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The impact of digitalisation on job quality and social dialogue in the public services: the case of Finland

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EXECUTIVE SUMMARY

The Finnish national digital strategy aims to be universal: nobody should be left behind. The national artificial intelligence (AI) programme Aurora (started in 2019) is one milestone in that process. The aim of the Aurora AI programme is to use AI to help people and companies to utilise services in a timely and ethically sustainable manner. The activities of the different authorities and actors are organised to help people cope in various life situations and also to support relevant activities for companies, facilitating seamless service paths between the public and private actors, institutions and individuals.

The WORK2030 programme launched in 2020 is a development programme for work and wellbeing at work, aiming to make more effective use of digital technology, to create working life innovations and to enhance work quality and wellbeing at work. The Ministry of Social Affairs and Health has the overall responsibility for the programme, and the Finnish Institute of Occupational Health sees to the operational implementation and practical arrangements of the programme. The programme is carried out in collaboration with ministries, public sector institutions, and trade unions and employer federations.

In their joint memorandum of understanding, trade unions and employer federations emphasise that digitalisation of working life must be steered by a culture of mutual trust. In contrast to doomsday prophesies of the end of work, trade unions also believe that digitalisation and AI will produce significant improvements in productivity, employment, delivery of public services and work processes at workplaces. In the joint memorandum, there are four major points: 1) ensuring the development of skills and competences; 2) support for workplaces in the introduction of new technologies and new ways of doing things; 3) coherent and fair rules of play for a harmonised operating environment, and 4) working together towards better solutions. The digital survey that forms the main basis for this report shows that almost every employee in all sectors use digital devices, but that there are differences between sectors and within the sectors regarding how these devices are used and what kinds of skills devices require from their users. The main finding is that digitalisation is viewed more positively in the public services than in the health sector or in the electricity sector. In the public services, digital tools are seen as a way to reach and serve clients, whereas in the other sectors they are seen as obstacles to serving clients.

Finland ranks first on the 2022 Digital Economy and Society Index, a summary indicator on digital performance in Europe and in different EU Member States. Finland's high score is based on good performance on human capital, integration of digital technology and digital public services indices. Despite the high scores, many problems and issues still need to be addressed so as to improve further and do things better. In that respect, the extensive social and Health Care reform (Sote) which came into effect on 1 January 2023 will be both a big challenge and a real opportunity for the digital public sector in Finland.

SECTION 1. INTRODUCTION

1.1 Purpose of the research

The purpose of the research presented here is to analyse various impacts of digitalisation on job quality in public administrative services, in the electricity sector and in the health care sector in Finland ([1]). The focus is on workers' perceptions of the changes generated by digitalisation in the performance of their daily tasks. The research also aims at raising awareness among trade unions and decision-makers of the consequences of the digital transition of work for the public services.

In recent years, employees in these service sectors are increasingly using digital tools and work processes that shape the way their job tasks are organised, implemented, scheduled, and controlled, and ultimately also shape how new processes benefit service users. The focus in this report is on those changes and their impact on various aspects of work. We discuss possible changes in labour market negotiations and in the social dialogue in Finland. The focus is on trade unions operating in the public administration, health care and public services.

Three unions participated in the DIGIQU@LPUB survey, interviews and focus group discussions: *Kelan toimihenkilöt* (representing employees in the biggest social insurance institution Kela), *JHL* (representing public sector employees) and *Pro* (representing public and private sector employees) ([2]). *Sähköliitto* (the trade union for employees in the electricity sector) only took part in the digital survey, and *Tehy* (the trade union for nurses) only took part in the interviews. Reasons for these limitations are given below.

The progress of the study has not been as smooth as expected, and there were several hurdles to overcome in carrying out the interviews and the digital survey. We should briefly explain some of these issues. In 2022, there were severe disputes, conflicts and a series of strikes in the Finnish labour market. The problems were related firstly to the Social and Health Care Reform (Sote), and secondly to the relatively low salaries and heavy workload in the health care sector. Due to the strikes and other labour market actions, *SuPer* (the trade union of practical nurses) decided not to participate in DIGIQU@LPUB at all, whereas *Tehy* decided not to take part in the digital survey but allowed us to look for representatives for group interviews. Thus, the representativeness of the responses from members of these trade unions is limited. However, the health care sector – including nurses and practical nurses – is represented by two other trade unions (JHL and Pro, covering employees in the public and private sector services). The total number of health care respondents to the digital survey was satisfactory (809 responses). In addition to JHL and Pro, the

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1. The other countries in the project are Denmark, France, Germany, Hungary, Italy, Poland and Spain.
2. Kela is an acronym for the Social Insurance Insitution of Finland. Kela is the most important social security organsation, responsible for all main social security programmes except for employment-related pensions, earnings-related unemployment insurance and work accident insurance (see Kela 2022a).

trade union for Kela employees (*Kelan toimihenkilöt*), representing the public services, participated in the survey. Their representatives were also interviewed.

The total number of responses to the digital survey from public sector employees was as much as 1,251. The smallest group of responses (111) was from the electricity sector. Unfortunately, it seemed impossible to organise focus group interviews for union representatives in the electricity sector. The trade union representing electricians did not manage to get people to participate.

The total number of people who responded to the survey was 3,007. However, 734 of these respondents did not give their occupation. In the subsequent analyses, these cases were treated as missing data. More detailed discussions on the sampling and sample sizes are provided in the sections discussing the three sectors.

The structure of this report is as follows. The first part of the report maps the terrain, and provides some background data on digitalisation in Finland in general and attitudes of the trade unions in particular. The second part analyses three different sectors: the electricity, public administration and health care sectors. In each of these, we will first give an overview of the sector and review the development of digitalisation and its present applications. Thereafter follow sections on work organisation, working time, health and safety, skill requirements, reconciling work and family life, career prospects and workers' rights. Each of the three sections concludes with a short summary. This part is based on the digital survey and interviews with trade union representatives. The third part of the report deals with digitalisation and social dialogue. The first sub-section in this part starts with a short contextualisation of the national system of industrial relations, followed by an examination of the role of digitalisation in industry-wide agreements. The penultimate sub-section describes the trade unions' approaches to and priorities on digitalisation. The final section presents the main findings. Finally, the fourth part of the report will provide recommendations for national and EU-level stakeholders.

1.2 Digitalisation: state of play and national strategies

1.2.1 Latest DESI Index

Finland ranks first on the 2022 Digital Economy and Society Index (DESI), a summary indicator on digital performance in Europe and in different EU Member States (European Commission 2022a). Finland's high score is based on good performances on the human capital, integration of digital technology and digital public services indices, as shown in Figure 1.

Figure 1.   Digital Economy and Society Index 2021.
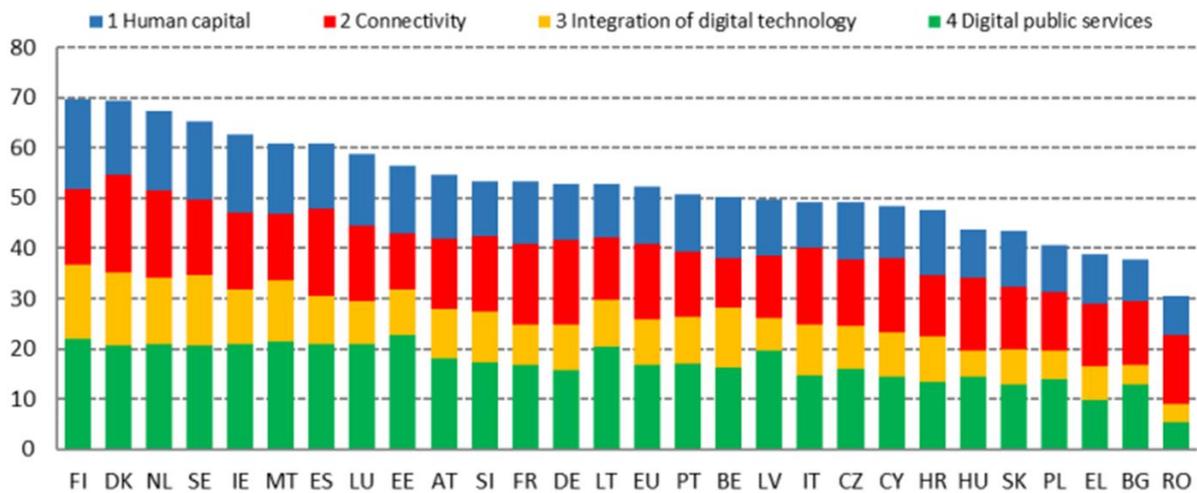
Source: European Commission (2022a).

In contrast to the comparatively high scores on those three dimensions, connectivity, i.e. the coverage of broadband networks, is less comprehensive in Finland than in many other Member States. Finland ranks 13th on connectivity, with 57 % fixed broadband coverage. This is partly due to the high usage of mobile internet in Finland, with 4G networks close to saturation in certain areas and a lead in 5G readiness, with commercial deployments underway. There is a significant urban-rural divide, as well as gaps in coverage for the vast areas characterised by low population density, with comparatively low economic incentives for rolling out connectivity networks. In particular, the sparsely populated areas in the eastern and northern parts of the country suffer from a lack of broadband connectivity. Next-generation access to broadband and fixed very high-capacity network coverage in Finland is low, while mobile network coverage is 100%.

Regarding digitalisation and gender, Finland ranks first on the Women in Digital Scoreboard. The Finnish educational strategy is based on lifelong learning. About 30 % of the Finnish adult population in the age bracket 25 to 64 years of age take part in further education. The EU average is about 10 % (Eurostat 2022). The Finnish adult education strategy is based on collaboration between public education institutions and education provided by enterprises. In particular, enterprises provide ICT training and skills improvement for their employees. Overall, 20 % of EU enterprises provide ICT training for their personnel. In Finland, the figure is about 40%, which partially explains the high human capital DESI score.

Source: European Commission 2022a; Eurostat 2022.

As figure 2 indicates, there is strong correlation between the level of DESI human capital and the participation in adult / lifelong learning (r = .76). However, oftentimes in Finland, as in any other country, the problem is that those who already have high human capital tend to participate more in continuous education than those with lower human capital stocks (see for example, Kyndt et al. 2011; Knipprath and De Rick 2015). In the EU, there is a 28 % gap in the participation rates in lifelong learning between those with tertiary education and those with lower educational attainments (OECD 2021). Thus, those with higher skill levels are the most prone to be involved in lifelong learning, which results in strong accumulation of advantages.

1.2.2 National digital strategy

Digitalised public services have rather a long history in Finland. The Social Security Institution of Finland (Kela) acquired its first computer in 1958 ([3]). Gradually, all data on social security issues were digitalised. Thanks to the individual social security number introduced in the early 1960s, it became possible to combine different databases to make public service processes more seamless.

3.   Kela is the most important social insurance institution, providing social security benefits to the Finnish population in all their life phases.

For example, the real-time income register now allows Kela to see the claimant's income without separately asking for documents on income. This digitalised income register simplifies and accelerates the application process and decision making on benefits. It is possible to digitally apply for all social benefits on the net. Finland ranks second after Estonia in digital public services, as shown in Figure 1 above.

In health and social care there is a specific digital service infrastructure (Kanta 2022), containing information on social welfare and health care, vaccinations and benefit utilisation. All information is available from the same source, allowing the service providers to offer their clients better and more accurate services. Needless to say, there may be ethical problems in the utilisation of such a huge amount of personal data. Therefore, official use is strictly limited and regulated by legislation. At Kanta, people themselves can check their own details (for more information on Kanta, see section 2.3.2)

Finland has also been one of the leading countries in the development of digital banking services (Lehti and Rossi 2017). Digitalisation is now a central part of private and public services and the public administration. Most services are available on the net. Information flows between organisations are mostly digital, and the national registers are extensively utilised in all services (Ministry of Finance 2021). The official registers in Finland are individualised, digitised, and effective. For multi-sectoral services, there is a common register for the Employment and Business Service Offices (TEOs), Kela, and the municipalities. Data exchange is regulated by legislation on personal data. The easy access to administrative data gives public authorities (for example social and health care services and social security institutions) better possibilities to digitally handle applications and to utilise artificial intelligence.

For those who lack internet access, the internet is available for free in public libraries and at most public service sites. In principle, social assistance covers the costs of internet access for low-income clients. Since online banking electronic identification is also used for many digital services, access to digital public services is connected to access to financial services. However, having access to an electronic identification or the internet is not always enough: people in need of services sometimes have difficulties accessing the information provided on the internet. Therefore, special attention needs to be paid to clients without the necessary skills, such as elderly people (see for example, Koskiaho and Saarinen 2019; Perttola 2019). Clients can thus also still initiate their benefit process by telephone, via mail or by visits to their local office.

The Finnish national digital strategy aims at universalism: nobody should be left behind. The national artificial intelligence (AI) programme Aurora (started in 2019) is one milestone in that process. The aim of the Aurora programme is to utilise AI to help people and companies to use services in a timely and ethically sustainable manner. The activities of the different authorities and

actors are organised to help people cope in various life situations and also to support relevant activities for companies, facilitating seamless service paths between the public and private actors, institutions and individuals. Aurora aims to promote people's ability and capacities to improve their overall wellbeing and, at the same time, will make it easier for service providers to form customer-oriented and dynamic service chains in collaboration with other operators, and to manage their activities based on up-to-date information. It is also hoped that not only will digital transformation help to develop innovative responses to local economic and societal challenges, such as sustainability of municipal budgets and delivery of health and social care, but that it will also help the country to meet the global Sustainable Development Goals (Ministry of Finance 2022).

The Finnish legislation on access to public and other essential services, also regarding information on services, stipulates that the actions of institutions responsible for delivering services must be transparent and that sufficient information on clients' rights and duties must be provided. Furthermore, it is the duty of the benefits/service providers to ensure that the clients understand what their rights are and what they are committing to.

All institutions responsible for social security provide information on clients' benefits, who is eligible, the conditions of eligibility and the levels of the benefits. Information is available on the internet, on various forms of social media, in paper form, at service numbers reachable by telephone, and from face-to-face contacts at the office of the insurance institution or their joint service points. Online benefit calculators are also available for self-calculation so clients can see whether they might be eligible for benefits and what the benefit level would be. Most institutions provide information in Finnish, Swedish and English. The Social Insurance Institution (Kela) has a wider repertoire of languages including Sami, Arabic, Russian, and Somali. Furthermore, since 2019, information is available also in *selkosuomi* [so-called clear language], and Kela is expanding its online services in sign language.

