: Daniel Molinuevo

Research team: Daniel Molinuevo, Robert Anderson, Anna Ludwinek and Corine van der Schans

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Research carried out prior to the UK's withdrawal from the European Union on 31 January 2020, and published subsequently, may include data relating to the 28 EU Member States. Following this date, research only takes into account the 27 EU Member States (EU28 minus the UK), unless specified otherwise.

This report presents the results of research conducted prior to the outbreak of COVID-19 in Europe in February 2020. For this reason, the results do not take account of the outbreak.

The European Foundation for the Improvement of Living and Working Conditions (Eurofound) is a tripartite European Union Agency established in 1975. Its role is to provide knowledge in the area of social, employment and work-related policies according to Regulation (EU) 2019/127.

European Foundation for the Improvement of Living and Working Conditions

Telephone: (+353 1) 204 31 00
Email: information@eurofound.europa.eu
Web: www.eurofound.europa.eu

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List of abbreviations

AI	artificial intelligence
AR	augmented reality
CSR	country-specific recommendation
DWP	Department for Work and Pensions (United Kingdom)
Esspros	European system of integrated social protection statistics
GP	general practitioner
ICT	information and communications technology
IT	information technology
OECD	Organisation for Economic Co-operation and Development
VR	virtual reality

Executive summary

This report examines the use of digital technologies in social services and the policies that promote digital transformation. The use of digital technologies in social services in Europe has not been studied to the same extent as its use in healthcare. While there are some studies on this topic, many of them focus on the use of information and communications technology (ICT) rather than more advanced types of digital technologies. The digital technologies analysed in this report are based on previous Eurofound research, which classified them into the following three clusters:

- automation of work: advanced robotics, artificial intelligence (AI) and machine learning
- digitisation of processes: Internet of Things, virtual reality/augmented reality and telepresence
- coordination by platforms

Digitalisation is analysed in relation to its impact on the design and delivery of social services. The social services studied include those listed in the European Pillar of Social Rights and can be public, private for-profit, or non-profit.

This report was researched and produced before the onset of the COVID-19 virus. A number of key messages and policy pointers have been added on the basis of the findings which could be useful for policymakers as they seek to address the range of issues which will emerge in the aftermath of the pandemic.

Policy context

Ensuring Europe is fit for the digital age is one of the priorities of the European Commission in the period 2019–2024. The actions to achieve this include looking into the human and ethical implications of AI, a European data strategy, improving the working conditions of platform workers, strengthening the digital skills of Europeans and digitalising European institutions.

European institutions have asked Member States to increase their efforts in promoting the digital economy. In the 2019 European Semester, 17 countries received recommendations related to digital technologies and digitalisation. Most of these 17 countries were asked to focus investment-related economic policy on digitalisation (including digital skills and infrastructure), taking into account regional disparities.

EU initiatives that deal specifically with the digitalisation of health and social care tend to focus on health-related issues, such as e-prescriptions or disease prevention. This prevalence of digitalisation in healthcare rather than social care can also be seen at the national level. The digitalisation of social services often takes place in combination with healthcare (for example, setting up databases to share health and social care records) or as part of wider reforms in the public sector. Often, the objectives of the digitalisation of social services are to achieve cost efficiency and to allow older people to live in their own homes independently for as long as possible.

Key findings

- Robots are used in health and social care mainly to monitor and interact with older people and/or to assist them with cognitive tasks. Robots also help carers by providing physical assistance (for example, lifting patients). The costs of robots, safety concerns and opposition from carers and the general public have limited their use in social care.
- The Internet of Things has been used in the homes of older people for monitoring purposes (for example, fall detection) and to facilitate cognitive and interactive tasks. The use of this technology and telecare in the future will be facilitated by the reduction in costs of wearable devices and the increasing familiarity of the population with these technologies.
- Care provided with the aid of robots, telepresence and wearable devices can also reduce the risk of contagion and ensure the continuity of care in times of confinement, lockdown and physical/social distancing.
- AI has been used in the planning of resource allocation and in the handling of applications for benefits in cash or in kind. AI can also predict needs at the individual level from service users and assist public employment services in matching jobs with applicants more efficiently.
- As in the case of the services sector, the use of blockchain technology is in an early phase of adoption in health and social care, where it has been used to pay benefits in cash and to monitor pension contributions.
- Platforms have been used to put users and providers of home care and childminding services in contact. The use of this technology can increase in the future in those social services where public provision decreases. As citizens become more accustomed to these technologies, they are more likely to use them to access social services.

- The level of evidence regarding the impact of these technologies in social services is limited, partly because many of these technologies are in a preliminary level of deployment. There is evidence that the automation or reduction of administrative processes allows staff to increase their productivity and to dedicate more time to other tasks. For example, the information available through wearable devices facilitates more efficient use of resources. In contrast, there have also been cases in which digitalisation has increased the workload, where staff need to spend more time reporting, monitoring or assisting service users when services are digitalised (for example, filling in online application forms).
- Digital technologies can achieve savings by helping to prevent more costly and intensive care, detecting fraud more effectively and ensuring that scarce resources are allocated more efficiently.
- From the users' perspective, digital technologies have contributed to an increased sense of safety and to the capacity of older people to live longer in their own homes. This in turn means that older people are less reliant on help from carers and that admissions to care homes can be postponed.

Policy pointers

- Resistance from staff and service users constitutes a barrier to the further deployment of digital technologies. While some of their concerns may be justified, the reluctance to use digital technologies can be due to lack of knowledge and skills. Further involvement of users in the co-design of services would also have a positive impact on uptake and on the user-friendliness of technologies.
- The review of the EU's Digital Education Action Plan and the new EU funding programmes provide an opportunity to tackle the digital divide and increase skills and familiarity with digital technologies. Tackling the digital divide and investing in digital infrastructure and skills are crucial, as these technologies are important tools to prevent contagion.
- The fragmentation of social services and the lack of a specific institution responsible for the digital transformation process have hindered the digitalisation of social services. The fragmentation of information (for example, having several databases of service users) also has a negative impact. Digital technologies can themselves help to tackle this fragmentation, especially if there is a centrally responsible body that drives harmonisation and sharing. Further exchanges and mutual learning between Member States regarding how to achieve the digital transformation of services could benefit from action at EU level.
- Most of the policy initiatives dealing with the digitalisation of social services identified in this research at EU and national levels focus on healthcare. While some issues and services are similar to health and social care, a more specific approach dealing with data protection, ethical issues and user involvement would be beneficial for the successful implementation in social services. The crisis ensuing from the Coronavirus disease (COVID-19) pandemic makes this specific focus all the more necessary, as these technologies are vital in ensuring the continuity of care, tackling social isolation and meeting spikes in the demand of care.

Introduction

This report presents the main findings of the research project *The impact of digitalisation on social services*. The aim of this research project is twofold. First, it provides an overview of policy initiatives at EU and national levels that promote the take-up of digital technologies in social care services. This overview includes digital transformation strategies, changes in legislation and other types of policy reform. Second, the report describes some of the drivers, rationales and objectives underlying these policy initiatives, the stakeholders and organisations promoting them, and the barriers encountered in their implementation. In some cases, these initiatives deal with social services as part of wider reforms targeting healthcare (for example, in the case of long-term care services) or the public sector as a whole. In those cases, reference is made to these broader types of policy initiative. The lessons learnt are used to draft messages about future trends and about implementing policy reforms that promote the digital transformation of services.

The structure of the report is as follows.

- The introduction sets out the scope, conceptual framework and methodology followed.
- Chapter 1 describes policy initiatives at EU and national levels.
- Chapter 2 provides examples of the use of digital technologies and possible applications.
- Chapter 3 describes the impact of these technologies, as documented in studies and interviews.
- Chapter 4 provides a conclusion and summarises the main issues encountered, indicating the barriers and mitigating factors to help reap the benefits of digital technologies.

Scope and conceptual framework

The conceptual framework and definitions of digital technologies in this report are those used in Eurofound's 2017–2020 programme of research on the digital age (Eurofound, undated-b). This programme includes research looking at how digital technologies impact the economy, the labour market and society in general. The types of digital technologies analysed in this programme of research are classified according to three 'vectors of change', shown in Box 1.

Many policy initiatives that promote the digital transformation of public services either deal with several types of information technology (IT), information and communications technology (ICT) and digital technology or do not make a clear differentiation between them. In those cases, policies dealing with ITs and ICTs are mentioned. ITs and ICTs are not the main

Box 1: Three vectors of change

Automation of work: This is 'the replacement of (human) labour input by machine input for some types of tasks within production and distribution processes' (Eurofound, 2018, p. iv). Automation in the digital age entails the use of algorithmic control of machinery and digital sensors, with ever-increasing computing power. This expands enormously the range of tasks that machines can carry out. This includes technologies such as advanced robotics, AI and machine learning.

Digitalisation of processes: This involves 'the use of sensors and rendering devices to translate (parts of) the physical production process into digital information (and vice versa)' to process, store and communicate information (Eurofound, 2018, p. iv). It includes technologies, such as the Internet of Things, virtual reality (VR) and augmented reality (AR).

Coordination by platforms: Platforms mediate any activity that uses 'digital networks to coordinate economic transactions in an algorithmic way' (Eurofound, 2018, p. iv). 'Platforms mediate for-profit or not-for-profit economic activities by bringing together service users and providers with the aim of conducting specific tasks or solving specific problems' (Eurofound, 2018). Some examples of platforms in the social care sector are care.com and sittercity.com. Blockchain technology is included in this category as a platform commonly owned by its users (Eurofound, undated-a).

focus of this research. IT refers to 'anything related to computing technology, such as networking, hardware, software, the Internet' (Sciencedaily, undated). ICTs are similar but relate more to communications technologies; they are technologies 'that provide access to information through telecommunications' (Techterms, undated). Regarding the examples of specific use of digital technologies, ITs and ICTs are mentioned in this report only if they are used together with the digital technologies described in Box 1. This is often the case in smart homes, which combine different types of ICT, advanced robotics and the Internet of Things. Information management systems and databases enable the use of digital technologies such as AI, and therefore they are included in this report. Technologies that can incorporate the use of the digital technologies in Box 1 are also described. For example, telecare and other forms of telepresence can include VR or AR. Similarly, assistive technologies are referred to in this report as they can comprise digital technologies such as home automation, assistive domotics or wearable devices. The technique of using big data analytics is also included because of its relevance to the digital technologies analysed here.

In this report, digital technologies are described and analysed in relation to their use in social services, also referred to in this report as 'social care' or 'social care services'. The social services studied here are those listed as services in the European system of integrated social protection statistics (Esspros) manual, which provides a framework for comparing benefits across countries (Eurostat, 2012). These benefits can be in cash or in kind[1] and can be public, private for-profit, or private not-for-profit. Within this wide range of services, the main focus is on the services listed in the European Pillar of Social Rights (European Commission, 2017c), which are:

- early childhood education and care and support to children (for example, parenting support, child benefits)
- social assistance welfare and benefits
- unemployment benefits
- old-age income and pensions
- inclusion of people with disabilities (including incapacity and disability benefits)
- long-term care
- housing and assistance for the homeless

Although sickness/healthcare benefits and services are listed as social services in the Esspros manual and as social protection in the European Pillar of Social Rights, they are not included in the scope of this research. Healthcare cannot be defined as a social service, and it has a more advanced level of deployment of the digital technologies listed in Box 1. An exception is made in the case of long-term care services such as home care, home help, personal care at home, nursing home care, meals on wheels, assisted and independent living facilities and sheltered housing. Those services are included in this report because they have both health and social care components. Long-term care services that are mainly healthcare related are excluded. Therefore, long-term care services provided in hospitals, primary care centres, hospices, health centre wards and other establishments focusing on palliative care, the terminally ill or nursing and rehabilitative services to persons requiring convalescence are excluded.

The use of digital technologies in social services described in this report refers mainly to the design (for example, agenda setting, provision of means) and the delivery or implementation of services. The emphasis is on the role of these technologies in service provision, but their role in administrative processes is also included. Höchtl et al (2016) point out that the use of big data analytics allows for evaluation and monitoring of services and policies during the design and delivery of services in a continuous way, rather than as a separate stage in the public policy process. Therefore, the evaluation and monitoring of policies is not the main focus, but it is mentioned whenever it is considered to be embedded in the design and delivery stages.

Methodology

Most of the information was gathered via semi-structured questionnaires filled in by the Network of Eurofound Correspondents, a group of experts who provide input allowing for the mapping and comparison of regulations, policies and practices in all EU Member States, the United Kingdom (UK) and Norway (Eurofound, 2019b).

In early 2018, the Network of Eurofound Correspondents provided information about the role of digital technologies in the delivery (i.e. the implementation phase) of social services in Member States, the UK and Norway. On the basis of this

1 'In kind' includes non-financial resources that are provided by a third party to the beneficiary.

information and desk research, a further contribution was requested at the end of 2018 from the network in 11 countries: Austria, Belgium, Czechia, Denmark, Estonia, Finland, France, Germany, Slovenia, Spain and Sweden. These countries were identified through the first use of the network mentioned above as having relevant developments regarding the use of digital technologies in the design of social services. The information gathered by the Network of Eurofound Correspondents was complemented by five country case studies (Austria, Estonia, Finland, Italy and the UK).

The country case studies include examples of digitalised social services. They also show how policies and strategies promote digital technologies at national, regional and local levels. Most of the information in the country case studies was gathered through three or more semi-structured interviews with key stakeholders. The interviewees were service providers, organisations representing service users and organisations representing the staff delivering the services (such as trade unions and/or professional bodies).

1 Overview of EU and national digitalisation initiatives

This chapter describes policy initiatives at EU and national levels that promote the digital transformation of social services. These initiatives include different types of public policies, such as changes in legislation, strategies, policy statements, guidelines and funding programmes. As stated in the introduction, while the focus is on those strategies dealing specifically with social services, in many cases the most relevant initiatives deal with healthcare and/or public services as a whole. The drivers that led to the establishment of these initiatives and the barriers encountered in their roll-out are also described.

Digitalisation at EU level

Digitalisation features prominently in the European Semester, which is the process for coordinating economic policies in the EU. This coordination starts with the Annual Growth Survey, which sets out the economic and budgetary priorities in the EU each year. Based on these guidelines, Member States draft their National Reform Programmes, which are subsequently reviewed by the EU institutions. When further action is deemed necessary, country-specific recommendations (CSRs) are issued.

In 2018, Ireland and Portugal received CSRs regarding the need to increase digital skills and digital literacy among their populations. An analysis of the National Reform Programmes submitted by countries in 2018 identified initiatives in the 'recitals' section as well as 'opportunities' to tackle issues through digital solutions in several countries in the areas of 'eSkills', 'eHealth' and 'Digital Public Services Delivery' (see Figure 1). For example, the reform of the Finnish healthcare system includes using digital and electronic services to increase productivity (European Commission, 2019d).

The 2019 Annual Growth Survey gave extensive coverage to the challenges and opportunities associated with digitalisation (European Commission, 2018a). Member States were invited to implement reforms and invest in technologies in order to reap the benefits of technological change and tackle disparities between regions and sectors. In 2019, 17 countries[2] received recommendations related to digital technologies and digitalisation. Most countries that received a recommendation about digitalisation were asked to focus investment-related economic policy on digitalisation (including digital skills and infrastructure), taking into account regional disparities.

In addition to the assessments made as part of the European Semester, the digital performance of Member States is measured by the Digital Economy and Society Index. This composite index includes a 'Digital Public Services' dimension with eight indicators that measure e-government and e-health (European Commission, undated-a). In 2019, the countries with the highest Digital Public Services scores were Finland, Estonia, the Netherlands, Spain and Denmark (European Commission, 2019b).

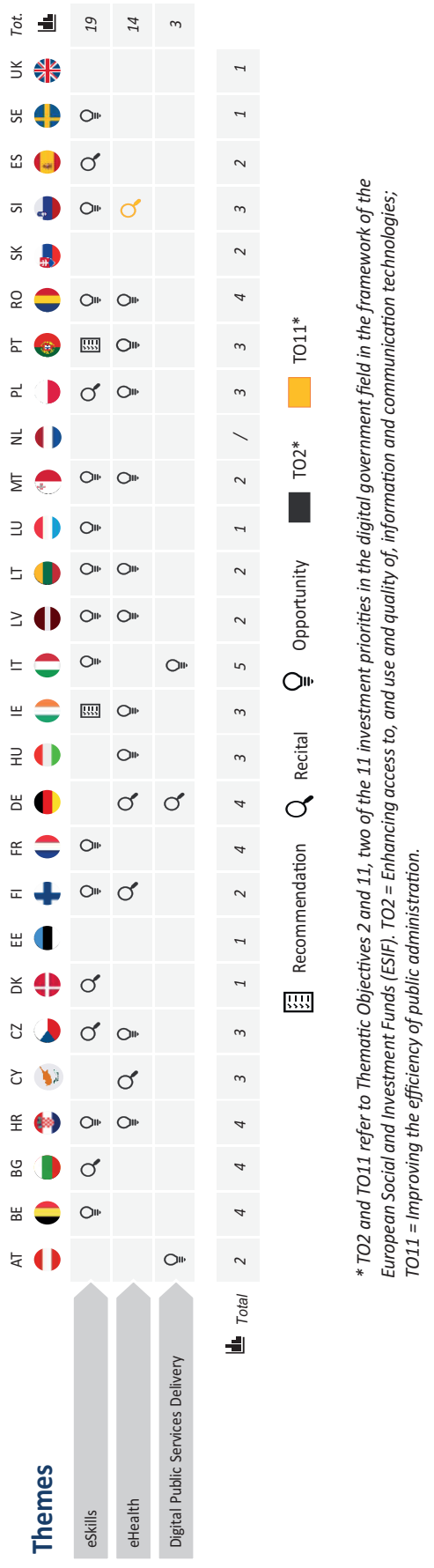
The overarching principles and objectives of the EU in the area of digitalisation are set out in the Digital Single Market Strategy. This strategy states the need for better public services to maximise the growth potential of the European digital economy. It also promotes interoperability, standardisation and connections between public services and authorities; for example, by enabling communication between e-government services in different Member States (European Commission, 2015). The Digital Single Market Strategy includes the eGovernment Action Plan 2016–2020, which consists of three pillars (European Commission, 2016):

- modernising public administration with ICTs using key digital enablers
- enabling cross-border mobility with digital public services
- facilitating digital interaction between administrations and citizens/businesses, changing towards more collaborative, participatory ways of designing a service

The 'Interoperability solutions for European public administrations, businesses and citizens' (ISA[2] 2016–2020) was established by the European Commission to promote interoperable cross-border and cross-sector public services. This initiative supports and funds projects dealing with, among others, big data opportunities for public administrations and bringing new technologies into the public sector.

2 The countries were Austria, Belgium, Bulgaria, Cyprus, Czechia, France, Germany, Greece, Ireland, Italy, Latvia, Luxembourg, Poland, Portugal, Romania, Slovakia and Slovenia.

Figure 1: Digitalisation in the 2018 European Semester



Note: *The European Commission did not issue a CSR to Greece in 2018.*
Source: *Analysis performed by Wavestone, December 2018 (European Commission, 2019d)*

The 2017 Tallinn Declaration on eGovernment entails a commitment from all EU and European Free Trade Association Member States 'towards ensuring high-quality, user-centric digital public services for citizens and seamless cross-border public services for businesses' (European Commission, 2017d). In addition, the Tallinn Declaration includes an annex entitled 'User-centricity principles for design and delivery of digital public services'.

Digital transformation at the local level is promoted through the Urban Agenda for the EU, which includes a Partnership on Digital Transition. The Urban Agenda was established in 2016 to promote collaboration between local authorities across the EU in different thematic partnerships, with the objective of improving regulation, funding and the exchange of information. The Partnership on Digital Transition's action plan aims:

> *to provide improved public services to citizens, to support European cities in exploiting the possibilities of digitalisation and assist European businesses to develop new innovations and create new business opportunities for global markets.*
>
> (European Commission, 2018e)

As for EU policy initiatives beyond 2020, achieving a Europe fit for the digital age is one of the six goals set out by then candidate and now European Commission President Ursula von der Leyen in her political guidelines for the European Commission for the period 2019–2024 (von der Leyen, 2019). The actions envisioned to make Europe fit for the digital age include investment in new digital technologies and the definition of standards. President von der Leyen also committed to putting legislation forward for a coordinated European approach on the human and ethical implications of AI within her first 100 days in office. Other initiatives foreseen include improving the working conditions of platform workers, a Digital Services Act to upgrade the liability and safety rules for digital platforms, services and products, and a Cyber Unit. Moreover, digitalisation of the European Commission is envisaged to lead by example for other public administrations in Europe. Lastly, the Digital Education Plan will be reviewed with the objective of strengthening the digital skills of Europeans (von der Leyen, 2019).

Communication on enabling the digital transformation of health and care

Communications are policy documents – with no legal effect – in which the European Commission presents its point of view on topics. The 'Communication on enabling the digital transformation of health and care' states that digitalisation can provide solutions for challenges such as workforce shortages, ageing and rising public spending. Population ageing is mentioned in the communication as one of the reasons why it is necessary to introduce digital technologies. The increase in demand of health and social care due to ageing means that it is necessary to find more effective ways to deliver services, including prevention and integrated service delivery. The communication emphasises the role of new technologies in achieving innovative forms of service delivery and mentions the EU initiatives relevant to this topic. These initiatives include: ensuring secure access to and sharing of health data; using better data to promote research, disease prevention and personalised health and care; and setting up digital tools for citizen empowerment and for person-centred care (European Commission, 2018d). Most of the content of the communication is more directly related to public health than to social care.

European Innovation Partnership on Active and Healthy Ageing

European Innovation Partnerships coordinate funding and activities at the EU, national and regional levels in different areas. The European Innovation Partnership on Active and Healthy Ageing was established in 2011 'to foster innovation and digital transformation in the field of active and healthy ageing' (European Commission, undated-b). It brings together organisations in the fields of health and social care and digital innovation that deal with active and healthy ageing (European Commission, 2018g). Some of the topics that have been discussed and where there have been exchanges of experiences are electronic health records, e-prescription solutions, health and social care ICT platforms, and telemonitoring (European Commission, 2018c).