Applications for benefits can be delivered either in person to the offices of the institutions responsible for benefits, by mail, by telephone, or online. Most of the benefit applications are now done online. The claimants can check the status of their applications online. The overarching idea is that digitalisation can facilitate people's participation in society. For example, for people with disabilities, screen readers and interpretation programmes help claimants with the application processes and to obtain information about their social rights. For those who lack internet access, the internet is available for free in public libraries and at most public service sites. However, not all clients have the proper digital literacy skills needed. Therefore, special attention has to be paid to clients without the necessary skills or with some restrictions, such as elderly people and people with disabilities.

There are several digital portals intended to fulfil the legislative stipulations on openness and availability of information. Suomi.fi (2022) is a general online source of all kinds of information for all people - a service channel where all Finnish public administration services and transaction channels can be found. The service is for residents, businesses and authorities. Pages are available in 12 languages: Finnish, Swedish, English, Estonian, Russian, French, Somali, Spanish, Turkish, Chinese, Persian and Arabic. In addition, services are also available in sign language. Suomi.fi provides possibilities for receiving and sending messages to public authorities, access to various registers, information on services, and maps to see where services are available in person.

In Suomi.fi, all relevant information, instructions and services are compiled in one address. After logging in, people can communicate with different organisations, and check the data registered on them. The objective is equality, ensuring that everyone can use services without being discriminated against, and can understand the text describing the services. The Regional State Administrative Agency for Southern Finland supervises the implementation of the accessibility requirements in the whole country. Relevant directives of the European Parliament and of the Council specify the level of accessibility to public administration digital services ([4]). The Suomi.Fi portal has been available from 4 April 2002. No data are available on the number of users or the number of visits to the portal.

InfoFinland (2022) is a multi-language website providing information to people planning to move to Finland and to immigrants already living in the country. It has been made available in cooperation with the public authorities. The portal contains general information on the country and more specific information on working and residence permits, jobs, social security, housing and education possibilities and contact information. The website is available in Finnish, Swedish, English, Estonian, Russian, French, Somali, Spanish, Turkish, Chinese, Persian and Arabic. The portal was established in 2010. There are no exact data on the number of users.

Administration of and overall responsibility for the digital strategy

The government of Finland (2022a) has published its vision for a digital Finland. The relevant publication, *Digital Compass for Finland*, dealt with the challenges and possibilities Finland will face with the accelerating development of digitalisation and the data economy. The publication emphasises the role of competitive and innovative business activities, high-quality expertise, broad-based education, people-oriented public digital services and safe and high-quality infrastructure. Achieving all the objectives requires better cooperation between the public and

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4. Directive on the accessibility of the websites and mobile applications of public sector bodies (2016/2102).

private sectors, universities, other research institutions, third sector organisations and social partners.

Regarding the administration of the national digital strategy sketched out in the Digital Compass, the Ministry of Finance steers its implementation in the public sector. The Ministry of Finance also manages the general criteria on information security, prepares information and administrative policies and develops digital administration. Separate ministries are responsible for steering the development of information management and related projects in their own domains. The role of EU-financed programmes is limited (however, see the discussion on the European Union's Recovery and Resilience Facility Plan, below).

According to the national digital strategy, digital transformation of industries and society is a key element for growth, entrepreneurship, job creation and welfare. In order to ensure future-oriented digital skills, teaching of digital competences is the responsibility of all providers of education and training, from basic education to adult education of company employees. The train-the-trainee approach for digital skills is applied in education at all levels, but also in companies (Ministry of Economic Affairs and Employment 2021).

The digitalisation of society in general, and the digitalisation of production modes in particular, will fundamentally change the old practices and ways of doing things. Often digitalisation is depicted as a threat that will erode paid labour. In consequence, the role of the representatives of labour, i.e. the trade unions, may, it is said, become obsolete. There have been many doomsday prophesies of the end of paid work (Standing 1999, 2011, 2016; Pajarinen and Rouvinen 2014; Frey and Osborne 2017). These prophesies on the end of work are arguably premature. However, the digital economy will certainly change modes of employment. For example, it has been calculated that one third of the traditional workplaces in Finland will disappear and will be replaced by new types of employment (Pajarinen and Rouvinen 2014). New modes of production and demand for new types of qualifications and skills may lead to social and labour market exclusion. However, there are alternative scenarios as well, and these scenarios are more positive and depict a more inclusive society and more inclusive labour market resulting from digitalisation (see e.g. OECD 2019).

The Finnish social partners share this more positive vision of the future of work in the digital era. In their joint monitoring report on digital transformation, trade unions representing employees in the municipal sector acknowledge that the digital revolution will change the content of work in all professions. While some of the old tasks will disappear or be organised in totally different ways, new professions and tasks will arise to compensate for the destruction of the old ones (KT-lehti 2022). According to an extensive survey carried out by the Central Organisation of Finnish Trade Unions (SAK), 75 % of those SAK members who had used digital tools said that digitalisation has

not made their jobs obsolete, 22 % said that some parts of their tasks have disappeared, while 45 % said that digitalisation has in effect destroyed their jobs (SAK 2018).

A positive side of digitalisation is that digital technologies can be used to support inclusion of disadvantaged persons and help them take part in the labour market and be active in their society. In this process, the role of trade unions is crucial. All the central Finnish labour market organisations published a joint declaration on the trade union principles regarding digitalisation and AI ([5]). In their declaration, the organisations emphasise that the strategy and its implementation must be built on ethical values of trust and inclusion. Thus, there is a shared vision among the social partners of the societal and inclusive role of digitalisation.

The vision of the future of work in the digital era is quite optimistic. Digital modes of production and of employment are held to open up opportunities for those who in agrarian societies and traditional manufacturing were regarded as disabled and unable to work (for example, those who had to use wheelchairs). Digital production will change the concept of 'the able-bodied person'. Digital interpretation apps are also thought to facilitate immigrants' employment. In this way, employment in digital society may be more inclusive than employment in previous modes of production.

Prime Minister Sanna Marin's centre-left government (in office since 10 December 2019) launched the WORK2030 programme. WORK2030 is a development programme for work and wellbeing at work, aimed at reforming practices, making more effective use of technology, introducing working life innovations and enhancing work quality and wellbeing at work. The Ministry of Social Affairs and Health has the overall responsibility for the programme, and the Finnish Institute of Occupational Health sees to the operational implementation and practical arrangements (Ministry of Social Affairs and Health 2021). The programme is carried out in collaboration with ministries, public sector institutions, as well as trade unions and employer federations.

In all societies education is one of the most crucial social institutions for general capacity building and providing basic digital skills needed in the labour market and for further studies. The national Finnish strategy for the educational system recognises the importance of ICT and aims to create a digital educational learning culture at all educational levels. Formal education is a necessary, but not a sufficient, condition for meeting all the skill demands of the digital society and digital labour market. The question is how to ensure that employees who have completed their formal education are properly equipped for changes in digital working life. Lifelong learning is seen as a solution to

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5. Confederation of Unions for Professional and Managerial Staff in Finland (Akava), Confederation of Finnish Industries (EK), Commission for Church Employers (KiT), Local Government Employers (KT), Central Organisation of Finnish Trade Unions (SAK), Finnish Confederation of Professionals (STTK) and the State Employer's Office (VTML).

help enterprises cope and to help individuals accumulate their skills so as to successfully engage with the labour market in a rapidly changing society (OECD 2021). At the individual level, lifelong learning means engagement in different forms of skill and competency development over the lifecycle.

An essential part of lifelong learning takes place at the workplace, and there must be a strong commitment from the employer's and employees' side to this (see, for example, Lundahl 1997 and Karlsson et al. 2018). Company-based continuous education and training programmes help to form the human resources that are necessary for the company to act in rapidly changing environments and for the employees to keep abreast of the accelerating demands which digitalisation creates. The share of enterprises that provide continuous learning to improve the skills of their employees varies from a low level (about 5 % of enterprises) in Bulgaria and Romania to a high share in Finland (about 40%), Belgium, Sweden, Norway, and Denmark (about 30 %, respectively) (Eurostat 2022).

Consequently, the share of people aged 25 to 64 years in the EU who had participated in education or training in the last four weeks was about 10 %. However, there are substantial differences between European nations in this respect. The range is from lower than 5 % in Romania and Bulgaria to close to 30 % in Denmark and over 30 % in Finland and Sweden. Countries with high density of unionisation, strong trade unions and extensive collaboration between social partners are at the top of the list regarding lifelong learning. For example, the share of enterprises providing training in ICT skills to their employees is highest in Finland (European Commission 2020).

In 2020, the Finnish Parliament adopted the Continuous Learning Programme. The programme widens opportunities for the working age population to upskill their digital competences. There are versatile digital services available. These services combine education and training, guidance and information on the labour market. A set of intelligent e-services will operate as a platform for a continuous learning system, Desi 2021 Finland.

The European Union's Recovery and Resilience Facility Plan (RRP) gave the Member States new opportunities to invest in their digital transformation. According to the plan, each Member State must allocate at least 20% of its RRP funds to measures contributing to the digital transition or addressing the challenges resulting from digitalisation. The percentages of these allocations vary from high, over 50% in Austria and Germany, to low - 20 % in Croatia. The lion's share (50 %) of the Finnish RRP was targeted at climate and environmental projects. The allocation for digital purposes (28%) was close to the EU average (26%). The digital challenges specified in the Finnish RRP include upgrading the rail traffic management system (receiving 15 % of the total allocated digitalisation funds), continuous digital learning (about 10 %), expanding broadband coverage

(about 10%), and increasing digital applications in health care and employment services (about 20 %). Smaller sums were allocated to increasing the level of digitalisation and automation in business, raising the level of investment in research, development and innovation, and streamlining work- and education-based immigration and facilitating international recruitment. Research and development projects on G6 were also supported (European Commission 2022a: 9-11; and European Commission 2022b).

1.3 Research on the impact of digitalisation on job quality at the cross-sectoral level: state of the art

Digitalisation is a kind of Schumpeterian creative destruction. Good examples of this process are the developments in digital finance and accounting services. The need for handling documents is reduced when the software does the handling automatically, emphasizing the importance of expertise. New firms will emerge, and some old firms will disappear. The current industry boundaries may be broken, and one operator can now provide broader service packages to its customers (Rantalainen 2021). Thus, there may be fewer actors and fewer employees. Indeed, in the last fifteen years, about 140,000 jobs have disappeared due to automation and digitalisation. The most dramatic declines have taken place in in the numbers of workers in office and customer services, process industries, transport, construction, repair and manufacturing. The prospect of finding a new job varies considerably between workers. Not surprisingly, those with higher levels of education in office positions are much more likely to find higher-paid expert work than those in routine industrial work. A substantial share of routine industrial workers end up in worse positions than those that they previously had, or even stay unemployed. Thus, the lower the level of education, the more likely it is that the standard of living will fall in the transition to new digitalised work (Maczulskij 2020).

Although Finland performs rather well in the DESI digital measurements (Figure 1), there are significant differences between people with high digital skills and those who have problems coping with current digital transformations. Consequently, digitalisation has different ramifications for their work, work tasks, quality of work and work-related stress as well as for other work-related physical and mental symptoms. (Alasoini 2018)

According to Statistics Finland's 2018 Quality of Work Life Survey, 90 % of wage and salary earners use digital applications at work. The Quality of Work survey, based on 4,110 employee interviews, showed that about half (40.5%) of Finnish employees cope well with the introduction of digital modes of work. The lion's share of this group of 'skilled users' are in the age bracket 25 to 44 years of age. For them, digitalisation has typically increased the efficiency of work, access to information and knowledge. Hence, their possibilities for creative work have increased. They feel they are getting enough support in using information systems and applications. For them,

digitalisation is an opportunity, and it has even reduced the workload and improved the characteristics of their jobs (Tuomivaara and Alasoini 2020).

The second group of employees comprises those who experience some problems and may feel 'digital stress'. According to the 2018 working barometer produced by the Central Organisation of Finnish Trade Unions (SAK 2018), close to 40% of the members of the SAK at least sometimes felt that they were 'at the mercy of technology'. Some 10 % of employees are in 'user gaps' – in other words, they either do not have the proper skills to handle the digital transformation or do not use digital tools at all (Tuomivaara and Alasoini 2020).

One additional problem linked to user gaps is that although the number of people employed in information and communication technology (ICT) and the number of employees who will use such technologies will grow massively in the near future, there are not enough applicants for ICT courses or students with digital qualifications. Furthermore, the gender balance among ICT students is still highly biased towards males (only one tenth of the students are female) (Kaarakainen 2019).

SECTION 2. IMPACT OF DIGITALISATION ON JOB QUALITY

In this section we provide analyses on digitalisation and its consequences in three sectors of economic activity. We are mainly interested in the connection between digitalisation and characteristics of jobs (job quality, security of employment and career prospects, health issues, time use and workers' rights). Except for the two opening sections (overview and history, and patterns of digitalisation in the sector in question), the presentation in each sectoral analysis is based on quantitative data collected via our digital survey and via qualitative interviews as well as focus group discussions with representatives of trade unions and grassroots employees.

Section 2.1 The electricity production and distribution sector

2.1.1 Overview of the sector

The Finnish energy production sector encompasses about 120 electricity-producing companies and about 400 power plants, more than half of which are hydroelectric power plants. The electricity production system in Finland is quite decentralised compared to those of many other European countries. Whereas the flip side of the decentralized system is that there may be coordination problems between the many different actors, the positive side is that the versatile and many-sided structure increases the security of electricity supply. About 80 % of Finnish electricity consumption is covered by domestic supply. The rest is covered by energy imported from Sweden, Norway and Russia. Currently, the Russian share is rapidly diminishing (Statistics Finland 2021a).

In 2019, the total energy sector employed about 42,000 persons, corresponding to about 2 % of all employees in the country. Regarding the energy-producing subsector specifically, the number of employees was about 18,000 persons (corresponding to 0.8% of all employees in Finland). Half of the 18,000 persons were employed in electricity production, 5,000 were in heat production and 4,000 in steam-based production. Direct operating activities in energy production employ about 15,500 people, and about 2,500 additional persons work in investments and in other indirect services. The numbers include the energy companies' own employees, subcontracting services and investments.

Indirect employment effects arise in particular from the procurement of services (excluding subcontracting), such as maintenance services and materials. The largest employment impact comes from electricity distribution network operations, which were estimated to employ about 11,500 persons per year in 2019 (GAIA Consulting 2021). The electricity industry is crucially involved also in the construction business. One fast-growing branch of the electricity sector is Internet of Things (IoT) property maintenance, including devices for controlling and steering various processes (such as heating, access to offices, efficient use and consumption of electricity etc.) in real estate and buildings.