Digitalisation at national level

Drivers and objectives

One of the main drivers for using digital technologies in the design and delivery of public services is the expectation that it will make certain services more cost-efficient (OECD, 2016). This was identified as a driver by the Network of Eurofound Correspondents in the digitalisation strategies in Austria, Bulgaria, Croatia, Cyprus, Estonia, Finland, France, Latvia, Norway, Portugal, Sweden and the UK. The Finnish strategy sets as a target to 'make a productivity leap in public services and the private sector by grasping the opportunities offered by digitalisation, dismantling unnecessary regulation and cutting red tape'. The strategy covers all forms of public services, including the provision of social services (Prime Minister's Office Finland, 2015). According to the head of the Austrian association for health and social care occupations (ÖGB/ARGE FGV), digital technologies are used to deploy employees more efficiently, to have faster access to clinical reports (and, consequently, more efficient delivery of care) and to reduce errors in communication.

Another important driver for the digital transformation of health and care services are policies aiming to manage the increasing ageing of the population. Demographic challenges place a strain on the provision of public and social services. Ageing is mentioned in the digitalisation strategies of Austria, Belgium, Czechia, Finland, Germany, Norway, Slovenia and Sweden. The strategy for the information society, Digital Slovenia 2020, supports 'projects for the development and strengthening of services supported by modern technologies for ageing gracefully, provision of comprehensive care and promotion of living in domestic environments' (Government of Slovenia, 2016, p. 42). The Slovenian active ageing strategy also refers to the use of 'new technological products and services [to] create new solutions which, in the context of a long-lived society, provide better opportunities in healthcare [and] long-term care' (IMAD, 2018). The promotion of independent living and ageing in place has also led to further use of digital technologies. In the spring of 2018, the Government of Sweden allocated a grant of SEK 350 million (approximately €33 million as at January 2020) to municipalities to enable them to invest in assistive technologies in social care (Government Offices of Sweden, 2018). Similarly, the 'Health, care and social affairs' section of the Digital Roadmap Austria states:

> *Innovative ambient assisted living and smart home technologies enable elderly and disabled people to lead a more independent life in familiar surroundings. Assistive technologies, mobile applications (apps) and social media should be used alongside conventional specialist applications, taking open source solutions into consideration.*
>
> (Austrian Federal Ministry for Digital, Business and Enterprise, 2016, p. 30)

Norway's White Paper *The healthcare of tomorrow* states that 'increased use of welfare technology opens more possibilities. It can give people the opportunity to master their own life and health, and help more people stay longer in their own homes despite disabilities' (Norwegian Government, 2012, pp. 27–28). The goal of the Innovations in Caregiving 2020 (Pflegeinnovationen 2020) programme in Germany is to strengthen people's ability to stay at home as long as possible and live autonomous lives (Bundesministerium für Bildung und Forschung, 2014). This programme is part of a wider

digitalisation strategy (High Tech Strategy). As part of this strategy, a funding programme was launched in 2018 for the development and/or testing of innovative robotic systems, which are geared towards practical requirements of care (Braeseke et al, 2019).

The digitalisation strategy of the Veneto region in Italy explicitly mentions social services as 1 of the 10 priority thematic areas for the implementation of the digitalisation strategy (Regione del Veneto, undated). As a starting point, it finds that the increase in the average age of the population, the rise in requests for social welfare services, the unfavourable socioeconomic conditions and, at the same time, the scarcity of resources in social services require a fundamental review of today's organisation of social services. This strategy includes the promotion of wearable devices, home sensors and telecare to support active ageing. The aim is to create a coordinated network of projects in which the digital component improves the autonomy and quality of life of older people.

Strategy types

The digital transformation of social services can take place in the framework of digitalisation strategies targeting the whole public sector. For example, the modernisation of the public sector initiated in France in the early 2010s resulted in the roll-out of online, paperless procedures. This meant that benefit applications for social housing for older people, people with disabilities and others could be filled in online.

In some countries, the digitalisation of social services takes place alongside that of healthcare. In Sweden, the government and the Swedish Association of Local Authorities and Regions have developed Vision e-hälsa 2025, an e-health policy that concerns the digitalisation of social services (without specifying exactly the social services covered). The aim is to make Sweden a world leader in using the full potential of digitalisation and e-health by 2025 (Sveriges Kommuner och Landsting, 2016). A survey sent to all public and private social service providers in Finland in 2017 found that, since the 1990s, the national technological development of health and social services has been steered primarily from the healthcare sector's perspective, not necessarily looking into the special features and needs of social services or giving social services a role in the development work. The study concludes that the strategy does not sufficiently take into account the special features of the social care sector (Kuusisto-Niemi et al, 2018). The Finnish Ministry of Social Affairs and Health also conducted an assessment in 2018 of the situation and development needs of digital services in social care, based on stakeholder consultation and examination of the relevant websites of municipalities. This assessment also confirmed the finding that social services are lagging behind healthcare when it comes to digital services (Kauppila et al, 2018).

In other Nordic countries, the use of digital technologies in health and social care (mainly long-term care) is referred to as 'welfare technology'. In Norway, welfare technology (*velferdsteknologi*) is defined as

> *technology that might contribute to an increased sense of security, social participation, mobility and physical and cultural activity, and that enhances the individual's ability to take care of him/herself in everyday life despite sickness or social, mental or physical impairment.*
>
> (Ministry of Health and Care Services, 2011, p. 11)

In Denmark's Digital Strategy 2016–2020, the term used is 'digital welfare solutions' (*digitale velfærdsløsninger*). The Danish Common Public-Sector Strategy for Digital Welfare 2013–2020 has seven priority areas, mostly dealing with healthcare. The priority on welfare technology in nursing and care includes the use of assistive devices that help people with disabilities in sheltered housing to eat. In 2014, smart homes technology was piloted in several municipalities, and a forum was established to discuss further use of digital technologies to support people with disabilities. Submission of information via speech recognition technology will be put in place in 2020 to improve case processing in welfare services (for example, by reducing time spent on documentation) (Danish Agency for Digitisation, 2013).

Another area in which the digitalisation of health and social care takes place simultaneously is the access and integration of data. Common databases enable the integrated delivery of health, social and education services, something that has been encouraged at EU level (for example, in the 2013 Social Investment Package or the 2008 Active Inclusion Recommendation). In France, the 2016 law for the modernisation of healthcare allows administrations to rely on certified external hosts for the implementation of programmes with health and social care personal data, such as the personalised medical record. This allows the sharing of information between different health and social care staff (for example, physicians and social workers) in the national system of health data (the SNDS database). Similarly, in Belgium, since February 2015, the process for requesting services in cash or in kind for people with disabilities has been digitalised in an information data management system, eHealthBox. This allows easier access to medical files for GPs, carers and home nurses, because it acts as a centralised hub for medical information, and it improves efficiency and reduces errors. Patients must give digital consent to every stakeholder wanting to access their medical files in the system. In the future, this system will be extended to other organisations that are involved in services for people with a disability (for example, employment services, services for people with disabilities or the

centre for vehicle adaptations). The digitalisation strategy of the Veneto region in Italy envisages the creation of big data and advanced analytics applications for social and socio-health data. The objective is to integrate available health and social data to create a real world of big data and create advanced applications that respond to the timely needs of governance, management, monitoring and research in the social care and health fields. An assessment conducted in 2017 in Finland on the progress of digitalisation in healthcare found that both primary and specialised healthcare are increasingly exchanging information with social services, which is considered a result of natural development according to the digitalisation strategy. However, not all regions had integrated social services into their regional information systems (Reponen et al, 2018).

Policy initiatives that deal with the digitalisation of healthcare often encompass long-term care. For example, the Flanders Care 2.0 policy, launched in 2015 in Belgium, supports the modernisation of the healthcare sector, including promoting the use of digital technologies in long-term care. In Germany, digital technologies are implemented in four health and social care centres (*Plegepraxiszentren*) that provide clinical, inpatient and outpatient care (including long-term care). The objective is to improve the living conditions of service users and the working conditions of staff. In this case, the technologies used include cleaning robots and beds that adjust the reclining position using sensors. These centres are part of the Federal Ministry of Education and the Care of the Future research cluster (Pflege der Zukunft), which started in 2017 and will operate until 2022 (Bundesministerium für Bildung und Forschung, 2018). The self-learning systems (Lernende Systeme) platform in Germany brings together experts in AI, robots and software systems that learn from data. One of its working groups focuses on the possibilities offered by self-learning systems for prevention, diagnosis and treatment in medicine and long-term care and rehabilitation. The working group is looking at possible uses of these technologies, along with their social acceptance and data protection issues (Lernende Systeme, undated). There are six measures in the Austrian federal government's Digital Roadmap policy area related to 'Health, care and social affairs'. Of the six measures, one deals directly with social services and is focused on encouraging 'the widespread use of assistance systems to help elderly people and people with special needs' (Austrian Federal Ministry for Digital, Business and Enterprise, 2016, p. 30).

2 Role of digital technologies in the design and delivery of services

This chapter defines the digital technologies that are currently in use in social services. It also provides information about the aims and specific functions of these technologies, as well as some estimates about levels of deployment and how they are likely to change in the near future. Although the services analysed include services in cash and in kind, most of the uses of these technologies are in kind.

Advanced robotics

The research carried out by Eurofound on game-changing technologies in the service sector focuses on advanced robotics, defined as:

> *the improvements in machine dexterity and the machine's ability to interact with its environment, as a result of which robots can be engaged in tasks that go beyond repetitive, discrete motions.*
>
> (Eurofound, 2019a, p. 3)

Eurofound's research shows that advanced robotics has reached full deployment in several manufacturing sectors and it is at an early stage of deployment in the service sector (Eurofound, 2020). This earlier level of deployment in the service sector can be partly attributed to the fact that robots working in this sector need to adapt to settings and cannot solely perform pre-defined tasks (Eurofound, 2019c). In the health and social care sectors, the scoping study on the emerging use of artificial intelligence (AI) and robotics in social care (Skills for Care, 2018) makes a distinction between physically assistive robots, socially assistive robots and cognitive assistance robots. Dahl and Boulos (2013) provide a more detailed classification based on the functions of robots, settings and users:

- robots providing assisted logistics in hospital and care home environments
- companion robots in home and hospital settings
- robots as motivational coaches for following exercise plans and diets
- humanoid robots for entertaining, educating and improving the communication skills of children with special needs
- home assistance robots for older people

The Skills for Care (2018) literature review found that the use of physically assistive robots is limited due to safety concerns. The main barriers for further use of AI and robotics identified in the literature review include costs and the antipathy felt by staff and users towards these technologies. This lack of confidence in robots is also shown in a Eurobarometer poll about public attitudes towards robots. When asked about the care of children, older people and people with disabilities, 60% of respondents felt that robots should not be used, which is much less positive than the attitudes expressed for the potential use of robots in other sectors such as healthcare and education (European Commission, 2012). In Europe, the level of deployment of robots in health and social care varies greatly from country to country. A report on the state of home care in Italy found that robotics was not used at all in the case of care for people with disabilities (Vetrano and Vaccaro, 2017). In contrast, the Network of Eurofound Correspondents was able to find several examples of use of robots in the Netherlands. The level of deployment in Europe is much lower than in Japan, where approximately 5,000 nursing homes have tested robots (The Economist, 2017).

As for future trends, the use of robotics in home care is constrained by the high price of robots. Social robots and virtual care models cost approximately GBP 25,000 (€28,000), and even if prices decrease over time, they will require a longer-term investment than the three-year contracts usually awarded by local authorities in the UK (Institute of Public Care, 2018). Further use of robots is therefore more likely to take place in care homes that can make a financial investment. Technological improvements are also necessary to increase the use of robots in home care (interview with a service provider in Austria). Dahl and Boulos (2013) identify a shift from costly, task-specific robots to more versatile and generally cheaper robots that interact with humans. Although robots are getting cheaper, cost remains an issue due to the lack of investment (from the public sector, insurance companies or care homes) beyond piloting projects.

Some specific examples of the use of robots in health and social care identified by the Network of Eurofound Correspondents and the country case studies are listed below.

- Zora is a socially assistive robot that has been used in Belgium in hospitals and nursing homes to assist older people and children. Zora can play interactive games and help with rehabilitation exercises. Zora can also interact with users to motivate them or to play music.

Box 2: Stevie and Stevie II – Ireland

In 2017 a robotic lab in Dublin presented Stevie, a robot that carries out routine tasks in assisted long-term care facilities. Some of the tasks are performed autonomously (for example, reminding users to take their medication), whereas other tasks are controlled by humans. Robot Stevie has humanoid features and interacts through sounds, lights and facial expressions (Trinity College Dublin, 2017). This robot has been piloted in Ireland, the UK, Italy and the US. The second version of this robot was the first social assistive robot with advanced artificial intelligence at the time of its presentation to the public (May 2019). The mobility and expression capabilities of Stevie II have been enhanced (Trinity College Dublin, 2019). The robot was included by *TIME* magazine in its list of 100 best inventions of 2019.

- In the Netherlands, the social robot Tinybot Tessa talks about specific personal memories of service users and plays music tailored to their tastes. The memories and music are recorded in an app. Tinybot Tessa prepares people for their care appointments and encourages them to do things that they can still do themselves, like drinking an extra glass of water on a hot day or going for a walk. The use of Tinybot Tessa has been tested mainly on older people with dementia, but it also appears to have a positive effect on people with intellectual disabilities or cognitive behavioural disorders.

Artificial intelligence

AI has been defined by the European Commission as follows: 'Artificial intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals' (European Commission, 2018b, p. 1). AI can be considered as enabling and supporting other technologies described in this chapter, as algorithms are often embedded in platforms and the Internet of Things, or it can be used to analyse data in blockchain or create software for AR/VR (Eurofound, 2020). The health sector has been hailed by the Organisation for Economic Co-operation and Development (OECD) as the perfect platform for AI, due to the need for data to improve diagnostics and treatments and because of the volume of data generated by patients and professionals in electronic health records and the Internet of Things. AI can contribute to the improvement of decision-making in the diagnosis and treatment of patients and to the development of new treatments. In the public sector, AI can contribute towards reducing the time spent on customer support and administrative tasks and increasing the involvement of citizens in the policymaking process. AI can also contribute towards better-informed decisions in the design of services and policies; for example, by fine-tuning the allocation of resources for health and social care services in different areas (OECD, 2019a).

In the UK, for example, Harrow Council is testing the IBM Watson AI platform to add healthcare to its online personal budget solution, Community ePurse. The AI platform pulls data from various aspects of a person's assessments and care plans, searching and analysing unstructured text for key concepts to help social care and health service workers access information relevant to that individual. Harrow Council expects this new IBM Watson platform, which incorporates the council's expanded online personal budget, to reduce costs by enabling care workers to optimise people's health and well-being through offering general practitioners (GPs) preventative options, reducing visits to hospitals and emergency rooms, and driving competition among service providers (IBM, 2018).

Box 3: Sentab seniors platform – Estonia

The Sentab system is a platform providing entertainment, social interaction and monitoring functions to connect seniors, their caregivers and relatives over the interfaces that are the most common for them, for instance a television interface for seniors and web and mobile interface for caregivers. Early trials at five nursing homes indicated that Sentab features are well aligned with the needs of seniors and caregivers. However, the system could be improved with further data analysis capabilities to determine the emotional state and short- and long-term memory of older people.

Sentab has developed a set of complex software algorithms for detecting mood patterns and recognising trends in seniors' emotional states, along with an internet protocol-based communications system and a database management system. For seniors, the system improves accessibility to social care and supports inclusiveness because they can live more independently.

Box 4: Unemployment profiling – Poland

The reform in 2014 of 340 job centres in Poland by the Ministry of Labour and Social Policy brought in the use of automated data processing and algorithmic decision-making to create unemployment profiles. The objective was to increase efficiency in job searches and create a more customised service. The data given by users at the job centres help to categorise them into one of three profiles, each of which has a different likelihood of employability and provides potential access to different types of services. Another selection without the computer-assisted tool is conducted within each category to choose the individuals who will actually be accepted into programmes. The tool is not fully automated; front-line workers may change the computer-generated decision about the profile if they disagree with it (CIHR, 2017).

Internet of Things

The European Parliament defines the Internet of Things as 'a distributed network connecting physical objects that are capable of sensing or acting on their environment and able to communicate with each other, other machines or computers' (European Parliament, 2015, p. 2). This includes wearable devices and sensors worn on the body (for example, smartwatches) as well as other devices that can transfer data to one another without human interaction. As in the case of the manufacturing and service sectors, the use of these technologies is expanding in the field of health and social care. Most municipalities in Sweden now use digital security alarms, and almost half (46%) have digital night supervision at home. In 2016, 29% of local authorities had mobile alarms via GPS, and 25% had fall alarm sensors and motion sensors (Socialstyrelsen, 2017).

Technology integrated into the homes of older people with the objective of helping them to live more independently often includes the Internet of Things. A systematic review of smart home applications for older people identified the following uses of technology: functional monitoring, safety monitoring, physiological monitoring, cognitive support or sensory aids, monitoring security and increasing social interaction (Demiris and Hensel, 2008). As stated in the introductory chapter, smart homes for older people often combine different types of digital technologies. For example, in the EU research project VictoryaHome, technologies such as fall detection, personal alarms and smart pillboxes have been combined with a smartphone app for family and friends and a video communication robot at home. The aim of this project is to allow older people to live longer in their own homes, and it comprises a set of technologies that have been tested within real care homes. The project includes technologies for medical care and telemedicine, as well as social well-being.

Box 5: Smart homes – Austria

The project moduLAAr/Leichter Wohnen ran between 2012 and 2015. As part of the project, 50 homes of older people (most of them living alone) in the federal state of Burgenland were equipped with sensors in bathrooms, doors and windows as an accident prevention and notification system. These homes were also equipped with devices providing reminders (for example, to take medication) or for social interaction. As part of this project, the HOMe Event Recognition System (HOMER) and a platform for the interaction between carers and relatives (OwnCloud) were developed (moduLAAr consortium, 2017).

As part of a collaboration between several Austrian research institutes, an IT company and a social service provider, the research project titled ZentrAAL was implemented in 60 households. Target groups were younger active seniors (60–75 years) with initial signs of needing support and security (for example, type 2 diabetes, minor cognitive limitations). The following devices were used: tablets (one mobile, one stationary), digital door peepholes, stove monitoring systems, contacts at windows and doors, radio light switches, digital scales, as well as fitness and emergency watches. All components were embedded in the myZentrAAL platform. Within the pilot region, ZentrAAL was available in two areas in Salzburg urban area and the rural area of Innergebirge, where 60 households were equipped with smart technologies for 15 months.

Regarding the development of this technology in the future, according to a service provider in an interview conducted as part of the case study in Italy, the development of new sensors and the evolution of analytical systems will make the use of this technology simpler and, therefore, could increase overall acceptance of technological devices. The acceptance of smart-home technologies will be much higher in the future, as older people will be more familiar with modern technology. An increasing number of private companies offer smart home devices. Given the expected increase in familiarisation with digitalisation technologies among older people, researchers will probably not develop applications tailor-made for older people anymore, like the moduLAAr/Leichter Wohnen application. The strategic paper of the City of Vienna also concludes that one can expect the use of this technology to increase (City of Vienna, 2016).

Telecare

The terms 'telecare', 'telehealth' and 'telemedicine' are often used interchangeably. A study documenting the use of telecare in Europe used the following definition:

> *Telecare includes technical devices and assistive technology as well as professional healthcare services to assist, monitor and care for people from a distance. Telecare includes a variety of services such as communication, monitoring, consultation, diagnostics and training.*
>
> (Pacita, 2014, p. 9)

The general objectives of telecare services are as follows (Government of Spain, 2017):

- promoting the permanence and inclusion of dependent people in the context where they normally live
- enhancing and keeping the degree of autonomy and independence of dependent persons at home
- favouring the safety and trust of dependent persons
- providing relief for dependent persons and their relatives
- serving as support for carers living with the dependent person

The mapping out in the Parliaments and Civil Society in Technology Assessment (Pacita) study showed that telecare in Europe mostly included the following technologies: sensors and monitoring devices, detectors, alarm systems, communication devices, video or imaging devices, smartphone apps and specialised medical devices connected to the internet (Pacita, 2014). Another study estimated that, by the end of 2018, around 7.8 million people in Europe were using some type of telehealth or telecare technology. The most commonly used type of device is traditional telecare alarms that have a button that can be pressed in case of emergency (Fagerberg and Hellström, 2019). In Finland, videoconferencing and other remote services, such as online counselling with customer authentication, are available in 9% of services for people with disabilities, child welfare services and services for families with children (Kauppila et al, 2018, pp. 25–26).

Below are examples from the UK and Finland of how telecare is being used.

- Technology Enabled Care services (by Tynetec) in the UK are designed to empower individuals to support themselves in their own homes and manage their own health conditions. Connected Care services (by Tunstall) combine a range of unobtrusive alarms and sensors, connected to a 24-hour response centre, which detect smoke or gas or a person falling; the aim is ultimately to improve health outcomes. The private companies Tynetec and Tunstall provide products and services such as telecare devices, at-home alarms, activity monitoring, bed occupancy sensors (to notify possible falls), to allow users to live independently but receive social assistance when needed. The targets for these products include older people and people with disabilities. Such products enhance users' access to care services while also improving their inclusion since they can live independently instead of staying in hospitals or care homes.
- Virtu.fi is a service for healthcare and social services professionals in the sparsely populated Finnish Lapland region. The service enables online and video consultations for people with disabilities, child welfare services (for example, legal consultation), early support, multidisciplinary cooperation, counselling, special teaching and language development services, psychosocial assistance for children and for families, support for child rights issues and other care services for children. It also provides methods for transferring data/information. The service combines various technologies for service providers, such as telepresence for consultations and other forms of co-working and information transfer forms for relaying confidential information, and allows communication between professionals and between professionals and users. Virtu.fi also provides services for citizens, such as online bookings, guidance and counselling (including via telepresence), and tools for measuring various personal health indicators.

As for future trends, the Pacita study highlights that the demographic changes that will shrink the pools of both informal carers and formal carers will also increase the demand for telecare services. From the technological side, the general increase of wearable devices in all areas of society will increase both acceptance and use of telecare devices. The interaction between devices is also predicted to improve over time. As for barriers to further use of telecare, the study lists the cost of devices, legal, ethical and data protection issues, and the need to train staff and users (Pacita, 2014).

It is estimated that by 2024, the more advanced types of telecare devices (for example, mobile telecare alarms or devices that can automatically trigger an alarm) will be the most predominant in Europe, with a predicted 8.3 million users (Fagerberg and Hellström, 2019). In the UK, it is estimated that the demand for Technology Enabled Care services will increase with the ageing of the population and care budget constraints. Introducing more monitoring services to provide 24/7 remote support via traditional and digital routes will create efficiencies of scale while helping older people to care for themselves (Appello, 2016). People aged 50–60 are already more tech-savvy, so there will be more demand for this type of technology. The traditional method of service delivery is changing, with greater emphasis now on how technology can support people through proactive alert monitoring rather than reactive response calls (LGA, 2017). An end-user association of people with disabilities in Italy explained that in social services the sectors of greatest development and perhaps of most interest are those related to teleassistance and the management of digital administration related to accessing social services.