The financial role of the whole energy sector is more important than its employment effects. About 6% of tax revenue from companies, 4% of all property tax revenue and 2% of tax revenue from income are collected from the energy sector.

2.1.2 History and patterns of digitalisation in the sector

History of the sector

The production of electricity in Finland goes back to the 1870s. The expansion of electricity throughout the whole country took place after the Second World War, which destroyed a substantial share of Finnish power plants. During the rebuilding period in the 1950s and 1960s, new hydroelectric power plants were built. The first nuclear power plants were built in the 1970s. By now there are four nuclear power–based plants in use. In the most recent decades, there have been strong investments in wind and solar energy / electricity. For the time being their share of total electricity consumption is rather small (10 % and 1 %, respectively). New energy systems tend to be renewable and carbon-neutral, such as energy from air, soil, water and waste heat (Business Finland 2021). The Russian war against Ukraine and embargos on Russian oil and gas have accelerated the movement towards fossil-free energy.

Initially, sectoral activities revolved around the production of electricity, building up and maintaining the electricity network, and transmitting electricity to the customers. Equipment and tools as well as work processes were mechanical. Gradually, the whole process became more complex, and digitalisation has entailed the introduction of new devices and opened up new opportunities (while also creating new challenges and threats).

One important potential implication of digitalisation is its ability to break down boundaries between energy subsectors, enabling integration and cooperation between various actors and systems. This kind of interconnectivity makes it possible to optimise supply and demand in real time. Nowadays, the Internet of Things (IoT) and other advanced artificial-intelligence solutions are important in exchanging data, goods, and services. Whereas previously the supply of electricity was from the company to the customer, it is now possible (due to digitalisation) to use 'virtual power plants' and load the extra electricity produced by the customer's solar panels to the main grid or sell the surplus electricity to other users (Business Finland 2021). It goes without saying that all these changes have significantly changed the skill demands and characteristics or work tasks in the whole electricity sector (see section 2.1.6 below). One example is the expansion of IoT in property maintenance technology (prop-tech), i.e. technology providing applications and information systems to real estate markets to manage and control various functions, including heating and consumption of electricity. Such developments demand new IoT skills.

Characteristics of digitalisation in the sector

The main characteristics of digitalisation in the electricity sector have been described above. The following quantitative analyses are based on the project's digital survey that yielded 111 responses. The survey was sent to 34,000 members of the Finnish Electrical Workers' Union. Thus, the response rate is extremely low (only 3 per thousand) and the results should be treated more as indicative than confirmatory.

82 % of respondents work in the private sector, while the rest are workers in semi-public (10 %) or public (8 %) enterprises. The sector is heavily biased towards males (92 % of respondents). Most of the employees (94 %) had secondary-level educational attainment. 4 % of respondents had tertiary education and the rest less than secondary-level education. 94 % worked full time and had permanent employment contracts. 81 % classified themselves as highly skilled technicians or professionals, 7 % as skilled technicians or professionals, 7 % as medium skilled clerical workers or technicians and the rest (5 %) as elementary workers.

Regarding the use of digital tools (such as mobile devices, smartphones or tablets), 87 % of the respondents say that they use these devices regularly. The main tasks reported are related to communication with colleagues (65 %), planning and scheduling of work tasks (59 %), monitoring tasks (54 %), measurement of data (48 %) and interacting with users (30 %). Digital applications are not used that much for performing repetitive jobs, moving heavy loads or retrieving data. 93 % of the respondents utilise communication and information tools. These tools are mainly used for sending and receiving e-mails (87%) and for exchanging information with partners (45 %). Information tools are frequently used also for training and learning (44 %).

2.1.3 Work organisation

To start with, on the basis of responses to the questions regarding work tasks, most answers indicate that technology has not changed the status quo: the lion's share of respondents neither agree nor disagree with the statements on potential changes set out in the digital survey. For example, 50 % of respondents say that digitalisation has not affected their job satisfaction. However, in responses to some other questions, a majority of the respondents feel that digitalisation has actually worsened their work situation, or instead evaluate the situation more positively (see Appendix Table 1).

As the results in Appendix Table 1 indicate, there was a tendency to select neutral answers to most questions on the relationship between digitalisation and work organisation. For example, 48 % of respondents chose the neutral neither-nor alternative when evaluating the impact of digitalisation on the quality of services provided to the end-users. This may indicate that digitalisation has not had that much impact on the content of electricians' work tasks. This said,

even with these neutral responses, there are differences in emphasis between the positive and negative experiences of digitalisation. On the positive side, substantial shares of respondents agree (somewhat or strongly) that digitalisation has improved job quality (44 %), productivity (51 %), cooperation (50 %) and coordination of tasks with colleagues (46 %), as well as respondents' possibilities to focus on significant aspects of their job (45 %). Some answers, however, indicate that many believe that digitalisation has worsened some aspects of their work. A share of 44 % disagree somewhat or strongly with the statement that digitalisation has reduced time used on routine tasks, while 37 % agree with the statement. Similarly, 50% of electricians think that digitalisation has increased the pace and intensity of their work, whereas 25% are of the opposite opinion—in other words, that digitalisation has not increased work intensity.

Similar divisions are apparent regarding the perceived impact of digitalisation on wages and overall job satisfaction. There is a strong opinion that digitalisation has not increased wages in the electricity sector. 31 % of the respondents say that working conditions have deteriorated, 37 % think that conditions have improved, while 32 % have no strong opinion on the issue. Regarding the more subjective aspect of job quality, 46% of the respondents think that digitalisation has neither improved nor reduced their job satisfaction ('my job is better now'), but there seem to be more feelings of dissatisfaction in this regard (31 %) than of satisfaction (22%). However, whereas 40 % say that their job is more interesting and attractive than previously, 29 % do not agree with the statement.

2.1.4 Working time

According to the Act on Working Hours (872/2019), regular working hours may not exceed 8 hours per day and 40 hours per week. Weekly regular working hours can also be arranged for an average of 40 hours within a maximum period of 52 weeks. The collective agreement for the technology industry (SSA 2020) gives the possibility to reach different agreements locally, for example, about the maximum length of daily and weekly working hours, and over a year-long equalization period with a 'working time bank' agreement.

According to the relevant collective agreement, employees must be assigned a regular rest period of at least one hour during their workday. The collective agreement makes it possible for the daily rest period to be organised locally. According to the agreement, an evening work shift is defined as including work which takes place between 6 and 10 pm, and night work is defined as taking place between 10 pm and 6 am. There is specific monetary compensation paid for evening, night and overtime work. Regarding overtime work beyond the 8 hours per day, the additional compensation is 50% of the normal wage for the first two hours, and thereafter 100 % of the normal hourly wage (SSA 2020).

Results from the survey provide interesting data to evaluate how the stipulations in the Act on working hours and in the collective agreement are mirrored in the responses of members of the trade union.

Two stories that can be told here, based on Appendix Table 2. The first stresses the status quo. Again, there is an overwhelming emphasis on the 'neither-nor answers' – in other words, the majority (about 70 % to 90 % depending on the item) of the surveyed electricians do not see any correlation between digitalisation and changes in working time. The other story is gloomier. About one fifth of respondents report that digitalisation has increased working hours, unpaid overtime and unsocial working time, and as many as a quarter say that their breaks and time for rest have decreased. Furthermore, about 40% report that they must spend more time online to manage their professional life. Somewhat surprisingly, for 12 % of respondents commuting time has actually increased, although one common assumption is that digitalisation will reduce the need to commute. The assumption is based on the increase in teleworking which is expected to result from digitalisation. 56 % of the surveyed electricians telework one day or less per week. 20 % telework for 2-3 days per week, and the rest more than four days per week.

2.1.5   Health and safety and outcomes for workers

A general overview of health provisions for employees

Every Finnish resident is entitled to adequate social and health care services. All legal residents are insured against health care costs and loss of income due to illness. Thus, coverage is universal. In the case of sickness, sickness insurance compensates about 70 % of loss of income. On top of the statutory insurance, employers are obliged to provide sick pay. The generosity and duration of sick pay varies according to the labour market contract and the duration of the employee's employment contract. In the electricity sector, the compensation for loss of income is 100 % for 4 weeks if the labour contract has lasted less than 3 years, for 6 weeks if the labour contract has lasted from 5 to 10 years, and for 8 weeks if the labour contract has lasted longer than 10 years (SSA 2020). After the termination of the sick pay period, the claimant is entitled to the statutory benefit. In addition to the usual health care services, a wide array of rehabilitation measures are available (for example, Kela provides as many as 18 different rehabilitation programmes - see Kela 2022b). Some workers are entitled to rehabilitation for physical and mental problems caused by the use of digital tools in work processes.

In each workplace there must be an occupational safety and health representative who represents all the employees in discussions on their occupational safety and health issues. As a rule, the occupational safety and health representative is elected for a two-year term. The position is based on the Act on Occupational Safety and Health Enforcement and Cooperation on Occupational

Safety and Health at Workplaces (44/2006). In addition, many collective agreements have more specific guidelines regarding occupational safety and health representatives.

Survey results on health and safety in the electricity sector

The survey among the members of *Sähköliitto* reveals that there are some problems linked to digital work processes. 20 % of the survey respondents say that digitalisation has had negative impacts on their physical health. In addition, 20 % of respondents report that their mental health has deteriorated. Back and neck pains are the most commonly reported physical symptoms (about 20 %, each), followed by physical fatigue, headaches and pain in the hands (about 10 %). As regards mental health, stress, mental fatigue and demotivation are the most common problems, which affect about 15 % of the respondents. However, if we look on the positive side, about 70 % say that they have not noticed any physical or mental problems which they would relate to digitalisation.

In the electric sector, digitalisation does not seem to generate harassment or violence in the workplace. About half of the responses to questions on harassment or violence are in the 'neither-nor' category: 35 % deny that they have experienced harassment or violence as a result of digitalisation, while some 10 to 15 % feel that digitalisation has increased harassment and violence against them. There seem to be strong feelings that digitalisation has increased monitoring of employees by their supervisors. Whereas half of the respondents say that monitoring has increased, one third are neutral and about one fifth have not perceived increases in monitoring (Appendix Table 3).

2.1.6 Skills and learning

In the electricity sector, various professions and numerous skills are needed for installing wires, for creating, distributing, repairing and maintaining electrical installations, and for planning and programming ICT systems. In addition to technical personnel, clerical personnel for administration and marketing products are needed. Thus, work in the sector is very diverse, demanding and constantly evolving.

Electrical and automation professionals install and maintain electrical and automation systems or distribution networks in real estate and facilities. Customer service is an integral part of the job qualification of an electrical and automation installer. Specialist vocational and polytechnical qualifications provide the skills required in the above-mentioned positions. Software developers, in turn, may have very diverse educational backgrounds depending on their ability to program, use and develop different software programs (for example, Python, CI/CD, IaC, Azure & AWS, and other cloud services). As a rule, in leading technical positions, a university degree in engineering is a requirement. The educational requirements for administrative staff vary depending on what

positions staff members occupy in the organisational hierarchy. Service and maintenance of all these high-tech IoT products demand special skills. Oftentimes those skills are acquired in the workplace, either through learning by doing or through extensive further education provided by the employer. The time spent in employer-provided training is regarded as ordinary working time, and it contributes to annual leave and other employment-related benefits just like ordinary work (SSA 2020).

According to the digital survey, 92 % of respondents had secondary-level education and the rest had tertiary-level educational attainments. As indicated above, many of the skills needed in digital electricity are obtained through lifelong learning at the workplace. Whereas as many as 70 % of those respondents who needed new digital skills say that they achieved those skills either through employer-provided training or learning by doing, the rest say that on the basis of their vocational education, they had sufficient skill levels. Half of the electricians report that they have not received any training from their employer - 20% have received training for specific skills and tools, and 10 % have received training in general skills.

There seems to be a need to improve the target efficacy of employer-provided education: 50 % of the respondents report that employer-provided training has not sufficiently taken into consideration the employee's needs. But on the other hand, 50 % do indicate that the training has strengthened their skills and career prospects (Appendix Table 4). However, as many as 24 % complain that there was neither enough time nor resources dedicated to training. Interestingly, the respondents are inclined to think that the employer-provided digital training they were given opens up more opportunities in other enterprises, rather than in their current workplace (38 % vs. 19 %) (Appendix Table 4).

In sum, there seems to be a need for more effective training that is better tailored to the employees' needs.

2.1.7 Reconciling work and personal life

The Finnish family support system

In modern employment-based societies, one of the most important questions is how to reconcile work and family. In different countries, there are (or are not) various institutional arrangements to facilitate the reconciling of work and family life. In Finland, there are many such institutional possibilities.

In the Finnish family leave system, each parent has a quota of 160 days. The parental allowance is paid for about 14 months per child. Parents can transfer up to 63 days from their own quota to the

other parent. On average, the amount of the public benefit is about 70% of the parent's annual income. If the parent has had no income, s/he gets the minimum amount (€29.05 per day, the amount for 2021). Single parents are entitled to the parental allowance quotas of both parents (Kela 2022c).

Childcare is politically defined as a right for children - for low-income families, childcare is totally free of cost, and the highest fee in municipal day care centre is € 288 per child per month. In addition, a home care allowance allows families either to look after their child / children themselves or to use private day care providers. It is possible to combine part-time work and a part-time home care allowance. A flexible care allowance can be paid to a parent caring for a child under 3 years of age and who works no more than 30 hours per week. When the child is under 10 years of age and falls ill, the parents can take temporary care leave for 4 days in a row to stay at home and care for the child. The eligibility for temporary care leave is based on the Employment Contracts Act. Kela pays a special care allowance if the parent has to stay at home for a longer period to take care of a seriously ill or disabled child under 16 years of age. A private day care allowance includes a fixed care allowance (€ 175 a month per child and a care supplement, which depends on the family's income. The maximum supplement is € 145 per child per month). Some local authorities pay municipality-specific extra compensation to families who use private care providers instead of relying on public day care (Kela 2022c).