Blockchain

Blockchain is a database (ledger) operating in a distributed network of multiple nodes or computers that keeps track of data transactions (Wright and De Filippi, 2015). In the public sector, this technology allows transactions to be managed securely without the need for a third party. Other possible benefits from this technology for the public sector are more tailored services for citizens and greater transparency and trust in governments. Identification via blockchain can be used to allocate funding and benefits in cash in a more time- and cost-efficient manner. In the area of social welfare, blockchain has been used by pension providers in the Netherlands to set up a pension infrastructure that allows tax authorities, employers and employees to monitor the contributions made by individuals in different pensions funds (European Commission, 2019a). In the UK, together with a company called Govcoin, the Department for Work and Pensions (DWP) piloted the use of blockchain technology to make social welfare payments in 2016, but concluded that it was not viable due to limited take-up and the costs involved (FinanceFeeds, 2018). There were also concerns regarding the handling and safety of personal data (Financial Times, 2016). In 2019, the deputy director at the DWP's Digital Delivery Shared Platforms stated that they were exploring the use of this technology to make faster payments (UK Government, 2019).

Box 6: MONI prepaid cards – Finland

The Finnish Immigration Service has chosen a financial services provider for one of its pilot programmes to provide refugees with MONI prepaid credit cards and mobile-first, customisable payment accounts for paying salaries and to replace the current cash payments for government benefits. The prepaid card is also linked to a unique digital identity stored on a blockchain. In this way, the asylum seekers can access financial services and they also have an easy way to verify identity. For those without official documents, this kind of digital identification allows them to perform a variety of tasks, from day-to-day errands and finding employment to accessing social services, thus helping with integration in society. The MONI card provides services in cash and in kind, allowing access to a range of social services through the card holder's digital identity.

Box 7: Casserole Club – UK

Founded in 2011 by the FutureGov consultancy and designed in partnership with four local authorities, Casserole Club is a social enterprise that connects those who enjoy cooking (and often have extra portions of home-cooked food) with those who may not be able to cook for themselves. The service is facilitated through an online platform that allows people to sign up as cooks and search for diners in their area to whom they can offer a meal. Most diners are over the age of 80, making Casserole Club an effective way of addressing isolation and loneliness among older people. Casserole Club now has more than 4,000 volunteer cooks nationwide. It allows neighbours to make friends through the shared experience of food, reducing isolation and loneliness and reinforcing inclusiveness in the process. It is an alternative to services like meals on wheels that are provided by public authorities and community centres.

Platforms

Platforms are digital networks that coordinate transactions in an algorithmic way. There are three parties involved in a digital platform: the online platform, the client and the user. Digital platforms aim to conduct specific tasks or solve specific problems (Eurofound, 2018). A mapping-out exercise found that 6.6 million people work worldwide on the care provision platform care.com (which is based in the United States and operates in 11 EU Member States), making it the second-largest company worldwide in terms of workforce in the on-demand economy (Smith and Leberstein, 2015). Another study of the scope and business of European platforms found that many of them have social aims, such as promoting volunteering (European Commission, 2017a).

Several examples of platforms matching, or mediating, supply and demand of social services were found in this research.

- Care.com is a company based in the United States that matches supply and demand for services such as care for children and older people, tutoring and special needs care. It operates in Austria, Belgium, Denmark, Finland, France, Germany, Ireland, the Netherlands, Spain, Sweden and the UK.
- In Belgium, AirBsit connects families to local babysitters and shows recommended babysitters used by friends (Deutsche Welle, 2016).
- iCareCoops in Denmark connects care professionals, volunteers and older people in need of care services, reducing the costs of care through volunteering.
- Hometouch in the UK finds home carers in the area and provides support with contracts, payments and emergency backup.
- CareMate in Estonia connects older people and people with disabilities with certified caregivers. The company ensures caregivers receive training.
- In Estonia there is also Helpific, which enables people with disabilities to find short-term social assistance from volunteers or paid help. Different kinds of assistance and services are available, including transport, home cleaning, assistance during events, etc.

Virtual reality and augmented reality

VR is the simulation of an artificial environment in which users can interact with objects or other users. A headset can be used to simulate a highly immersive environment. AR adds layers of digital information over the physical environment, providing information but not creating the same degree of immersive environment as VR (European Commission, 2017b). Staff can use VR to get a better understanding of service users' situation. A social enterprise in the UK (Cornerstone VR™) trialled this technology so that staff being trained can experience the sort of events that children in care may have been through (for example, neglect, domestic abuse and other traumatic family issues) (The Big Issue, 2019; The Cornerstone Partnership, undated). VR has also been used with care home residents who have dementia. Khora Care in Denmark creates VR that can be experienced together with other people with dementia, as well as with staff and relatives (Khora Virtual Reality, undated). Also in Denmark, the Aarhus local authority has developed an app (Job on the run) that matches jobs with job applicants. GPS technology allows users to find job vacancies in the nearby area. Businesses that post a job vacancy can also include a VR video with a 360-degree camera, so that job candidates can view it with VR glasses or on their smartphone or tablet (Aarhus Kommune, undated).

Future trends

The Eurofound European Jobs Monitor shows that personal care workers in human health and social work activities accounted for 5.2 million jobs in Europe in 2018, making it the seventh-largest employer in the EU. This type of job experienced modest growth (2.8%) between 2011 and 2018. Furthermore, public expenditure in long-term care is estimated to grow to a greater extent than expenditure on healthcare or pensions (European Commission, 2018h). However, the wages for these types of jobs are in the 21st percentile, which is much lower than most of the other jobs employing large numbers in Europe (Eurofound and European Commission Joint Research Centre, 2019). Data from the 2018 European Union Labour Force Survey show that, in the EU, approximately one-third (34.3%) of personal care workers working in human health and social work activities were in the 50–64 age category, slightly higher than the total employment average (30% of those employed were in that age bracket). Most workers (87.4%) in those activities were women. The combination of low wages and an ageing workforce comprising almost exclusively one gender suggests that there might be supply shortages in the near future, which is even more problematic given the context of increasing demand due to ageing populations.

This expected shortage in the social care workforce will increasingly be a driver for the use of digital technologies. Austria, for example, received a CSR in 2019 related to the sustainability of health and long-term care. It is estimated that long-term care expenditure will double by 2070. Therefore, the Commission recommends more effective public procurement and greater use of e-health solutions (European Commission, 2019c). Given the expected workforce shortages, national government representatives felt that the digitalisation of social services will continue to increase in the next 5 to 10 years.

Gaps in public provision also offer opportunities for private providers using digital solutions. This is true for all digital technologies covered in this report, but perhaps especially so for platforms since they connect clients and workers. The developer of betreut.at (the Austrian version of care.com, a platform matching supply and demand for care services at home) felt that policymakers' choices regarding public provision of services impact the demand for and future development of platforms. If more private childcare is needed, there will be increased demand for this service via platforms. The reduction in informal care provision will also influence the demand for private services through platforms. Platforms offer formal schemes in sectors particularly prone to undeclared work and thus have the potential to formalise care that was previously provided informally or was undeclared (European Commission, 2018f).

In contrast, digital technologies that require public funding would be negatively affected by budget constraints. The providers of the Technology Enabled Care telecare services in the UK limited the deployment of this technology due to a lack of resources from local authorities. Social robots and virtual care models cost approximately GBP 25,000 (€28,000) per unit, and even if prices decrease over time, these technologies will require a longer-term investment than the three-year contracts usually awarded by local authorities in the UK (Institute of Public Care, 2018).

3 Impact of digital technologies

According to the managing director of the UK development group Places for People, 'digital is about making life better for people who live in independent living and making life easier and simpler and it makes our services more efficient and cost effective' (Appello, 2016, p. 8). This chapter presents some of the evidence regarding the impacts of digital technologies for service providers and service users. The reporting of these impacts is based mainly on studies and evaluations that were identified by the Network of Eurofound Correspondents. The five country case studies conducted as part of this research include studies documenting the impacts of digital technologies. The country case studies also identify impacts through interviews with key stakeholders (for example, service providers, organisations representing service users and organisations representing staff delivering the services).

Eurofound's research on game-changing technologies in the service sector has found that the level of evidence regarding their impact on working conditions is weak (Eurofound, 2020). The available evidence on the effectiveness of AI and robotics in social care is underdeveloped, partly because the use of these technologies is limited and much of it is in the preliminary or pilot stages (Skills for Care, 2018). In Italy, the use of digital technologies in long-term care is at an early stage, and therefore the level of evidence available is limited (Vetrano and Vaccaro, 2017). The French Court of Audit notes that the impact of the digitalisation of services in France is poorly documented and lacks systematic evaluation; it recommends the use of satisfaction surveys as a remedy (Cour des Comptes, 2016). The providers of Technology Enabled Care services in the UK (described in the 'Telecare' section in Chapter 2) note that there has been a shift from a model of outsourcing services, which focuses on the inclusion of technologies and roll-out targets, to a model that emphasises the required outcomes and, subsequently, decisions about which technology to use.

Impact for work organisation and processes

The information in this section includes some findings from other Eurofound research (Eurofound, undated-b). This research includes three literature reviews looking at the impact on each of the three clusters of technologies (i.e. digitalisation, automation and coordinating by platforms) and their implications for job quality, labour market, social policy, social dialogue and industrial relations (Eurofound, 2017a, 2017b, 2017c).

Another Eurofound research project looked at the implications of advanced robotics, autonomous transport devices, blockchain, wearable devices, VR and AR. The current and potential impacts of these five digital technologies were classified in terms of employment, skills, work organisation, work processes and working conditions (Eurofound, 2020).

Changes in work organisation and the nature of tasks

Even though blockchain is still in the early stages of adoption in the service sector, it may lead to the replacement of intermediaries, contracts and/or verification systems (Eurofound, 2019a). The use of blockchain in the prepaid MONI card for refugees in Finland (see Box 6 in Chapter 2) has made it easier for the authorities to pay allowances: instead of needing to handle and distribute cash manually, all payments are made digitally to prepaid MONI cards provided to the asylum seekers, saving time and allowing personnel to focus on other tasks.

Digitalisation of information is a more efficient way of storing, processing and communicating information than the analogue format. Local Government Denmark collected information on the use of welfare technologies (such as telepresence and digitally supported rehabilitation and physical exercise) by 98 local authorities. Telecare and 'screen visits' reduce commuting time, allow more flexibility in organising work and tend to be shorter than home visits (KL, 2017). These changes were also found in the case of ICTs that render information from analogue to digital format. In Malta, the Welfare Case ICT Management System has led to several benefits. Prior to its set-up, social workers were still drafting handwritten notes and using paper files and spreadsheets to log their daily activities. The benefits of the new system include a higher level of collaboration between social workers and less time spent on routine tasks such as paperwork. Because of this, social workers spend more time on their core professional duties (MITA, 2017).

Other national studies show disadvantages associated with the use of ICTs and digital technologies. Service workers involved in the roll-out of Universal Credit in the UK (described in the 'Technical issues' section in Chapter 4) expressed concerns about increased workload because the change to an online system of welfare claims will require assisting users to manage their online accounts and solving technical problems (Hodkinson et al, 2016). In France, 93 social workers and managers were interviewed (individually or in focus

groups) as part of a study of ICTs at work: three-quarters (75%) of the social workers interviewed stated that they needed to do tasks online on behalf of users. Almost all workers (95%) stated that they needed to help service users with tasks online frequently (Davenel, 2016).

The increase in documentation requirements linked to digital technologies is perceived differently by managers and carers in Austria. Carers feel that more time spent on documentation means less time available for the provision of care. Carers also report that the electronic format can be problematic and that a lot of irrelevant information is asked for and/or provided (Winkler et al, 2006). Management rates aspects of documentation requirements more positively. For them, digital reporting provides legal protection, makes the work visible, ensures continuity, provides important information for the planning of care, increases quality, ensures information flow, is a natural part of the caring process, reflects on tasks performed, facilitates interdisciplinary cooperation, facilitates coordination within teams, improves occupational role/professional self-image, increases patient satisfaction and decreases time spent in changing shifts (Winkler et al, 2006).

Zechmann (2014) interviewed staff about their attitude towards the technology in the moduLAAr/Leichter Wohnen project (described in the 'Internet of Things' section in Chapter 2). Service providers particularly appreciated the availability of data, such as automatic measurement of blood pressure. The charity Samariterbund Burgenland (the service provider), however, indicated that moduLAAr/Leichter Wohnen made it necessary for staff to check whether users had difficulties with the technology. The staff interviewed felt that moduLAAr/Leichter Wohnen generally increased their workload because of the additional time needed to look at the health data transferred by the system and because they had to reply to questions from users.

Aside from the impact on reporting and administrative workloads, the digital technologies in the digitisation category (such as telepresence) can also enable increases in productivity by rendering physical location irrelevant for many types of service delivery (Eurofound, 2018). Also, wearable devices provide managers with real-time tracking data about workers and consumers and can be used as a basis for making changes in work organisation and processes (Eurofound, 2019a). In the case of social care, this is reflected in the Digital Supervision project in Norway, which involved the use of digital sensors at night in nursing homes, care homes and private homes to alert personnel if something went wrong. The project was tested in four Norwegian municipalities, and the staff involved felt that resources were used more appropriately (HMS Magasinet, undated; USN, undated). Similar technology for monitoring patients at night has reduced the number of staff required during night shifts in Sweden. However, it has also increased stress among the remaining staff, particularly when there have been problems with the technology (ETC Västerås, 2017).

Technology Enabled Care services in the UK (described in the 'Telecare' section in Chapter 2) have reduced the workload of care staff while ensuring that emergencies are dealt with faster (Appello, undated). For a representative of the Technology Enabled Care Services Association, this technology allows for more efficient use of resources, as staff can reduce time spent on some care tasks (for example, making calls to or visiting all patients) to focus on emergencies. According to a survey with care providers, 51% of respondents see connectivity as a key benefit of digital care systems, with 45% mentioning the advantages in terms of communication and inclusion (Appello, 2016). The service provider PA Consulting noted that, in the context of a reduction of carers in the market, telecare allows for better use of staff capacity.

The digitalisation of processes can lead to issues regarding the privacy and autonomy of workers. However, better information can also improve work processes; for example, by reducing the need for workers to repeat tasks (for example, quality control) or by increasing safety (Eurofound, 2018). A study carried out by Peña-Casas et al (2018) looked at the impact of digital technologies in home care and in public employment services in France, Italy, Spain and the UK. The desk research, questionnaires and focus groups with workers and trade union representatives showed the impact on work processes and job quality. In both home care and public employment services, the majority of those interviewed felt that digitalisation had a high impact in the loss of control over working processes and methods and the introduction of performance-oriented management. Most of the interviewees working in public employment services felt that these technologies had a high impact on the monitoring of work and workers and that they led to the loss or standardisation of social relationships with colleagues and service users. Questionnaires and focus groups with staff in public employment services pointed to a perceived dehumanisation of the work they do, which had become more individualised and compartmentalised. In the home care sector, the opposite was found, with most of those interviewed feeling that impact on those areas was low (Peña-Casas et al, 2018).

Changes in the cost of service provision

Many of the studies identified by the Network of Eurofound Correspondents focus on the economic gains achieved with digital technologies. In Norway, Intro International AS and AHO (2015) evaluated the effects of implementing digital technologies in long-term care services in some parts of Oslo. The digital technologies analysed included medicine dispensers, security alarms and devices for health checks. The findings indicate that welfare technology reduces pressure on healthcare services by decreasing consultations, home nursing services and admissions to hospital. The study by Local Government Denmark referred to in the previous section showed that the economic gains achieved through the use of digitally supported training come from less commuting by therapists and fewer hours of therapy needed due to improvements in service users' condition (KL, 2017).

For local authorities in the UK, Technology Enabled Care services (described in the 'Telecare' section in Chapter 2) can cut care costs and increase the efficiency of care services, as evidenced by several local programmes (Independent Age, 2017). In East Sussex, this telecare programme has demonstrated an approximate cost avoidance value of GBP 32 (€44) per client per week and has estimated preventive savings of GBP 589,000 (€800,000) through the use of Technology Enabled Care. Similar savings have been identified in Nottingham City with a minimum return on investment of GBP 3.51 (€4.79) per GBP 1 (€1.4) invested in the use of technology and with significant additional savings through avoided hospital admissions. Local government in Hampshire made net savings of GBP 1.9 million (€2.6 million) through assistive technology take-up by 2,931 older people (LGA, 2017). According to the service provider PA Consulting, the telecare service provided to 15,000 people over four years overall saved GBP 7.1 billion (€8.1 billion) to Hampshire County Council. These calculations were based on surveys with social carers (based on the amount of care not provided) and users, information in referrals from social workers and calculations from the local councils.

The Casserole Club (described in Box 7 in Chapter 2) was designed with UK local authorities to help address the gap left by a reduction in 'meals on wheels' services. The aim of the consultancy behind the service (FutureGov) was that Casserole Club will help reduce the number of individuals who would require meals on wheels, therefore resulting in a potential cost saving to councils (FutureGov, undated). When the Casserole Club was put in place in 2011, authorities across the UK spent around GBP 88 million (€100 million) on delivery of meals on wheels, so even a 1% reduction in the number of meals required could represent important savings (IoT UK, 2017). On average, it costs a council GBP 4.90 (€5.60) to provide one meal. If 100 diners get on average two meals a week from a neighbour, Casserole Club will have saved councils at least GBP 50,960 (€58,000) a year (Nesta, 2014).

The founder of the MONI blockchain credit for refugees in Finland envisions the creation of a model in which refugees employ themselves as micro-entrepreneurs, with automated taxation through smart contracts, further decreasing the government's administrative burden and, in particular, the costs of tax collection (Mitzner, 2016). Another benefit is that digital payments are more traceable than cash payments, thus allowing, where necessary, monitoring of spending in a more effective and efficient way (interview with the service provider). In addition, the overall costs of using the card for allowance payments are lower than those for making the same payments in cash. The Finnish Immigration Service makes payments related to money withdrawals (Rastamo, 2016).

Improvements in the detection of welfare fraud are another way in which digital technologies contribute towards greater efficiency and savings. In the UK, the DWP has piloted AI to detect fraudulent claims. This is done by looking for patterns, such as repeated use of the same phone numbers or addresses, or by looking at inconsistencies between information posted on social media by claimants and information given in benefit applications (Forbes, 2018). In Ireland, since 2011, the Public Services Card has been mandatory to receive all welfare entitlements. The Department of Employment Affairs and Social Protection has cited savings of about €800,000 through the suspension or ceasing of welfare payments when previous service users failed to complete the card registration process. The department indicated that it believes fraud is a factor in this non-engagement by some former service users (Irish Examiner, 2017; Irish Times, 2018). Similarly, in Slovenia, the audit report covering the first year of implementation of the information management system IS CSD2 showed that this system significantly reduced abuses, as centres for social work base their calculations on the data obtained from official databases rather than from beneficiaries, as they had done previously (Court of Audit of Slovenia, 2013, p. 68). The centres for social work use IS CSD2 as an integrated information system that offers support in data aggregation, decision-making, standardised display of legislation and other documents, and automatic calculation of social transfers. The ministry uses IS CSD2 primarily as a management information system that enables the correct payment of transfers, decision-making, planning and data control.

It should be noted that even if there is an expected high return on investment in terms of savings and productivity gains, high investment costs and unclear reimbursement models may deter private providers from getting involved in the digital transformation of public social care (Eurofound, 2020; Laya and Markendahl, 2020).

Impact for service users

Security, independence and inclusion

Many studies identified by the Network of Eurofound Correspondents indicate that digital technologies increase service users' sense of safety. A summary of projects and services in Norway using security and tracking welfare technologies for older people and people with chronic diseases indicated that the use of these technologies contributes to an increased sense of security and sense of accomplishment among users (Knarvik et al, 2017). The Digital Supervision project (described in the previous section) also gave users a stronger sense of security (HMS Magasinet, undated). Also in Norway, Dale and Grut (2015) evaluated the impact of digital welfare technologies for children with disabilities and their families. The study consisted of four case studies in which researchers visited families to analyse how digital technologies can support children and adolescents with attention deficit hyperactivity disorder and/or autism and their families in their daily activities. The digital technologies used were smartphones, tablet computers and assistive technologies. The parents involved in this study reported that their children were less dependent on them thanks to technology helping with routines, setting reminders and improving communication.

The evaluation of the research project ZentrAAL in Austria (described in the 'Internet of Things' section in Chapter 2) shows that it was possible to integrate ambient assisted living technologies into the daily lives of users and reduce their initial scepticism towards new technologies. Smartwatches converted into fitness and emergency watches enabled older people to make emergency calls easily, whenever and wherever they needed to. This led to an enhanced feeling of security among the older people and, thus, improved their mobility (Trukeschitz et al, 2018).

Research shows that the Telecare Plus Service in Malta allows older people, those with disabilities and individuals with chronic illnesses to continue living in their area, since assistance is available locally if needed. This service provides users with a supportive network that connects adequate social welfare and social support in a community setting (Formosa, 2015). The service also reduces the need for constant supervision.

According to an interview with a representative from PA Consulting (the provider of Technology Enabled Care services, described in the 'Telecare' section in Chapter 2), a survey of telecare users in Hampshire found that 94% felt safer and more secure at home due to the devices. One interviewee explained that telecare brings the following benefits:

- less reliance on domiciliary care (i.e. avoidance of visits from social carers)
- delayed admissions to care homes (in Hampshire, telecare services delay admissions by 24 weeks on average)
- reduction in care breakdown (i.e. the burden on partners (informal carers) of people with disabilities is relieved, thus extending unpaid informal care relationships)

The benefits listed above are linked to better prevention thanks to information being more readily available. For example, Technology Enabled Care services records the occurrence of falls, thus allowing early intervention to prevent further damage from developing, such as fractures (TSA, 2016).

FutureGov measures the impact of Casserole Club (described in Box 7 in Chapter 2) according to the number of meals shared and information provided by users. Among the older people receiving meals through the service, 70% consider the volunteer cooks their friends and 80% say they would not have as much social contact without Casserole Club (IoT UK, 2017). Testimonies of users show that they appreciate the company and that Casserole Club enables them to eat better. Casserole Club enables neighbours to build long-lasting friendships through the shared experience of food, reducing isolation and loneliness in the process. Casserole Club may also reduce the need for domiciliary care, since the social contact provided may prevent some home accidents (FutureGov interviewee).