Reconciling work and personal life in the electricity sector

As described above, the Finnish welfare state offers a number of different possibilities to successfully reconcile work and family. An interesting question is to what extent the survey respondents' opinions on the impacts of digitalisation on the work-life balance corresponds to the general aims of family policy and labour market legislation. According to the digital survey, opinions on the work-family life balance are divided and extremely varied. For example, whereas 34 % think that digitalisation has not increased personal or family time, 30 % say that it has had a positive impact. 36 % do not have strong opinions on the issue. In contrast to the divided opinions on those items, the answers to questions on teleworking are more skewed. The 'neither nor' option is overwhelmingly the most common response on whether teleworking impacts household duties or the boundary between work and personal time (69% and 59%, respectively). However, 17% of respondents find it difficult to combine teleworking at home with household duties, and as many as 40 % say that teleworking blurs the boundary between work and personal time (Appendix Table 5). Thus, digital work seems to have both positive and negative impacts on the work-life balance for workers in the electricity sector.

2.1.8 Career prospects and employment security

The overarching question is whether digitalisation will endanger existing jobs. Employees in the electricity sector express divided opinions on the impacts of digitalisation on the future of employment, their career prospects and employment security. 43 % of respondents have a positive view of the overall employment effect of digitalisation (28 % are sceptical). Regarding confidence in their own future prospects, about one fifth are negative - the same share see their prospects as positive, and the rest (60 %) are neutral. Not surprisingly, opinions are related to the age of the respondents. Whereas 14 % of those in the age bracket 15 to 34 years disagree or strongly disagree with the statement that digitalisation improves their job security, the corresponding share is ten percentage points higher within the oldest age group (55 to 64 years of age). Thus, opinions on the future are conditioned by the age (and the level of education) of the respondent.

One central task of trade unions is to try to improve the employment security of their members. Members of the Electrical Workers' Union have divided opinions on whether their union has been effective at improving job security: 50 % of the respondents say that they do not know whether this has been the case, whereas 25% say that their union has not been effective at all. The rest (25 %) think that their union has done good work in safeguarding jobs.

2.1.9 Workers' rights

At a general level, workers' rights are defined in the Act on Employment Contracts (2001/55) and the Act on Working Hours (872/2019). Collective employment agreements provide more specific stipulations on workers' rights to consultation, rights regarding working time arrangements (including the right to electronic down-time), as well as other aspects of employment in the sector in question. For the electricity sector, the relevant collective agreement follows broader collective agreements negotiated for the technology branch between the Industrial Union [*Teollisuusliitto*] and the employer federation Technology Industry [*Teknologiateollisuus*]. The members of the Industrial Union work in various professions in the technology industry, which includes the metal product industry, the electronics and electrical industry, metal processing, and the machine and vehicle industry. There are several hundred professional titles for workers within the union's purview. The union has approximately 130,000 members in 194 professional sections of the contract sector of the technology industry (Teollisuusliitto 2022). Oftentimes, the agreements negotiated for the technology sector pave the way for further labour market agreements.

In principle, the legislation and collective agreements stipulate that workers have the right to relevant information and rights to electronic down-time, which means being allowed to switch off digital tools outside of working hours and to be unavailable for the employer.

The majority of the DIGIQU@LPUB survey respondents would like to promote rights to electronic down-time in three ways. 88 % are of the opinion that rights to electronic down-time should be defined in labour legislation, 77 % emphasise that cross-sectional collective agreements should provide for this, and 75 % say that such regulations should be also be included in workplace-level agreements.

There seems to be considerable ignorance on the information processes linked to planning, designing and implementing digitalisation of work processes and tools at the workplace. Depending on the case, 50 - 60 % of the respondents admit that they do not know if any information was provided, or how information on the digitalisation process and its implementation strategy was transmitted. About 10 % say that information was distributed either individually or via representatives of the trade union. About a quarter think that there has not been any information at all on the subject matter. Respondents also seem to know little about information on the perceived reasons for digitalisation of daily work tools, methods, and the opportunities this brings. The shares of those not knowing whether information has been provided on tools, methods and opportunities regarding digitalisation are 58 %, 16 % and 26 %, respectively. Thus, the picture provided concerning the information given is a bit gloomy.

2.1.10 Conclusions on the sector

The use of digital tools is rather common in the electricity sector. About 90 % of the survey respondents regularly used digital devices. They are mainly used for communication with colleagues, planning work tasks, monitoring tasks and communication with clients. Opinions on the pros and cons of digitalisation seem to be rather balanced. Digitalisation is seen to somewhat improve productivity by improving the quality of services. Respondents have not perceived major changes in work time as a result of digitalisation. However, a significant proportion of respondents report some problems in reconciling teleworking with various household tasks. Another challenge is that information sharing on digitalisation is rather limited. Furthermore, about 30 % of our survey respondents say that they are not happy with digitalisation and that their work is not any better with digital tools, compared to 20 % of those who are happy with digitalisation. The rest do not have opinions on the issue. Opinions are thus divided, and there seems to be rather widespread ignorance on how digital tools and work processes have been introduced. The survey also reveals that training and development of skills needs to be strengthened and be more tailored to the needs of employees.

Section 2.2 The public administration sector

This section starts with an overview of the public administration sector in Finland, followed by a summary of the development of digitalisation in the sector. The final and main part concentrates on analysing results from the digital survey distributed to public sector workers. All in all, the

digital survey was sent to 56,842 employees, producing 1,251 responses. Thus, the response rate was extremely low (2.2%). It is not possible to satisfactorily evaluate the representativeness of the sample and correct the possible selection bias in the responses. However, on the positive side, the sample size is at least big enough to allow reliable statistical analyses.

Not surprisingly, the respondents' gender distribution is heavily biased towards women (84 %). 6 % of the respondents are younger than 35 years of age, 12 % belong to the age bracket 35-44 years, 29 % to the age bracket 45-54, and the rest (53 %) are older than 55 years of age. Most of the respondents have lower or upper secondary educational attainment, and 19 % have achieved post-secondary qualifications or a university degree, whereas 2 % have only primary education.

2.2.1 Overview of the sector

The Finnish public administration system consists of three different levels (central government, regional authorities and municipalities), with numerous different actors present on these three levels.

The highest state bodies are Parliament, the President of the Republic and the central government. The central government comprises ministries and the national agencies operating in their administrative branches. The central government implements the laws passed by Parliament, and is also responsible for the overall public administration. The Social Insurance Institution of Finland [Kela] is an off-budget state social security agency, and has an extensive network of local offices. Kela is responsible for all the main social insurance and income maintenance schemes, except for work accident insurance and employment-related pensions. Kela has local offices to serve people who wish to use face-to-face services instead of digital communication.

The Regional State Administrative Agencies and the Centres for Economic Development, Transport and the Environment (ELY Centres), which are steered by ministries, act as the regional administrative authorities carrying out steering and supervising tasks in their geographical areas. Their task domains include social welfare and health care, environmental questions, financing and development services for enterprises, infrastructure maintenance, public transport, employment subsidies and labour market training.

Finland has more than 300 municipalities. Under the Constitution of Finland, municipalities are self-governing units and have the right to tax their residents. The state may only intervene in the activities of the self-governing units in certain cases. Municipalities are responsible for providing their residents with statutory basic services. The basic services are mostly funded from municipal taxes, central government transfers and fees charged for the services. The most important of the basic services are health care, social welfare (child welfare, care of the elderly and services for people with disabilities), educational and cultural services (early childhood education, basic

education, upper secondary education, library services and youth work), and technical services (building supervision, environmental protection, construction of roads and other infrastructure, water services and waste management).

In 2019, the Finnish public sector had 669,000 employees, i.e. 30 % of all employees. 71 % of public sector employees were women. The central government employed 138,000 people (of which 49% were women), and the remaining 531,000 public sector workers (of which 77 % were women) were employed by the municipalities (Statistics Finland 2020).

2.2.2 History and patterns of digitalisation in the sector

The digitalisation of public services has important ramifications for both public employees and clients that use public services. Digitalisation affects all aspects of public sector activities, from use of health care data to development of educational tools, digital identification, digital processes for claiming welfare benefits, customers' ways of communicating with the public sector, gathering and using personal data, etc. (see, for example, Larsson and Teigland 2020). Technologies such as block chains or artificial intelligence open up totally new possibilities for the delivery of public services to customers. Information on the use of public sector services and completion of transactions is available from various agencies. Authorities and municipalities serve citizens by means of transactions at their offices and through their customer service channels.

The digitalisation of public sector services started decades ago. Already in the 1980s, Finland moved to a fully digitalised census. The centralised, high-quality population register made this possible. Finnish taxation happens automatically; there is no need to approve one's tax declaration if the information is correct, and if not, the data can be corrected remotely. Finnish passports and national IDcards can be applied for on the internet; the photography shop sends the passport photograph digitally together with an application number, and in a week or so the client can collect the passport from a kiosk. During the whole application process, the citizen does not need to visit any government agency or police station.

In 2014, Finland built the national digital service architecture to improve cost efficiency and connectivity in the entire public sector. The Suomi.fi services (Finland.fi) are a toolbox for commonly used digital services, like e-ID, authorisation services, digital post, and act as a one-stop shop for the various public sector services. In 2019 a comprehensive income register became effective. It is used by such public authorities as the tax authorities, and social security institutions paying out various benefits. The income register means less work for applicants, who no longer need to provide income documentation to the social security institutions.

Regarding social services, the development of various ICT solutions and practices has played an important role in improving accessibility. For example, in practice all social security benefits (e.g.,

those paid by Kela, the Social Insurance Institution of Finland), taxation and other functions of public authorities can be managed via the internet. The internet narrows the distances in a country such as Finland, which is geographically large but sparsely populated. Although internet coverage is comparatively good in Finland, and although social assistance reimburses the costs for those on a low income, there are still people with no access to the internet at home.

There are ambitious plans to rectify this situation and to develop a service network based on artificial intelligence applications. AuroraAI, the programme aims to guarantee citizens' seamless access to services (Ministry of Finance 2022. The idea is to accelerate the transition of the public administration into the age of artificial intelligence in a secure, ethical manner. The plan is to connect public and private actors, and to provide smoothly functioning services built around the life events of citizens. The Ministry of Finance, responsible for the Aurora projects, says that '…the model will make use of the decentralised and open network created by artificial intelligence and smart applications… Using artificial intelligence, the AuroraAI network will make it possible to allocate the supply of services in a timely manner to citizens or companies in need of such services.' The Aurora project also aims to combat the digital marginalisation of people on a low income. Chat-bots, for example, are being developed, which use data analysis algorithms to review the customers' situation and suggest the most suitable services (Ministry of Finance 2022).

AuroraAI became operational at the end of 2022; it will help organise the public administration to support organisations and help people in their everyday lives. There are high aspirations and great hopes that the digitalisation of their services will reduce bureaucracy and enable them to provide more efficient and equal services. It is planned that these digital solutions will be accessible and easy to use, ensuring that citizens will not be digitally marginalised or fall between the cracks of the digital world. Another problem here may be people's lack of knowledge. Those without the skills required to manage digital services should receive support and still be able to access services via traditional service channels.

Finland has about 200 citizen service points that are jointly organised by all major actors in the public administration system. At service points, the client can use digital services organised by the municipality, Kela, the Digital and Population Data Services Agency, the police licence administration and the tax administration, as well as public employment and business services. Service points also provide information on public sector services and their use. A service point can also be used as a polling station. The range of services provided varies by service point. Service points located in sparsely populated areas usually offer mainly municipalities' own services. In larger cities, the service points also offer the services of state authorities such as the police, Kela and the TEO (Employment and Business Service Offices), which also have their own customer service points. Citizen services provide expert assistance on a one-stop-shop basis. The support

can also include courses on the use of digital devices or services, guidance events or one-on-one help.

As a rule, all institutions responsible for social security provide information on their benefits, who is eligible, what the conditions are and the levels of the benefits. Information is available on the internet, in paper form, at service numbers via telephone, and via face-to-face contacts at the office of the insurance institutions or their joint service points ([6]). In most cases, online benefit calculators are also available to see whether claimants might be eligible for various benefits and how much (in Euros) they could receive. For example, Kela provides information on all the benefits it pays out, and in all the relevant cases the online calculator is available for making self-calculations (Kela 2022b). The same applies to the other benefit-providers. These Kela services have been constantly developed and improved since 2006 when Kela started to share information digitally. All services are also available via Suomi.fi. In 2021, the Kela websites were accessed about 80 million times, in a country with 5.5 million inhabitants.

Most of Kela's information is available in Finnish, Swedish, English, Arabic, Russian and Somali. Kela also has an interpretation service for people with disabilities. Information in Finnish is also shared via social media: Facebook, YouTube, Twitter, LinkedIn and Instagram. Since 2017 Kela has used chatbots to offer quick and convenient access to customer service around the clock. Most other social benefit providers also use chatbots. On the OmaKela (MyOwnKela) e-service (started in 2021), clients can handle all their Kela matters – for example, apply for benefits, send attachments, review decisions, check payment dates and the amounts of benefits, report changes, send and read messages, and check the status of their applications. Kela extensively uses the information accumulated in the national income register (effective in 2019) as a basis for benefit decisions. This makes it easier to apply for benefits. Fewer documents need to be sent to Kela. In 2021, OmaKela was accessed on about 35 million occasions (Kela, 2023).

For those who lack internet access, the internet is available for free in public libraries and on most public service sites. In principle, social assistance should cover the costs of internet access for low-income clients. Since online banking electronic identification is also used for many digital services, access to digital public services is connected to access to financial services. However, having access to electronic identification or the internet is not always enough: people in need of services sometimes have difficulties accessing the information provided on the internet. Therefore, special attention has to be paid to clients without the necessary skills, such as older people and people with disabilities (see, for example, Koskiaho and Saarinen 2019; Perttola 2019). They can get information on their benefits and initiate their benefit processes by telephone, via mail or by visits

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6.   For multisectoral services, there is a common register for the Employment and Business Service Offices (TEOs), Kela, and the municipalities.

to their respective local offices. Kela also provides telephone support for digital application processes.

2.2.3 Work organisation

The great majority (95 %) of the DGQS respondents work in public institutions, and the rest in semi-public organisations. When the respondents were asked to classify themselves in one of the pre-defined occupational categories, the answers were as follows: highly skilled professionals or technicians (11 %), skilled professionals (41 %), skilled technicians (6 %), medium-skilled clerical workers (34 %), other technicians (3%) and low-skilled elementary workers (5 %). Thus, both educational attainments and skill-levels are higher than among the respondents from the electricity sector. 92 % have permanent and full-time employment contracts. The rest are working under fixed-term or other forms of contracts and working hours.

The utilisation of digital tools is widespread. Virtually all public employees report that they use digital devices (99 %). The main categories of use are as follows: to send and receive e-mails (90 %), plan and schedule work tasks (75 %), communicate with colleagues and internal or external service providers (73 %), interact with customers (54 %), monitor performance of work tasks (47 %) as well as to measure and obtain data (47 %). Digital devices are frequently also used for online training and learning (66 %). In the public sector service occupations, digital machines for lifting or moving heavy objects are not used.