Sentab (described in Box 3 in Chapter 2) was piloted in Estonia and the UK in 2016 and 2017. Altogether, 28 people were involved in a longitudinal experiment. The home users included both men and women with different education levels and varying levels of digital proficiency. The user groups in the pilot showed a positive relationship between the use of the digital interactive tools for social engagement and the reduction of perceived loneliness. In the case of 57% of participants in the pilot, scores on the UCLA loneliness scale reduced either 'somewhat' or 'significantly' by the end of the pilot. The study also confirmed a U-shape in perceived loneliness levels according to age – it was common for the youngest and oldest participants to perceive higher loneliness levels than those in the middle-age tier.

Service quality and efficiency

The information gathered by the Network of Eurofound Correspondents regarding impact on the quality of services is limited and mostly based on the views of staff or service users. A report on the Virtu.fi project includes some preliminary insights about the impact on individuals who used the service (Karppi et al, 2013). Self-assessed quality of life was slightly poorer after using the Virtu.fi channel. This might be explained by age, which is associated with lower perceived quality of life. Despite this finding, the experiences of users in relation to the technology provided were positive: they felt less lonely, more secure and more connected. The service providers (such as social workers, nurses, students) who developed the content of the programmes and assisted the older people found the project to be very useful and convenient. However, the Virtu.fi project also showed the need for increased involvement of service users in consultation with staff, as face-to-face consultations provide much more information and enable the performance of some tasks that are not possible via television screens; for example, if a client needs to measure their blood pressure for the nurse or show their surroundings to the social worker.

In Denmark, studies involving both employers (KL, 2017) and trade unions (FOA, 2014) showed that employees working in social services see digital technologies as a positive tool in their jobs. The analysis by Local Government Denmark (mentioned in previous sections) shows that the main outcomes of the technology are: the patient having increased responsibility for their own rehabilitation (77% of municipalities see this outcome); more flexible planning of the patient's day (74%); and the patient being more motivated (72%) (KL, 2017). In the analysis by the trade union FOA (2014), the population for the study was 1,187 of its members who were working in the social sector and the health sector. The technologies in the study included robots used for washing. More than four out of five employees stated that the quality of their service had improved due to the use of technologies in their work.

Also in Denmark, ICURA Trainer, a wearable device for rehabilitation, provides a high level of user satisfaction. Among the reasons for this is the user's sense of improved continuity in their rehabilitation due to being able to train at home every day. Another factor stressed by users is increased flexibility, making it easy to plan for rehabilitation within a tight schedule. The users of the technology met with their therapists 6 times in the rehabilitation period, while the usual treatment involves 12 meetings. Satisfaction with the number of sessions was higher among those using the ICURA Trainer than those receiving the usual treatment – a good example of how new technology can retain a high-service level even though the number of physical meetings is reduced (Rask, 2015).

In France, services offered in the online public employment services hub Emploi Store are deemed satisfactory by most users (79%). However, it was used by only 12% of jobseekers in 2016 (Pôle Emploi, 2017). The Italian National Institute of Social Security evaluated the online simulation of future pension benefits with a sample of 53,159 out of 3.6 million users. About 80% of respondents considered the service 'very useful' or 'extremely useful', and similar results were obtained with regard to user-friendliness of the tool and the relevance of the knowledge gained (INPS, 2015).

After the project was finalised, the moduLAAr consortium found that there had been a positive impact on the quality of life of participants: increasing the feeling of safety and dealing regularly with their own health through measurements had positive effects on quality of life. Moreover, participating in the project had a positive influence on social interaction in general, given the regular interaction with service developers and providers (moduLAAr consortium, 2017).

As of 2014, users of digital social services in Estonia were generally satisfied. For example, of those who had used digital social services in 2013 and 2014, 61% were 'very satisfied' and 28% were 'satisfied' with services related to unemployment benefit that were provided over eesti.ee (users gave an overall score of 4.5 on a 5-point scale where 5 is the highest). Similarly, for communication with local social workers via email, 60% were 'very satisfied' and 17% 'satisfied' (overall score of 4.4) (TNS Emor, 2014).

4 Main issues related to digitalisation

Two literature reviews (Hofmann, 2013; Sanchez et al, 2017) identified the following ethical issues and implementation barriers regarding the use of digital technologies in health and social care:

- general unwanted consequences, such as user loneliness, isolation, loss of socialisation and passiveness, as well as growing vulnerability and feeling unsafe
- moral and ethical issues regarding freedom of choice, dignity and reconciling the priorities and needs of service users with those of other stakeholders
- political and technical considerations around the participation of service users in decision-making, privacy issues, consent and access to personal data

This chapter summarises some of the main issues identified in implementing digitalisation strategies and using digital technologies in social services, as well as some of the mitigating measures that have been put in place to overcome barriers. Implementation issues summarised in this chapter were identified mainly by the Network of Eurofound Correspondents and the country case studies.

Fragmentation

The Network of Eurofound Correspondents has identified a lack of coordination between service providers as a barrier to effective digital transformation. The fragmentation of services can lead to difficulties in funding digital technologies, as contracts need to be negotiated between different parties without clear reimbursement models (Hilbert et al, 2013). The absence of a unified social service system and the lack of coordination between services has been noted in Cyprus as a reason for not making further use of digital technologies, as the framework and the necessary economies of scale are not in place. Similarly, the Italian administrative structure requires a high degree of collaboration between the national, regional and local levels. This lack of collaboration might have slowed down the digitalisation process and made it more difficult to agree on ambitious national strategies (interview with a representative from the national government).

Denmark has also experienced delays in the digitalisation process due to the use of different IT systems in different parts of the public sector. The development of an e-health platform (Sundhedsplatformen) is designed to tackle this issue. The set-up of this platform began in 2016, and it has been criticised in relation to technical problems, some of which have been caused by the use of different systems in the same platform. A similar issue can be found in Finland, where the use of ITs in public services has been a policy focus since the 1990s. Consequently, there are currently old and new systems for ITs, ICTs and digital technologies being used that can be incompatible or not interoperational or that might not be able to comply with the same level of security standards. Replacing old systems thus poses challenges in terms of costs and retraining of staff in the use of new systems. In some cases, the aim of digital technologies is actually to overcome this fragmentation of information (see examples of integration of health and social care data in Chapter 1).

To a certain extent, the fragmentation of information is linked to data protection. The challenges associated with the trend towards making data more accessible while ensuring its safety have been highlighted in Germany with the introduction of an e-health law in 2015. Companies are also concerned about data security when it comes to linking their processes and data systems with other firms that might be competitors. Cooperation in developing new technologies, also in the social services, might therefore be difficult. A national pact on cybersecurity will be set up and involve all relevant groups, such as manufacturers, users and public administrations. Germany's IT Security Act is to be reformed to defend against new threats.

The fragmentation of information can also have a negative impact on service users. For example, Belgians who have worked in both the public and private sectors had difficulties using the information portal mypension.be because the information needed to be centralised and merged. From the service provider side, one limitation to the system has been that not all care providers have the same file management options available to them, which has impacted on their ability to consult and edit information. Carers were often unable to consult and edit information, which is an important limitation of the system (Steunpunt WVG, 2016). The reforms in social services that have taken place simultaneously in the country (including changes in the ICT infrastructure) also make interoperability difficult.

Resistance from staff and users

One issue common to both staff and users is the rejection of technologies that seem to replace or reduce human interaction. While digital technologies may reduce the need to receive care services, contact with carers is the main form of social interaction for many service users. In France, 61% of jobseekers prefer face-to-face interaction, and only 18% prefer using the internet (Pôle Emploi, 2014). These concerns are reflected in some policy initiatives. In the Austrian Digital Roadmap, for example, it is stated that 'Technological solutions should be used as a support and to improve quality and process optimization, but never as a substitute for personal communication and attention' (Austrian Federal Ministry for Digital, Business and Enterprise, 2016, p. 30).

Some authors have pointed out the paradox of having home care services delivered remotely (Roberts and Mort, 2009; Pols, 2012). A study in Finland looking at the obstacles or barriers to citizens using social and health services found that the main deterrent was the belief that e-services are not as good as face-to-face contact (63%) (Finnish Institute for Health and Welfare, 2014). Staff may oppose the use of digital technologies for fear that their job is being devalued or due to ethical concerns (Braeseke et al, 2019). A newspaper in Sweden reported that older people and trade unions reject technologies that replace human contact (for example, pet robots for people with dementia) because of ethical issues and risk of job loss (ETC Västerås, 2017). The latter has also led to strike action in France; the group of trade unions organising the strike criticised the dehumanisation of public services (Libération, 2017).

Digital literacy

Reluctance to use digital technologies is, in part, caused by lack of knowledge and pertinent skills. Portugal received a CSR in 2018 regarding the low digital skills of the population. The country's ICT Strategy 2020 includes a set of measures aimed at combating digital illiteracy, as well as promoting the inclusion of the population in general, and of children, young people and disadvantaged groups in particular.

Lack of internet skills is particularly important among the most deprived (Le Monde, 2016). According to a French NGO (Emmaüs Connect, 2017), about five million people in France experience both digital and social exclusion. A study by the NGO Connexions Solidaires also reveals that few social structures are equipped to help users deal with digital services (Davenel, 2016) and underlines the problem of lack of training of social workers (Gautellier, 2002; Davenel, 2016). Studies on the impact of the digitalisation of services for people with disabilities have focused on the issue of discrimination in terms of access, since people with disabilities often lack internet skills (Le Chêne and Plantard, 2014; Balin and Gossart, 2015; Brice et al, 2015; Davenel, 2016). In addition, less than 10% of social workers in France reported having received training to deal with digital social services, and only 30% reported being able to help users increase their own digital skills (Davenel, 2016).

A report from 2016 shows that Danish businesses lack employees with the relevant IT competencies to fully exploit the new technologies; there is a gap between the supply of and demand for IT experts. This of course also affects the public sector and the use of technology in social services. The barrier is addressed by ongoing specialisation of IT competencies in the education sector. This barrier is also addressed by employing experts from abroad (Højbjerre Brauer Schultz, Kubix and Alexandra Instituttet, 2016).

Data sharing and protection

The General Data Protection Regulation of May 2018 sets out the requirements to process personal data of individuals that must be met by all enterprises established in the European Economic Area (or that are established elsewhere but handle data from individuals in the European Economic Area). Data collection needs to be declared and data must be handled with the explicit consent of individuals. When appropriate, pseudonyms must be used or data must be anonymised.

Social services thus face an added level of complexity when handling data, which in many cases can be sensitive (and therefore non-compliance can lead to fines). For organisations that work with children, this means that they must ask for consent to process the data of children in an easy-to-understand and child-friendly language. In the case of younger children, consent to handle data must be obtained from parents or legal guardians, which can become problematic in the case of child protection services (The Guardian, 2018). People donating to or volunteering for non-profits have the right to see, or to have removed, the data that organisations have about them (Charities Institute Ireland, undated).