In most public sector services, a 'digital office' is in use. In that virtual office, the employee has a list or queue of customers. The digital program always 'feeds in' a new customer when the previous one has been dealt with and the decision is finalised. The virtual office is not bound to place and time. The same procedure is applied in the ordinary office at the workplace, as well as while teleworking at home, at the worker's summer house or in any other places with an internet connection.

As Appendix Table 6 shows, public employees' opinions on the impact of digitalisation are much more positive than those of the electricians. For example, sizable majorities report that digitalisation has improved their job quality (68 %), increased productivity (69 %), improved possibilities to schedule work tasks (63 %) and improved working conditions (62 %). The responses on most other impacts of digitalisation are also more positive than negative. Only the question on whether digitalisation has improved wages in the public service sector garners somewhat more negative answers. It is perhaps more correct to say that respondents think that wage increases have nothing to do with digitalisation. Digitalisation also is often reported to have reduced the time spent on routine work. The flip side to this is that a large majority of respondents believe that digitalisation has increased the pace and intensity of work (72 %).

The verdict from the table is very much in line with the picture we obtained in qualitative interviews. In all the interviews conducted with public sector workers, digitalisation was said to contribute to better, less bureaucratic and faster services.

> *I would say that now, with digitalisation, it is much easier, faster and clearer to carry out our main tasks than during the 'paper time'. We have access to data files containing most of the information we need in our work. This means that we need to ask for less documents from the customers. We have them already on our computers. It is less bureaucratic. (Interview, group 2)*

In the Finnish public services, most issues can be handled digitally, as exemplified by Kela above. However, there are situations where customers do not have sufficient skills to operate digitally. They may lack access to digital devices, or they cannot use digital devices, or they are unable to fill in forms for various reasons. For example, they may be immigrants who have not mastered the language(s), or who in some cases may not even be able to read or write. In many cases a number of service languages are available, or increasingly also digital interpretation services or devices. For the illiterate, face-to-face services must be provided.

> *There are not many services that are not digitalised in our repertoire of public services. We serve all kind of customers. Most of them are satisfied with our digitalised services. The customer can apply for our services digitally, and we handle the customer's application. We can combine various registers, for example, income, tax, medical and health registers, previous client histories etc. We do not need that much additional information from the client. Decisions on benefit can be made almost in real time. However, there are situations where the customers need either the phone or face-to-face services. Phone services can handle all issues. For those who have problems even with phone services, we have our offices where people can go and get help, for example with interpretation services. (Interview, group 4)*

Most communication between colleagues and between different public service subsectors (e.g., between Kela, municipalities and the employment offices) is done on the net. However, there are some differences between the age groups in their views on how digitalisation has affected their work and cooperation and collaboration with their colleagues. In the age bracket 15 to 34 years, digitalisation is seen more positively than in the 55+ age group. For example, 67 % of the younger respondents say that digitalisation has not improved the coordination of tasks with their colleagues, while 57 % think that cooperation with colleagues has improved. The corresponding percentages for those over 55 years of age are over 10 percentage points lower (53% and 45%, respectively).

> *I must say that I belong to that generation who rather takes a phone and asks a colleague than uses emails or other digital devices to get information. I think that it is much more convenient and intimate. (Interview, group 2)*

An interesting and important aspect came up in a focus group discussion: digitalisation tends to individualise the processes of dealing with benefits and the final decisions on them: '*One problem in digital services is that decisions are individualised. Previously customers were handled in teams and often the teamwork was more effective*' (Interview, group 4).

2.2.4 Working time

The general impression from Appendix Table 7 is that in most cases digitalisation is not perceived as having impacted working time much, if at all. On working hours, paid and unpaid overtime and commuting time to customers, over 80 % chose the 'neither nor' option. The most significant changes are reported to have taken place regarding commuting from home to work. Digitalisation made it possible to move to teleworking, and the Covid-19 pandemic accelerated the process. For example, before the pandemic, teleworking was not that much used as an option at Kela. At present, however, teleworking is more the rule than the exception. The same applies to most other public service providers.

Although many respondents believe that the situation is unchanged, and many others report positive changes, some negative responses were also made. Working hours (15 %), unpaid overtime (15 %) and unsocial working time (19 %) are reported to have increased. A surprisingly large share of the respondents (33%) say that breaks and rest times have decreased. In most public sector offices, so-called flex time is used. Within certain time frames, employees can choose when they work. Working time is digitally monitored. When the employees start working, they sign themselves into the system. When they stop working, they log out. Working time is thus digitally monitored.

> *Our working hours per day are 7 hours 15 minutes. The maximum daily working time is 10 hours. The weekly working time is 36 hours and 15 minutes. Working time must not exceed 48 hours per week over a six-month period. Our 'working time bank' gives us flexibility to organise our working time to some extent. If we work more hours than those defined in the collective agreement, the compensation is 50 % for the two first hours and thereafter 100 %. We have to register online both if we are sitting in our offices or if teleworking at home. The flexible time to sign in the morning is between 7.00 and 9.30 and to sign out in the evening between 14.30 and 18.00. Supervisors can keep track of the time worked from their digital reports. (Focus group 3).*

One of the explanations for why unpaid overtime work has increased and breaks for rest have decreased is the disappearance of assisting personnel. Many of the work tasks that previously were taken care of assistants and secretaries have been digitalised and are now performed by the employees themselves.

> *In our branch, there used to be secretaries taking care of running tasks, for example helping with travel, booking hotels, organising data files, obtaining the information needed, etc. Now employees do everything themselves. Furthermore, if you do not use digital systems that often, you easily forget how they function and what you have to do. It takes time to try to figure out all the details the digital system asks for. Oftentimes such operations are done outside the official working hours. (Focus group 2)*

Installing and learning to use new software are also often done outside regular working hours: '*If I try to update programs or install new programs, it would take an eternity and I would lose my temper. Therefore, I ask my younger colleagues for help. (Interview, group 2)*'.

2.2.5 Health and safety and outcomes for workers

Section 1.2.5 above gave a short overview of the health care provisions guaranteed for employees in the legislation. The legislation stipulates the minimum level of benefits. Employers have freedom to organise better employment-related health provisions than the minimum. Public sector employees tend to have better occupational healthcare provision than private sector employees:

'We have rather good social and health care benefits at our working place. We have free lunch and afternoon coffee with snacks as a fringe benefit. In addition, our health care provisions are rather generous, including free dental care and access to various health tests, screening, rehabilitation, adjusted working hours if needed, etc. (Focus group 3)

Some report that digitalisation has caused both physical and psychological problems. Whereas 47 % of respondents have not noticed any changes or problems, 25 % say that they have new physical pain symptoms, and 17 % say that pre-existing health conditions have worsened. The most common problems are pain in the neck (27 %), back (18 %), hands (17 %), vision problems (16 %) and physical fatigue (15%).

69 % of the respondents report no current psychological problems. However, 15 % have new problems which they attribute to digitalisation, and a further 9% report that pre-existing problems have deteriorated. Stress is the most common problem (15 %), followed by mental fatigue (13 %), overwhelming emotional demands (11 %), as well as demotivation and anxiety (9%).

If we compare the responses in the electricity sector and in the public sector, interesting differences emerge. A much higher share of public sector employees report, physical health problems than those reported by workers in the electricity sector (53 % vs. 33 %). Interestingly, regarding psychological health problems, there are no differences (31 % in the public sector and 32 % in the electricity sector). According to Appendix Tables 3 and 8, opinions in the electricity sector are however much more negative as regards harassment and verbal violence. The majority of public sector employees surveyed disagree with the statements that digitalisation has increased harassment from colleagues or experiences of verbal or physical violence. However, a higher share of public sector workers report that monitoring has intensified, as compared to the surveyed electricians (58 % vs. 49 %).

One qualitative interview result which sheds more light on health issues is that flexible hours and teleworking are believed to have significantly reduced sickness absence in the public service sector. This was taken up in two focus group discussions.

Teleworking has decreased sickness absences. When you work at home, it does not matter if you are coughing or if your nose is running. You can carry out your task anyway. But during the pandemic it was not possible to be at work. Especially open-plan offices were bad in that sense. Immediately, if you were coughing, somebody came to say to you to go home and take care of your health. (Interview, group 2)

> *Our employee barometers display a higher level of satisfaction, now that we have introduced remote working on a larger scale. (Focus group 3)*

2.2.6 Skills and learning

Only 3 % of the public sector employees say that there were no new skills required in their everyday work. 28 % already have all the skills needed. The rest need to upgrade their digital literacy, general and specific skills (24 %) or only specific skills (43 %) to properly manage their jobs. One tenth of the surveyed employees have not received any training. The employer-provided training has mainly (for 32 % of respondents) dealt with specific tools needed at work, or a combination of general and specific skills (26 %). The problem seems to be that in most cases the training is conducted online, often outside of official working hours.

> *The employer provides training on the utilisation of new digital tools. In most cases, training courses are on the net. Then, there you sit and try to figure out what to do. Previously, there were tutorials for us as a group. Then if you did not understand, you were able to ask your cleverer colleagues what and how to do. But now you are there alone. (Interview, group 2)*
>
> *The process is rather top-down. The employer decides what software will be used, and there is not that much negotiation about the issue. Employees must adapt themselves and try to learn. There are tutorials but as a rule they are on the net. Often the employee tries on her own time to learn how to use the programs installed. (Interview, group 3)*

Also, public sector workers report some problems in matching training with the needs of employees. 45 % of the respondents report that training did not sufficiently take into consideration their personal needs. Nevertheless, as many as 76 % are of the opinion that training strengthened their skills and career prospects, and about 40 % think that training opened up new career opportunities either with their current employer or with other potential employers (see Appendix Table 9).

2.2.7 Reconciling work and personal life

The Finnish social policy system, supporting the reconciliation of work and family life,is described in Section 2.1.7. This system also significantly affects workers in the public services, partly because the sector is heavily female- dominated, and as a rule, the work-life balance is much more of a problem for women than for men. Surprisingly, however, if we compare Appendix Tables 5 and 11, we see significant differences in favour of the female-dominated public sector, compared to the electricity sector. Regarding the work-life balance, public sector employees seem to be much more positive about their ability to combine work and family life. Thus, the issue is not only a gender issue, but also a sectoral issue, linked to the content and characteristics of work tasks and organisations.

Among the public sector employees surveyed, 74 % report that they have the possibility to telework - as a rule, in their own homes. There are also possibilities to work in satellite offices. 48 % report that that possibility is also available, whereas teleworking at clients' homes is not a widely used option (19 %). The number of weekdays available for teleworking varies greatly. As many as 36 % say that they can telework for 5 days a week - 29 % telework 3-4 days per week, and the rest (35 %) have 1-2 teleworking days per week.

The public service sector respondents see the impacts of digitalisation upon the work-life balance in a significantly more positive light than respondents in the electricity sector. As many as 67 %

say that digitalisation has affected their work-family balance positively, and half of the respondents are of the opinion that digitalisation has increased their personal and family time. Furthermore, teleworking is depicted in a positive rather than in a negative light. Whereas 46 % disagree with the statement 'when teleworking at home it is difficult to differentiate between working time and personal time', 26 % agree with the statement. Similarly, when asked if it is difficult to combine teleworking at home with household responsibilities, 43 % disagree with this statement, while 18 % think that there are some problems. Qualitative interview responses also illuminate this issue:

> *Teleworking gives some degree of freedom. You are there, for example, when children go to school and when they come back from the school. When you take breaks from your work, you can put the washing machine on and take care of the laundry. There are lots of positive sides in teleworking, and I do not believe that we will ever go back to the traditional office model where we sit there. Our employer can digitally follow our work performance. There are no problems with that. Of course, there are negative sides also. One misses the work community and coffee and lunch meetings with colleagues. Furthermore, when you are there alone at home and you do not know how to update programs or how the new programs work, it is more difficult to get help. However, I do not believe in the return of traditional office work. (Interview, group 2).*
>
> *Experiences of the positive and negative sides of teleworking are related to age and family situation. Often those with families and small children or school-age children are happy with teleworking at home. They do not need to use time for travelling to work and from work back home. Therefore, there are degrees of freedom to combine work and family life. (Interview, group 3)*

One interesting question is how employees operate in teleworking situations when the connection to the office breaks down for some reason. Are the resulting breaks free time or work time?

> *If the digital system collapses, we cannot do anything. We are totally dependent on the ICT systems. If the problem is general, the time we cannot work is working time, whereas when the problem is in users' computers, they must try to get help via the net- or the telephone-based help desk, or go to their offices to get the problem solved. Without digital systems we cannot work at all. (Interview, group 2)*

In sum, digitalisation and its impacts are described rather positively both in the digital survey and in the interviews.

2.2.8 Career prospects and employment security

Public sector employees also tend to view digitalisation positively when it comes to its perceived impact on career prospects and employment security. As Appendix Table 9 shows, public sector

employees are rather positive about their career prospects and about the avenues digitalisation opens up for them. As many as 60 % say that digitalisation is good for the general level of employment, while 15 % have the opposite opinion. In addition, 55 % regard their own future employment as secure, while 15 % are sceptical about their job in the future. Both issues are linked to age. For example, whereas 75 % of those who are younger than 35 say that digitalisation is good for the general level of employment, the corresponding share for those over 55 is 51%. Nevertheless, the older employees also often see digitalisation as positive for employment:

I must say that digitalisation is here, and that our work and the future of work very much depend on our ability to use digital possibilities in various public and private services. In Finland, geographical distances are huge. In particular in the northern part of the country, most of the services must be based on the internet instead of on the client travelling hundreds of kilometres to the service office. Thus, digitalisation is a win-win solution for all. (Interview, group 4)

Similarly to respondents in the electricity sector, a substantial share of public employees (50 %) say that they cannot assess how successful their trade unions have been in combatting the detrimental impacts of digitalisation and securing working places. Whereas about 30 % instead think that their unions have not been effective at this, 20 % are more positive. The overall impression from the digital survey data is that women have a more positive attitude regarding digitalisation than males.

It is difficult to say how we have managed to cushion the possible negative effects. But at least regarding our services, our employees are more or less satisfied with their employment. When it comes to the trade union's possibilities to represent their constituencies, digitalisation gives better possibilities. You do not need to travel to participate in meetings. Everything can be done online. It is more effective. (Focus group 3)

2.2.9 Workers' rights

The general principles regarding workers' rights to be informed and to have electronic down-time, as well as the legal and contractual bases for these rights, have been discussed in Section 2.1.9 above. The digital survey gives a somewhat gloomy picture of the formal employer-based regulation of workers' right to electronic down-time. 25 % say that they are required to take breaks and 20 % have access to psychological support. But only 10% of the respondents report that other institutionalized aspects of electronic down-time (e.g., a charter of good practices, training in time use management, employers' rules for down-time etc.) are in place.

However, this is not necessarily a major problem, in the light of the abovementioned findings on work-life balance. 45% do not feel any pressure to be connected, and 30 % say that connectivity is a personal choice. When working at home, it is possible to take breaks and to make the workload less heavy. Furthermore, there are rather strict rules for how flex time and the time bank must be used. It is up to the supervisor to keep track of the time worked, and in the last instance, the union shop steward as well as the health and safety representatives will interfere if the rules are broken.

> *We do not have any problems with employees' rights to disconnect themselves. Our flex time gives us possibilities to adapt our time use within a certain time frame. Outside that frame we are not supposed to be connected with our work devices. The situation is totally different with supervisors and managers. As I see the situation, ordinary employees do not have problems, but managers seem to have problems with disconnectivity. (Focus group 3)*

Like employees in the electricity sector, public sector service employees seem to be rather ignorant of the information processes and procedures in their workplaces. About 80 % say that they do not know if formal information has been sent out on the planning and design of digital work processes and tools at the workplace. The qualitative interviews also shed light on this question:

> *It is the need of the employer that dictates which kind of digital tools there will be. The managers and the ICT sector decide what will be done. It is rather a top-down process, and afterwards the employees must learn to use the devices implemented. (Focus group 4)*

2.2.10 Conclusions on the sector

The public sector employees we interviewed often referred to the SDC CGA Framework agreement on digitalisation (2022), which sets out issues and processes linked to digitalisation of work. They emphasised that in the Finnish context, compliance with the agreements is not a big problem. In most cases the situation is satisfactory. However, as the survey results presented above show, there are some issues. The biggest problem seems to be that employees are not properly informed on the needs for and forms of the new digital technologies that employers will introduce and implement.

The overall view of digitalisation in the public administrative sector is rather positive. Digitalisation is regarded as a necessary tool to serve clients and to improve productivity. Furthermore, most respondents are of the opinion that digitalisation is not a threat to employment in general (60 %) or their own employment (55 %). Furthermore, digitalisation combined with teleworking is seen as giving possibilities to better reconcile work and family life.

Women are more positive than men. The relationship between age and a positive attitude to digitalisation is curvilinear. Positive attitudes increase up to the age bracket 35-44 years, thereafter they decrease in a linear way with age. As regards professional groups, not surprisingly, highly skilled professionals and technicians have the most positive attitudes. Interestingly, skilled professionals have more sceptical views than skilled or medium-skilled technicians or medium-skilled clerical workers. Low-skilled elementary workers have the most critical views.

One intriguing finding concerns the use of artificial intelligence and partially robotised decision making in public services. It is still an open question how much such automated decision-making should be used. As one interview person expressed it: '*We get almost all the data we need for our decisions on the clients' benefits and in fact our decision-making is automated to such an extent that when all the lights are green, we, i.e., the public sector employee, cannot change the automated decision. Then the big issue is who is responsible if the decision happens to be wrong. The program or the employee?*' (Interview, group 2).

Section 2.3 The health care sector

2.3.1 Overview of the sector

According to the Constitution of Finland, every legal resident is entitled to health care. Public health care services are divided into primary health care and specialized medical care. In addition, occupational health care is available to employed persons (as described in Section 2.1.5).

Primary health care refers to municipally arranged services, including monitoring of the health of the population, promoting wellbeing and health, and prevention, diagnosis and treatment of diseases, in particular public health diseases. Primary health care services are provided at municipal health care centres (InfoFinland 2022).

Specialised medical care refers to secondary and tertiary health care, provided by experts for demanding medical or dental care. To a large extent, specialised medical care is provided at hospitals. Specialised medical care refers to examinations and treatments, such as cancer screening, dialysis, major surgery, etc. The majority of hospitals in Finland are public, i.e., owned by municipalities or joint municipal authorities. University hospitals and central hospitals of the hospital districts are responsible for the most demanding medical operations (InfoFinland 2022).

The situation changed in the beginning of 2023 when the Sote reform became effective, and responsibilities for health and social care were transferred from 309 municipalities to the 22 newly-established welfare counties. The social and health care sector employs about 400,000 persons.

2.3.2 History and patterns of digitalisation in the sector

An individual social security number for each Finn was introduced in 1962. Since that year, a huge amount of data – including data on health, utilisation of health care, vaccinations, medicines, etc. – has been gathered on individuals on the basis of their social security number. Finland was the first country to digitise the national health registries. The registers are based on the individual and unique social security number. Processing and analysing the rich resulting data repositories give enormous possibilities for a digital health revolution – and, at the individual level, opportunities to provide help in addressing patients' problems. Electronic patient records reached 100% coverage of the population as early as in 2007 (Reponen et al. 2021).

Finland has had a National Archive of Health Information (Kanta) in use since 2014. The national data system provides for electronic prescriptions, a pharmaceutical database, clients' own pages and a patient data repository. As a rule, all health care units are already using it. Kanta services benefit the citizens as well as social welfare and health care service providers. For individual users, there is *My Kanta,* where people can seek their personal health and health care information. For medical doctors and pharmacies, the prescription service makes it possible to issue all prescriptions digitally. In fact, all prescriptions are issued and dispensed via the Kanta services.

Pharmaceutical Kanta is a database that contains necessary information about medicines, their prices and reimbursement status for issuing and dispensing. *The Patient Data Repository* plays a key role in sharing information between healthcare service providers. The repository allows centralised archiving. Needless to say, the digital repository is invaluable from the health care provider's perspective. Medical doctors or hospitals providing health care can see the medical and sickness records of the patient. In emergency situations in particular, this in an essential asset (Kanta 2022). Electronic prescriptions and the Patient Data Repository are in full use in the public health care sector and mainly also in the private sector.

There is a wide variety of digital health care applications in use. One of these is the *Apotti* system used in the capital area. Apotti was created by the stakeholder municipalities and Helsinki University Hospital (HUS) to create a digitalised client and patient record and enterprise resource and planning (ERP) system combining social care and health care. The Apotti system became effective in 2021. For the individual, Apotti includes an e-service portal that gives access to combined digital public social and health care services, also via mobile phones. Mobile applications can serve as a cheaper alternative to internet-based services. The development of mobile applications also opens up limitless possibilities for digital medicine, which would no longer require physical encounters with a medical doctor. About 80 % of Finns have at some point used digitalised health services. For health care workers there are devices for communication, monitoring, and collaboration. The aim of such digital devices is to lighten the load of medical doctors, nurses, and other hospital and health care professionals, with video appointments, a

secure chat function, secure messaging, health questionnaires, remote health monitoring, and automated screening features (Apotti 2022).

The most advanced technologies, such as 5G/6G, IoT, Artificial Intelligence, and big data analytics, open up new opportunities for digitalised medicine when used to analyse the extraordinary wealth of Finnish health-related register data. Furthermore, merging personal health data (My Data) that individuals themselves collect through their activity bracelet, heart rate monitoring devices, sport watches (for example Polar) and/or smart rings (for example Ouraring) facilitates more personalised, preventive, and predictive health care services, and opens up innovative avenues for diagnosis, therapy and care (see, for example, OYS 2022).

The Covid-19 pandemic accelerated the development of digital health care. Many services that were previously based on face-to-face consultation were transferred online. For example, most medical consultations, psychotherapy services, etc. now began to be carried out via the internet. Thus, the extraordinary circumstances of the pandemic created an avalanche of new forms of digital health care.

2.3.3 Work organisation

In the digital survey, there were 809 answers from employees working in health care. 84% of the respondents are women. The age structure of the employees is heavily skewed towards the older age groups: 6 % are younger than 35 years of age, 12 % belong to the age bracket 35-44 years, 29 % to the age group 45-54 years and over half (55 %) of the respondents are older than 55 years of age. The composition of the age structure is highly alarming, and in the near future the Finnish health care sector is projected to face a huge shortage of labour.

The lion's share (80 %) of the respondents work in public companies, 5 % in semi-public and 15 % in private companies. Regarding educational attainment, about 80 % have secondary-level diplomas and 20 % have tertiary-level education. 57 % classify themselves as skilled professionals, and the second biggest group (22 %) is low-skilled elementary workers. Technical employees at all skill levels comprise a further 10% of respondents and the rest (11 %) are medium-skilled clerical workers. In the Finnish health care sector, permanent employment (88 %) and full-time (83 %) contracts seem to be the norm.

Almost all of the respondents (95 %) regularly use mobile devices at work, such as laptops, smartphones and tablets. They are mainly used to communicate with colleagues (52 %), plan and schedule work tasks (42 %), to monitor performance of work tasks (34 %), interact with service users (32 %) and to measure data (24 %). Whereas the utilisation of various communicative devices is widespread, with almost everyone using them, the use of machines operated by digital commands to perform certain physical tasks is much less common. Only 12 % say that they use

such devices. The main reasons for this are to carry out repetitive tasks and to move heavy loads or persons.

As was described above, a considerable share of health care services have been transferred online - such as, for example, various therapy services and consultations / discussions with mental health care customers.

Appendix Table 11 provides an overview of opinions on how digitalisation has possibly changed the characteristics and content of the work in the health care sector. A comparison of the opinions on digitalisation in the health care sector with the opinions of public service employees reveals highly significant differences. There is a much more negative undertone to opinions on digitalisation in the health care sector.

In many items presented in Appendix Table 11, there is more emphasis on the negative sides than on the positive sides of digitalisation. For example, a near-majority of health care workers believe that digitalisation has undermined the quality of services (47% for health care workers vs. 27% for public service workers). A higher share of health care workers (51 %) report weakened possibilities to focus on significant aspects of their jobs (compared to just 30 % of public service workers). Finally, a near-majority of health care workers (47 %) also report that digitalisation has increased the time used for routines (again, compared to just 30 % of public service workers). On the positive side, however, significant shares of health care workers believe that digitalisation has improved the coordination of tasks with colleagues (40 %), improved working conditions (40 %), and even improved the quality of jobs (45 %) – somewhat surprising findings, given the overly negative views that health care workers report on other items. Explanations for these findings can perhaps be related to the characteristics of the work tasks and services provided in the sector. Most work tasks are related to meeting people. It is thus logical that employees often feel that the digital registration systems where they must report their tasks take time from genuine nursing work.

> *Nowadays, there are many more demands to report what we are doing and what we did with our patients. This increases the workload. In addition to the usual tasks, you have to report everything in digital reporting systems. On one hand, the increased demand for reporting is partially caused by legal obligations to report all curative measures, in view of possible legal complaints. On the other hand, reporting is linked to digitally sharing information between different actors in the social and health care sector. The flow of information and access to information on our clients is better, but the flip side is increased workload and feelings that we have to engage ourselves in secondary tasks instead of concentrating on what we really need to do. Furthermore, when we write down the clients' stories and diagnoses, they feel that we are more interested in the computer than in their business. (Focus group 4)*

Digitalisation has produced lots of good things in our work. For example, we can in advance see patients' histories, i.e., which kind of sicknesses they have had, which kind of medicine they are getting, etc. The problem is that we have a couple of digital systems, good in themselves, but the problem is that they do not properly communicate with each other. Therefore, we have to commute between different systems, and it is time-consuming and frustrating. Additional problems are that digital systems between the health care and social services are not totally compatible with each other. Let's hope that the Sote reform will improve the situation. (Interview, group 1)

We have to massively report various things in our systems. In particular, this need is important in intensive care. When I was working in intensive care, I sometimes had the feeling that I spent more time with the computer and the digital systems than in taking care of my patients. (Focus group 4)

When we, long long long ago got our first digital and computer-based systems, the problem was that we had too few computers, and they were big table computers. We had first to write down reports by hand on paper, wait until the computer was free and first then feed in our information into the digital data storage. Now the situation is much better. We can have our laptops or mobile phones that can even transcribe what is spoken. (Interview, group 1)

Despite the somewhat negative responses to some of the questions, there is a strong belief that digitalisation is good for society in general (over 50 % believe this), and that digitalisation also has a positive impact on the general level of employment (40 % believe this). General questions on societal impacts produce more positive answers than general questions on impacts of digitalisation on the worker's own job. 36 % do not agree with the statement that their jobs are now better because of digitalisation, while only 24 % agree with the statement.

As in the case of public services, digitalisation opens up new possibilities for remote medicine: '*During the Covid-19 pandemic, almost all therapeutic sessions were moved to the net. There are pros and cons. But the positive side is that services are more easily accessible' (Focus group 4). The positive aspect of digitalised medicine is that we can contact our medical doctors wherever they are. For example, one of our doctors was in the U.S., but we could consult him by Teams. So there are lots of possibilities' (Interview, group 1).*

2.3.4 Working time

Most of the respondents (84 %) work full-time, and only 16 % are part-timers. Digitalisation has not changed working time arrangements that much in most respondents' view – therefore, between 80 and 90 % of all responses were 'neither-nor' answers, though not to the question

dealing with breaks. The overall situation is viewed by most as unaltered, with fewer seeing changes in any given direction. In that sense, Appendix Table 12 is very similar to the corresponding table for the public service sector. One of the main differences is that whereas the public service employees perceive that teleworking has significantly decreased their commuting times, this change has generally not been experienced in the health care sector. The main reasons for this again are likely to be linked to the characteristics of health care work.

> *In our occupations there are not that many possibilities for teleworking, as in some other occupations that are not based so much on personal face-to-face encounters and physical closeness and intimacy. Our occupation is with care tasks. (Interview, group 1)*

About one fifth of the respondents report increases in working hours and paid overtime due to digitalisation. A quarter of respondents report reductions in breaks and rest times. It is difficult to say if these changes are more related to the Covid-19 pandemic than to digitalisation. Digitalisation seems to be at least partly implicated in increased working hours and increased overtime. But the overall picture here once again is that health care workers believe that digitalisation has most likely had no impact on working time.

2.3.5 Health and safety outcomes for workers

The framework of the Finnish occupational health care and safety system was described in Section 2.1.5. The task of the occupational safety and health representatives is to keep an eye on issues related to environmental health, employees' wellbeing, and working hours, as well as to prevent bullying, harassment and different forms of violence.