The difficulties of ensuring privacy have affected the development of digital services. In Norway, the Nyby platform was set up in 2017; it connects people that require help with tasks like buying groceries or cooking with those willing to provide those services for a fee. Nyby has been developed in collaboration with a private company, with pilot projects in Asker municipality and some parts of Oslo. The company is still in discussions with municipalities on how to address privacy issues, but is currently developing a model where people within a closed community can form a group on the app. It is not yet decided what information should be available to whom. In Ireland, the Data Protection Commissioner published a report in 2019 deeming illegal the requirement to apply for a Public Services

Card to access services other than social welfare. The Data Protection Commissioner also stated that it was illegal for the state to keep the data of card holders (Irish Times, 2019).

There have been instances in Hungary of medical data stolen from devices that are connected to a records system. The data were then used to send targeted advertising messages and even to blackmail patients (ORIGO, 2017). Robust data protection safeguards should accompany increased use and analysis of data to ensure that the user consents to the use of their data and that data are anonymised (LGA, 2017). For example, in the UK, Kent City Council is using and analysing linked but anonymised health and social care data to support evaluation and modelling of demand (LGA, 2017).

User involvement/co-creation

One way in which the take-up, acceptability and user-friendliness of services is being promoted is by increasing the involvement of users in co-designing digital services. This is linked to a wider use of digital technologies in decision-making. In the UK, for example, 'civic tech' is increasingly being used to involve citizens in local government. A review of these technologies showed that the uptake was limited, partly because their design sets boundaries on the engagement of users (Crisis, 2018).

The StreetLink platform in the UK connects homeless people with local services via citizens. The app was developed with a steering group that involved representatives from local authorities, charities, outreach teams and service providers. In Italy, as part of the design of the digitalisation strategy of the Veneto region, 10 thematic meetings were held, including one on the potential use of digital technology in social services (Potti, 2017). Vienna's digital strategy was developed in 2015 through a participatory process involving citizens, civil servants of the City of Vienna and local companies (Magistratsdirektion Wien – Geschäftsbereich Organisation und Sicherheit, 2015). During the information-gathering phase, 172 ideas were collected, including providing audio information for visually impaired people and a communication app for older people in care.

Profiling of the unemployed in Poland (described in the 'AI' section in Chapter 2) is a negative example of user involvement. Although the profiling questionnaire has a closed set of answers, the unemployed are not informed about possible answer choices and have no idea about what is actually being noted by the person conducting the interview (Niklas et al, 2015). Apart from that, there is no administrative appeal against the profiles assigned. This has been contested by the Polish Ombudsman.

Lack of resources and/or political support

The Network of Eurofound Correspondents identified insufficient staff deploying the digitalisation strategy as a barrier in Bulgaria. A significant proportion of the employees involved in the deployment of e-government services are involved in technical maintenance of hardware and software infrastructure rather than participating in e-service projects. Lack of adequate funding was also an issue in Bulgaria, in view of the ambitious goals set in its E-Governance Development Strategy. Similarly, Digital Roadmap Austria was not allocated any additional financial resources or extra budget lines for its implementation. In *The Ascent of Digital survey*, Deloitte contacted a range of UK public sector leaders involved in digital transformation, between January and March 2015. According to this survey, insufficient funding and competing priorities are the most significant barriers impeding digital transformation. In Spain, the lack of investment and resources by public authorities is the main barrier for providers of digital technologies (Martínez Sans, 2017). The lack of funding of social services in general also affects the deployment of digital technologies. In Slovakia, only 13 out of 5,000 social service providers are registered to use telecommunication technologies. Because of the persistent problems local governments have with financing home care services, attention is focused on those services for which state subsidies are provided. The barriers to assistive technology outlined in a Department of Health paper in the UK also point to funding issues:

> *The opportunities for assistive technology service providers to develop new services that meet the needs of the individual are substantial, but there are challenges, including previously low levels of investment in many assistive technology services, the lack of care pathway commissioning for these services and the lack of awareness of assistive technology on the part of the public.*
>
> (Voluntary Organisations Disability Group and the National Care Forum, 2013, p. 22)

However, the success of the public sector digital transformation in Estonia can be attributed to the leadership of civil servants combined with strategic planning (World Bank, 2006; Ernsdorff and Berbec, 2007). Other studies hint at the very pragmatic approach that can be observed in Estonian e-government development; that is, focusing on development-driven strategies rather than on strategy-driven development. Central information systems and applications were developed by 'technocrats' without the existence or guidance of complex policies and action plans (Kalvet and Aaviksoo, 2008, p. 52).

Not having an institution specifically responsible for the roll-out of initiatives also hinders their deployment. According to the president of the Lithuanian Business Confederation, the country still does not have a clear strategy or guidelines nor a leading institution consolidating initiatives about digitalisation and social care (LRT 2017). Instead, this function is distributed among a number of authorities. Several countries have set up an organisation responsible for the digital transformation of the public sector. For example, the Central State Office for the Development of Digital Society has been established in Croatia. In Greece, the Ministry of Digital Policy, Telecommunications and Information (renamed the Ministry of Digital Governance in July 2019) developed the National Digital Strategy.

Technical issues

Access to the internet is a prerequisite for the use of digital technologies. The Network of Eurofound Correspondents noted the need to improve broadband coverage and issues with internet connectivity as barriers in Germany, Hungary and Romania. Increasing data volumes require high-volume broadband so that digital technologies requiring big data are accessible for everybody. In 2016, the German Federal Minister of Transport and Digital Infrastructure increased the budget for broadband expansion from €2.7 billion to €4 billion, partly in order to tackle the lack of broadband in some rural areas. In 2016, domestic households in central Hungary had the highest rate of internet access in the country as a whole (86% compared to 72% in the north and south Alföld). Despite that, there has been a visible increase in internet access in Romania, only 28% of people coming from poor areas have weekly access to the internet. The objective set by Romania is to increase that percentage to 45% by 2020.

Technical problems are also a recurrent issue in many digital transformation strategies. In the UK, the set-up of the Universal Credit system (see the box below) has been heavily criticised by the National Audit Office (NAO, 2014) and was affected by growing technical problems, cost hikes and delays. In 2013, the DWP effectively re-set the Universal Credit timetable amid problems with the IT contract.

The Virtu.fi telecare system in Finland experienced several problems in delivering the technology and programmes due to issues with internet connection. In Norway, Dale and Grut (2015) also mentioned technical issues such as set-up, coordination and synchronisation between devices in the use of digital welfare technologies for children with disabilities and their families. In Austria, technical difficulties negatively affected the acceptance of a care robot (Hobbit) by service users.

Box 8: Universal Credit – UK

The aim of Universal Credit is to simplify the benefits regime for working-age people by replacing six former benefits (Child Tax Credit, Housing Benefit, Income Support, income-based Jobseeker's Allowance, income-related Employment and Support Allowance, and Working Tax Credit) with one single application process. Universal Credit uses digital services to reduce the extent of form-filling for benefit recipients, who can interact with the department using an online account. Universal Credit was introduced in stages across the UK. Users can only start applying after being instructed by the DWP about moving to Universal Credit. The Universal Credit reform is due to cost GBP 1.5 billion (€1.7 billion) over five years but will provide the government with savings of GBP 150 million (€170 million) per year. Users claiming Universal Credit will receive their first payment within 35 days instead of 42, as was the case previously (BBC, 2017).

5 Conclusions

This report mapped out the digitalisation policies implemented across Europe. The policy initiatives relevant for social services either deal mainly with ICTs or do not specify whether they cover the digital technologies that are the focus of this research. The identified policy initiatives promote the digital transformation of social services in combination with, or as part of, healthcare. Nordic countries, in which 'digital welfare' initiatives cover both health and long-term care services, are a good example of this. Wider digital transformation initiatives for the whole public sector also lead to changes in social services, for example, online access to services and electronic identification processes. The same situation can be found at the EU level, where most of the initiatives that promote the digitalisation of social services do so in combination with healthcare and put more focus on aspects that are specific to healthcare services (rather than social care).

The measures put in place to tackle the Coronavirus disease (COVID-19) pandemic rely heavily on digital technologies. Robots testing for symptoms of contagion or carrying out cleaning tasks are used to minimise the risk of contagion. Apps tracking geolocation are being used to monitor those at risk of contagion. Telemedicine is being used to diagnose those experiencing the symptoms of the virus.

Most of the examples of digital technologies found in this research are in the long-term care sector. Robots are used to assist older people and people with disabilities, helping them with physical, cognitive and interaction/emotional tasks. The Internet of Things and telecare have enabled older people to monitor their own health status and to live longer in their own homes. These technologies can also reduce the risk of contagion and ensure the continuity of care in times of confinement, lockdown and/or social distancing. Older people are particularly vulnerable to COVID-19 and therefore nursing homes have restricted visitors.

Countries are introducing schemes to offset the loss of jobs to tackle the economic and social consequences of the pandemic. Some authors have advocated for the introduction of minimum schemes as the most efficient way to provide support (Financial Times, 2020). Here as well digital technologies can be part of the solution. Blockchain has been used to pay benefits and to monitor pension contributions and can be of help in the delivery and management of other benefits in cash. Assistance in job seeking in public employment services can be supported using AI.

The spike in the demand for health and social care services makes it all the more necessary to use digital technologies that can increase efficiency and productivity. AI has been used in, for instance, child protection and long-term care; it is used in these services to anticipate needs and allocate resources accordingly. Platforms have been used to put users and providers of home care and childminding services in contact with each other.

As for the impact of these technologies for staff and service users in social care, the evidence is relatively weak given their limited use in this field. The extent to which digital technologies reduce the administrative burden and other work for staff is not clear. Some of the studies identified in this research found that staff need to spend more time entering and monitoring data. Other studies show how administrative tasks have been automated thanks to digital technologies, thus giving staff more time to provide care. Savings achieved through digital technologies are described in several studies. These savings in costs are achieved by allocating resources more efficiently, reducing the volume of services required or preventing the use of more costly types of care (for example, admissions to care homes or hospitals).

From the user perspective, studies found that digital technologies have a positive impact on user satisfaction, feelings of connection and sense of safety. They also reduce the need to rely on formal and informal carers because users can monitor their health status themselves and are assisted in performing some tasks. Most of the studies found that social interaction is encouraged rather than replaced by digital technologies. More robust evaluation could perhaps be supported by the EU research and innovation programme Horizon Europe.

The fragmentation of social service providers and of the information and technologies they use (i.e. their interoperability) has a negative impact on the roll-out of digital technologies. Lack of skills and training for staff are also a barrier to the uptake of these technologies by staff and service users. Staff who do have the necessary skills can be negatively affected by users' lack of skills, because they may need to spend time assisting them or doing tasks on their behalf (for example, filling in online forms or applications). For the healthcare sector, the OECD has recommended appropriate training and skills development in privacy and security measures for processing personal health data (OECD, 2019b). This report shows that training and skills development are required for social services as well. It is a challenge for staff to ensure that data is collated, shared and used in

a way that reassures service users that their data is protected; therefore, it is vital that training is provided to improve skills in this area. The review of the EU Digital Education Action Plan announced by Commission President von der Leyen (2019) provides an opportunity to improve these skills.

Furthermore, between 2021 and 2027, the new InvestEU Fund will provide EU funding in skills, education, training, research, innovation and digitalisation (including for AI and the digitalisation of industry) (European Commission, 2018i).

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To support the European Commission's objective of ensuring Europe is fit for the digital age, this report examines the use of digital technologies in social services and the policies that promote digital transformation. The report explores some of the main issues involved in implementing digitalisation strategies and using digital technologies in social services, as well as some of the measures that have been put in place to overcome barriers. The overall aim is to work towards closing the knowledge gap regarding the opportunities and risks associated with technological change in this area.

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