There are hopes that digitalisation will make work tasks easier and help to make the work processes less tiring. However, answers given to the question 'Do you feel that the introduction of the digital tools and methods in your daily routine has had an impact on your physical health?' indicate the opposite. About half (52 %) of the respondents say that they have not noticed any deteriorations in their health status linked to digitalisation, while about one third (35 %) of the respondents say that digitalisation has either brought new physical symptoms or worsened pre-existing physical health problems. The most frequent physical problems are pain in the neck (21 %), hands (16 %), head (14 %) and eyes (12 %).

Regarding psychological problems, about 70 % say that they have not noticed any consequences of digitalisation for these, whereas a quarter report that their mental health has worsened. Problems reported include stress (15 %), as well as mental fatigue, anxiety, demotivation and overwhelming emotional demands (about 10 % for each problem category). The qualitative interviews also indicate that problems exist:

> *There is a lot of digitally steered equipment that would help employees, for example in lifting or carrying heavy patients. But oftentimes it is faster to do everything by hand. Because of the constant time pressure, those fancy help devices are not always used. Furthermore, not all employees can use that equipment. Needless to say, all this will gradually cause pains in the back, shoulders and hands. (*Focus group 2)

Appendix Table 13 summarises opinions regarding harassment and bullying. About half (48 %) of the sample think that digitalisation has increased monitoring of employees by their supervisors. The positive side is that about one third of the respondents say that harassment and various forms of violence have diminished as a result of digitalisation, whereas less than one fifth see that harassment and violence have increased. Regarding the two last- mentioned items, it is however difficult to disentangle the impact of digitalisation from that of many other factors.

2.3.6 Skills and learning

As described earlier in Section 2.3.2, many digital tools are used in work within the health care sector. In addition, constant and rapid technological development is taking place within health care. The issue is, then, whether and to what extent employees can handle all the new digital devices being used in their workplaces. According to a study on digital skills among nurses, 90 % of those who handle patient registers in primary health care report that they are competent in digital skills (Reponen et al. 2021; see also Vartiainen 2021).

To be able to properly handle digital applications and processes requires new skills. Consequently, 72 % of our respondents believe that they have to improve their skill levels. If we omit those who say that they do not need to use any digital equipment, the percentage is as high as 80 %. Mostly, people believe they need specific skills (35 %) used in everyday work. About 60 % have undergone training organised by their employer, while 16 % say that they have not obtained any education in digital matters.

Many employees, particularly nurses, must use a number of different registers and platforms. They must try to find information on medicines and previous sicknesses. Sometimes there are different platforms that doctors use when writing medical prescriptions, or that nurses use in calibrating drug dosage in the course of practical nursing work. This may cause confusion: '*Sometimes when I see in my device what the medical doctor has prescribed in his platform, I wonder if it can be true. There must be a mistake. Then I contact the doctor and ask if he really meant what he has written. Usually, it appears that the doctor has forgotten to think through some essential point and that things have gone wrong. But happily enough, we have this double checking possibility. I have taken a special module in medicines and I know those things rather well'* (Interview, group 1).

> *There are lots of complaints about Apotti and similar systems. However, there seems to be a generational divide. Younger nurses already learn to use Apotti in their basic training. When they come to work here they are rather fluent in utilising all the possibilities that Apotti gives. So I would argue that Apotti is better than its reputation.* (Focus group 4)

The problem with employer-provided training and education, also in health care, seems to be that workers perceive mismatches between the employee's needs and the education which employers offer (Appendix Table 14). Almost half (45 %) of respondents criticise the education and training they have obtained, saying that their needs were not sufficiently taken into consideration. Nevertheless, the same share of respondents think that training strengthened their skills and career prospects. However, only one fifth of respondents believe that their training will open up new opportunities for them in their current workplace, while one third of respondents think that their training may increase their opportunities at work with other potential employers.

> *One problem in the Sote reforms and in welfare counties is that there is a tendency for each welfare county to develop their own digital platform, and these different platforms do not discuss with each other, i.e. it is not possible to transfer data from Apotti in Helsinki to Esko-system, in the Oulu region.*

2.3.7 Reconciling work and personal life

If we compare employees in the public service sector with the employees in health care, we might expect that due to differences in the characteristics of work, the potential to telework will differ between the sectors (Appendix Tables 10 and 15). Workers may then have differing possibilities to reconcile family life and work. We find that this indeed does seem to be the case. The public sector service employees have far more positive views on the work-life balance than employees in the health care sector.

There are substantial differences between these two sectors in the use of teleworking. Whereas about 80 % of people in public services reported that they have access to teleworking, a similar share of health care employees say that they do not have such possibilities, and those who have such possibilities tend to report only one or two days per week available for teleworking.

> *Our jobs do not give many possibilities for teleworking. You take care of your patients at your workplace, in my case at the hospital. Sometimes, I can do some digital 'paperwork' at home, but it is rather seldom. When my children were small, I used to be a part-timer, which helped a lot in fitting all the pieces together.* (Interview, group 1)

32% of the health care workers surveyed disagree with the statement that digitalisation has increased personal and family time. Regarding teleworking, most respondents (about 70 %) select the 'neither nor' option. This may be an indication of the low recourse to teleworking, in contrast to the public service sector.

2.3.8 Career prospects and employment security

Most respondents report rather good career prospects and employment security in the health care sector. About 90 % of the employees in the health care sector have permanent and full-time jobs.

Furthermore, there is currently a 'nurse deficit' of 15,000 people. In other words, it is projected that at least this many nurses and practical nurses will be needed in municipal health and long-term care services, and the deficit is rapidly growing larger. It has been calculated that in the next decade, about 20,000 nurses and practical nurses will retire from the municipal health and social care services (Kangas 2022b). In order to solve this problem, more nurses and more digital services are needed in the Finnish health care sector. Against this background, future employment prospects should be extremely good. However, the good employment prospects do not seem to have that much to do with digitalisation – instead, they are linked with the skewed age structure in the sector, and with the retirement trajectories of older nurses. In addition, the rapidly ageing population increases needs for health and long-term care. And as discussed above, digital medicine may partly help to solve the problem, but only in part.

Opinions on the impact of digitalisation on job security and future employment prospects are divided. There are approximately equal numbers of negative and positive opinions on the statement that digitalisation will improve the respondent's own job security: about 30 % of the respondents to the survey disagree and 30 % agree with the statement. Interestingly, over 40 % of employees say that digitalisation will improve the general level of employment in their sector. Thus, digitalisation is seen to generate general rather than individual positive effects. Over 40 % do not believe that digitalisation will improve their salaries, and almost 40 % disagree with the argument that digitalisation will make work more interesting. Scepticism is also voiced in the interviews: '*In principle the employment prospects in our branch are good, but they do not necessarily have that much to do with digitalisation. There is a huge lack of care personnel. In a country like Finland, we need digital services to guarantee access at least to remote services. Employment possibilities should be good. However, there are some worries. Wage setting is one of the problems. Salaries in our branch are rather low, and the Sote reform is a big question mark. Thus, although the employment prospects as such may be good, there are lots of worries and problems. (Focus group 4)*'

2.3.9 Workers' rights

Probably linked to the characteristics of the work in the health care sector, about 40 % of our respondents say that there is no need to be available electronically outside of working hours. One fifth of respondents log in from home by personal choice, and one third of the respondents do not feel any pressure to be electronically available when they are at home. Nevertheless, there is a strong opinion that regulations on electronic availability should be enshrined in labour legislation (80 %), in general labour market agreements (70 %), or in sectoral labour market agreements (75 %). The interviews also bear witness to a rather permissive situation: '*Personally, I feel that I do not have any problems with connectivity or possibilities to disconnect. When I leave the hospital, I am disconnected. I do have some possibilities to telework, but these options are related to specific cases. (Interview, group 1)*'

Health care workers have similar perceptions to workers in other sectors regarding whether relevant information has been provided on digitalisation strategies and implementation of specific tools needed in the work process. Relatively few respondents state that information has been given, and most of the respondents (70 - 80 %) are unaware if such information has been given at all, or if their workplace has adopted a digitalisation strategy. According to legislation and employment contracts at workplaces, there should in fact be an orientation programme providing all the basic skills needed to utilise the tools required for work processes. As shown in Appendix Table 14, over half of the respondents believed that employer-provided training had enhanced their personal skills and improved their employment prospects. Thus, the situation regarding the extent of information given and relevant skill-formation is perhaps not as gloomy as it is depicted by the survey. Some interview responses provide additional nuances here: '*When we got Apotti, there was an intensive period of training. There we had courses and there were experts available and there was a hotline where we could get help if we had problems with the system. Now when Apotti is already there and when someone new comes from outside, s/he will go through the orientation program to learn to use the system. (Focus group 4)*'.

2.3.10 Conclusions on the sector

Digitalisation is an elementary part of the Finnish health care system. There are various registers with abundant data and other information important and useful for proper care of patients. In fact, in primary and specialised care, all relevant data are digitally available. In principle, most of the data should be available in the common platform Kanta (see Section 2.3.2). The problem is in smoothly combining social and health care databases and transferring personal data from one sector to another.

An additional problem has been that health care was previously a municipal responsibility. There are 309 municipalities in Finland, and many of them had their own digital platforms for collecting and filing information. The problem will now be partially resolved when the Social and health care

(Sote) reform transferred responsibilities for social and health care from individual municipalities to bigger entities, i.e. welfare counties.

The Sote reform, the biggest ever social policy reform in Finland, came into effect on 1 January 2023. There are now 22 larger entities (21 welfare counties and the city of Helsinki). The overarching goals of the Sote reform are to strengthen the financial basis for service delivery, to guarantee equal access to health and social services, and to reduce inequalities in health and wellbeing (Ministry of Social Affairs and Health 2022b). Certainly, Sote will make flows of information between different sectors and actors more seamless. However, there will still be major problems. The larger welfare counties have their own digital systems – for example, the Helsinki region has its own (widely criticized) Apotti system, and Northern Finland has its own system called Esko. These different regional systems are not fully compatible with each other. Furthermore, it is not known how the digital systems in the different municipal and regional hospitals will be merged with the digital platforms created by the welfare county to which the hospitals belong. The interviewees expressed scepticism: '*Sote is supposed to be effective in a couple of months. However, we do not yet know what will happen. We do not know what information systems we will be using. We have not gotten any information on that. I suppose that the managers of our hospital also do not know what will happen. I suppose that it will take time before our systems will be properly merged together with the welfare county system. But I am confident of my own job. Work will continue and we will learn to use new digital devices and programs'* (Interview, group 1).

It is presently very difficult to anticipate if the Sote reform will achieve the grand goals set out for it. Furthermore, there is a question regarding financing. The public administration is not organised separately at the three levels of the state, the counties and the municipalities. Municipalities and counties are jointly responsible for promoting public health. Rescue services are organised alongside the health care system and the social welfare services. The public sector will remain the organiser and primary provider of services. Private sector actors and the third sector will supplement public health and social services (Government of Finland 2022b). Presently, it is impossible to anticipate the total costs of the reform, as well as to estimate whether, in addition to state and municipal taxes, the county tax will be needed to cover all costs of the new system.

Several further questions remain about the final costs. For example, harmonising salaries and wages between counties will increase costs. Furthermore, significant extra costs will also be generated by the building up and coordination of ICT systems. There is insufficient clarity on the price of the new three-tiered management model and how it will work. The only certainty is that more money and more personnel will be needed. The magnitude of the projected deficits varies by region, but the problem is the same. More money is needed. The other option is to close down hospitals and squeeze the supply of services.

These anticipated problems were being widely discussed in 2022 when the surveys and most of the interviews were carried out. Thus, data for the Finnish part of the Digiqualpub project were gathered in the shadow of the Sote reform, a situation which doubtless affects the results of our investigation for the health care sector. The author of this report carried out some follow-up interviews in January 2023. The main message was that the 'salary is coming in as previously'. Thus, the biggest ever social and health care reform does not seem to have had any major impacts on the content or work and employment conditions of staff. It remains to be seen what the long-term impacts will be upon employees and customers.

Section 2.4 Overall sectoral cross-cutting conclusions

The survey shows that almost every employee in all the sectors we have investigated use some kind of digital devices. But there are differences between sectors regarding how the skills needed in digital work processes are acquired. In all of the sectors investigated, the highest share of respondents state that the reason why they need training is to acquire special skills in using work task-specific tools and software. More than 30% of respondents in each of the three sectors share that opinion. About 10 % of all the respondents say that digitalisation has not required them to acquire new skills. The perceived need to acquire new digital skills was somewhat lower in the electricity sector. There were no major differences between the other two sectors.

The public sector employees have the most positive view of digitalisation and the possibilities that digitalisation provides to reconcile teleworking with family life. Public sector employees are able to telework more often than employees in the health care and electricity sectors.

One of the most important aspects of work is whether or not one's work is interesting. Table 1 below presents how the respondents in the three different sectors see the impact of digitalisation and whether or not digitalisation has made their job more interesting and attractive. Whereas there are no major differences between the electricity and hospital sectors (χ^2= 5.39, sig = .250), there are statistically highly significant differences between the public administration and the other two sectors. In the public service sector, digitalisation is seen as a necessary and basic tool to serve clients. By contrast, in health care, employees often feel that digital processes actually interfere between them and their clients, and they are much more likely to believe that the time they spend on digital operations takes away time from their basic job, taking care of their patients. In public services, the basic milestones for carrying out one's job are easier to digitalise. Thus, digitalisation and digital tools more often provide effective ways for public service workers to help their clients.

Table 1.   Has digitalisation made your work more interesting? (%)

	Electricity	Public services	Health care and hospitals
Strongly disagree	18	6	18
Disagree	13	13	19
Neither disagree nor agree	32	19	28
Agree	30	31	24
Strongly agree	7	32	12
χ^2= 147.79; sig. = .000.			

Source: q23_5 by q7.

In order to summarise the findings presented above, we created two summative indexes. The first one, 'general aspects', is an additive index of questions q22-2 to q22-7. The index is given values from 6 to 30. The lowest value of six pertains to the most negative views of general impacts of digitalisation, whereas the maximum value of 30 pertains to the most positive opinions. The second additive index refers to more personal dimensions ('personal aspects'), and is a sum of questions q22_8, 23_1, 23_2, 23_4 to 23_6. In principle, this index also runs from 6 to 30. The values are interpreted in the same way as for the first index.

The first observation is that the index of general aspects has higher overall values than the index of personal aspects. Furthermore, the variation between opinions (the standard deviation) is larger for the personal index. As the section above indicates, opinions on and attitudes to digitalisation seem to depend on the sector of employment. However, this is not the full story. In addition to the sector, respondents' gender, age and socio-economic position in the occupational hierarchy have their own impacts on experiences with digitalisation. Regarding personal aspects, analysis of variance reveals that females, younger people, the socioeconomically better off and public service workers are all are more positively oriented towards digitalisation, by statistically significant margins. Regarding the general aspects index, employment sector and socioeconomic status both have statistically significant connections with attitudes.

To cut a long story short, we present box plot graphs on the distribution of opinions among the different occupational groups in the three sectors. Box plots produce useful information on the distribution of opinions. The plots are easy to interpret. 50 % of observations are inside the 'box', whereas 25 % of observations are within the lower 'whisker' and 25% within the upper 'whisker'. The line in the 'box' indicates the mean value in the occupational category in question.

The main outcome, as stated above, is that there are significant differences between sectors: public service employees are the most satisfied with digitalisation, followed by health care workers.

The lowest positive values are found in the electricity sector. The picture is largely the same regardless of whether we look at perceived impacts of digitalisation at the individual or at a more general level. However, within each sector, respondents are more negative about the personal impacts of digitalisation on them themselves than about more general impacts of digitalisation, on society or employment. The respondents understand the importance of digitalisation and the digital economy, but they do not immediately see positive effects of the process in their own life and working conditions.

Not surprisingly, opinions on digitalisation are linked to occupational status, but surprisingly, the relationship is not linear. Those in the lower levels of the hierarchy tend to have more negative opinions of digitalisation. Highly-skilled professionals and highly-skilled technicians have the most positive views on digitalisation. Interestingly, skilled professionals and skilled technicians display surprisingly low values. Their values are lower than the values for moderately-skilled clerical workers.

Figure 3.   Clustered boxplot presentation of the distribution of opinions on the personal and general scales on impacts of digitalisation.
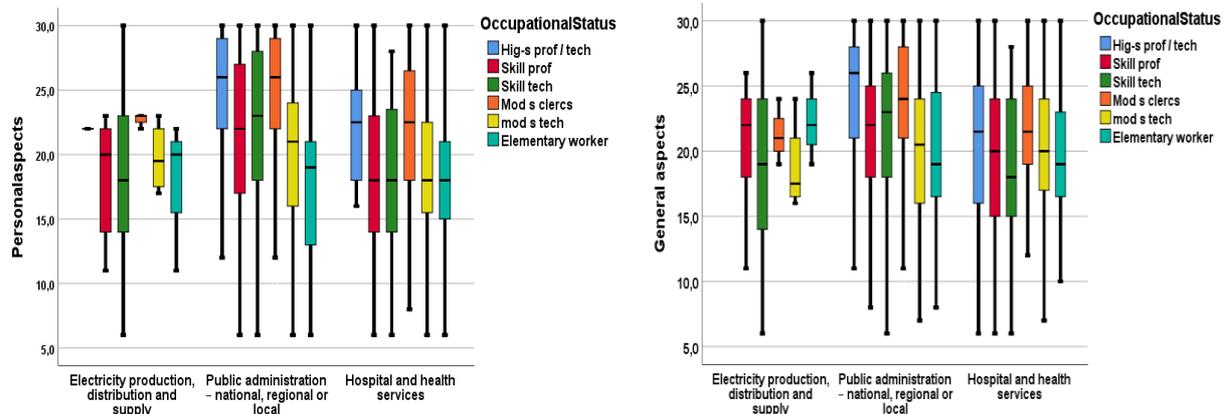
SECTION 3. DIGITALISATION AND SOCIAL DIALOGUE

Section 3.1 Introduction: contextualizing the national system of industrial relations

In order to place the Finnish case in a broader frame of reference, we shall describe the Finnish model of social corporatism. Finland belongs to the Nordic welfare state model exemplified by comprehensive and generous welfare provisions, high tax rates, and low levels of inequality, poverty and social exclusion (see, for example, Kautto and Kuitto 2022).

One of the most important trademarks of the Finnish welfare model has been tri-partite collaboration between social partners and the state (Kangas 2007). The pre-requisites for well-functioning collaboration were strong and unified employer and employee organizations, with the capacity and will to conclude social accords. These organisations could take into consideration long-term 'national interests', not only the short-term interests of their own constituencies. In broader categorizations of welfare capitalism, Finland could be classified as a representative of coordinated market economies (cf. Hall and Soskice 2001; see Kangas and Saloniemi 2013).

The Finnish trade union structure is rather concentrated. There are three main confederations. The Central Organization of Finnish Trade Unions (SAK 2022) represents more than one million employees who are members of SAK's 21 industrial labour unions. Members are from industry, the public sector, transport and private services. The Finnish Confederation of Professionals (STTK 2022) is an umbrella organization for 17 affiliated unions with 0.6 million members, mainly salaried employees in the public sector, private industry, and the private service sector. Since its bases are in the service sector, STTK is female-dominated: about 75 % of its members are women. STTK's membership consists of nurses, technical engineers, police officers, secretaries, and bank employees. Finally, the Confederation of Unions for Professional and Managerial Staff in Finland (Akava 2022) has 35 affiliated unions with over half a million members. Akava's members are generally highly educated, and include employees, entrepreneurs and self-employed professionals in either the public or private sector, generally in positions such as experts, teachers or managers. Comparatively speaking, union density in Finland is very high, although it has fallen rapidly, from close to 90 % of the labour force in the late 1980s to 65 % in in the late 2010s. If retired members are removed from the statistics, in 2019 the union density was 68 %, with the share being four percentage points higher for women than for men (Keskinen 2019; Launonen 2021). Despite the decline, union density in Finland is the third highest in the EU (after Denmark and Sweden).

The employers' interest groups are also concentrated. The Confederation of Finnish Industries (EK) is a conglomeration of heavy industry and private sector service employers. In the public sector, there are two separate employers' organizations: the Local Government Employers (KT) and the

State Employer's Office (VTML). Furthermore, the Finnish Lutheran Church has its own employer organization, the Commission for Church Employers (KiT).

One special feature the Finnish system of labour market negotiations has been concentrated income policy negotiations, with 'social pacts' brokered by the central government. Employer and employee organizations bargained over wages, while the government facilitated agreements by using sticks and carrots. The sticks were mainly increased taxes if wage increases were too excessive. The carrots were promises of higher employment-related benefits such as sick and family leave benefits, better pension provisions and other social policy-related reforms. The social partners have actively participated in reforming the Finnish welfare state (Pesonen and Riihinen 2002: 91-95; Kangas 2009). Thus, social corporatism has been very strong, and the social partners not only played an important role in establishing a well-functioning collective bargaining system, but also in the construction of the comprehensive social policy model. For example, all major reforms of employment-related pensions have been the result of negotiations and agreements between the social partners (see Kangas, Lundberg and Ploug 2010).

Another central feature of the labour market negotiation system has been *yleissitovuus*, or the principle of 'generally binding agreements' – that is, collective agreements which are generally applicable throughout the labour market. This means that every employer has to follow the stipulations which the generally applicable collective agreement sets out for the sector in question (Ministry of Social Affairs and Health 2022a). This has been possible because labour market agreements have been negotiated at the sectoral or at higher levels. Collective bargaining coverage has traditionally been high, and it still is over 90 %. The share of company-level agreements is still very low.

However, the situation is gradually changing, and social corporatism is gradually withering away as employers try to get rid of generally binding agreements. During the most recent decade, the employers' federations have insisted on branch- or local-level bargaining instead of the centralized, top-level wage agreements that have been in use since the mid-1960s. The shift in emphasis mirrors the ever-stronger position of employers vis-à-vis employees. The shift in the balance of power is linked to the fact that whereas employers are acting in increasingly global markets and benefiting from that, trade unions are more bound by national contexts. Furthermore, there is a steady decline in the share of unionised employees, which mirrors the structural transformation of employment from traditional manufacturing with permanent and full-time jobs and high union density towards services with part-time and atypical work contracts and much lower degrees of unionisation.

As Figure 4 illustrates, those categories with strong insider positions in the labour market have the highest rates of unionisation, while those in more vulnerable positions and more exposed to

unemployment have significantly lower membership rates. Union membership in Finland also gives access to earnings-related unemployment benefits. The earnings-related unemployment insurance is run by unemployment funds. Membership in the fund is voluntary. Thus, in the event of unemployment, those who are not members of funds are not entitled to income-related unemployment allowance. They must rely on the basic, flat-rate unemployment benefit paid by the Social Insurance Institution of Finland (Kela).

Figure 5.   Membership of unemployment insurance funds by employment status (%) in Finland in the mid-2010s.
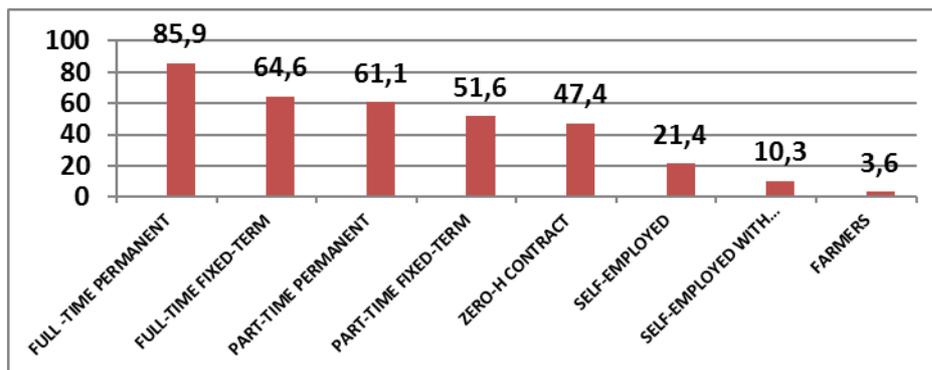
Source: Author's own calculations from the survey commissioned from Taloustutkimus. The survey (n = 2,052 respondents) was carried out in December 2015.

However, it is important to emphasise that the trajectories described above do not mean the end of social dialogue in Finland, even though its forms and contents may change. Nowadays, the social dialogue covers topics such as the employment relationship, working conditions and working hours. Employee and employer federations prefer labour market agreements to statutory solutions on such labour market issues as minimum wages or teleworking. Regarding the latter, Finland (together with the other Nordic countries) addresses teleworking issues in laws on safety and health, laws on working time and general labour laws rather than specific laws on teleworking. In practice, telework is mainly regulated through sectoral collective bargaining or through sectoral and company-level agreements (Eurofound 2022, 46).

Labour market issues are no longer mainly dealt with at national level. The European level is more and more involved in the discussions. The European Commission consults labour market organizations when considering any social policy principles. The European Trade Union Confederation (ETUC) represents national trade unions in various sectors of European labour relations. All Finnish national trade unions, SAK, STTK and Akava, are affiliated with the ETUC. The Confederation of Finnish Industry EK is affiliated with BUSINESSEUROPE, and the Local Government Employers as well as the Ministry of Finance are members of the European Centre of Public Employers and Public Enterprises (CEEP). The Association of Employers of Local Authorities is also a member of the Council of European Municipalities and Regions (CEMR). The European Economic and Social Committee (EESC) represents the views of organized civil society in the

European Union, and includes Finnish representatives of labour market organizations, consumer groups, agricultural producers and other stakeholders.

A comparison across EU Member States (Lafuente Hernández, Rasnača and Vitols 2019) shows that in access to democracy at work, there is a great deal of variation between countries. Employees' possibilities for democratic representation at work are unequally distributed, despite generally agreed rules on workers' rights to information, consultation and participation. The European Participation Index (EPI) is a compound index of different levels of collective representation of employees. The EPI index shows that the level of democracy at work is high in the Nordic member countries (Finland, Sweden and Denmark). However, as we have seen above, there seems to be much room for improvement regarding digitalisation in general, or access to information on digital changes in particular. Being the leading country on the EPI index does not help much. Interview responses also point this out:

> *Digitalisation as such does not play that important a role in collective bargaining processes and collective agreements. In fact, it is not an issue. Of course, there are sections on workers' rights and duties related to digital work processes. But it is not the main thing. Digitalisation gives employers better and more effective possibilities to screen the performance of their employees. However, there have not yet been discussions or initiatives to move toward individual wage setting. What is happening is pressure from the employers' federations to get rid of centralized wage agreements and shift the process to the sectoral level and further to the local level. (Focus group 1)*

In 2021, the central trade union confederations SAK, STTK, Akava and the employer confederations published a joint memorandum of understating on social dialogue on digitalisation (SAK & al. 2021). According to the memorandum, there is a need for a dialogue between management and personnel and also among the personnel. Dialogue in workplaces and industries is the best-suited method, in the Finnish circumstances, to implement the joint European digitalization framework agreed upon between the European employers and employees. As also commented in the interviews: '*In Finland, we prefer social dialogue rather than legislation that is too crude and clumsy a method. The question is the same as in discussion on minimum wages. There are countries that demand that the minimum wages level be defined in legislation. In Finland, as well as in the other Nordic countries, we think that the best way is social dialogue and collective agreements that are more flexible and take better into consideration national, local and sectoral circumstances and special needs. (Focus group 1).*

Section 3.2 Trade unions' position on digitalisation at the national level

Trade unions and employer federations emphasise that digitalisation processes in working life must be steered by a culture of trust. In contrast to the doomsday prophesies of the end of work, trade

unions also see that digitalisation and AI will produce significant improvements in productivity, employment, delivery of public services and work processes at workplaces. Positive developments can be hastened by policy measures, public funding and collaboration. The goal is a high-quality working life, characterised by employee wellbeing and high labour productivity (Digitalising Finland 2019).

In their common programme for digitalisation, the Finnish trade union confederations specify four major points: 1) ensuring skills and competence development; 2) support for workplaces in the introduction of new technologies and new ways of doing things; 3) coherent and fair rules of play for a harmonized operating environment, and 4) working together towards better solutions.

Ensuring skills and competence development is one major objective of the programme. In order to respond to changes in the content of jobs, and to meet the demands which workers face in new occupations, there is a growing need to acquire the ability to combine technology skills and interaction skills. Achieving these goals is a task for the entire education and training system, from basic education to workplace learning and training.

A further main objective relevant to coping with the digital transformation is to strengthen peoples' capacity to read, as well as to critically evaluate what they have read. This task pertains to all information available in digitalised form and through all possible digital channels. A second objective is to improve skills in digital writing and in telling stories in digital forums. Such skills are particularly important when services traditionally provided face-to-face (such as health care, mental health care services etc.) are digitalised. Thus, the concept of digital literacy covers various aspects of reading texts, and interpreting images, sounds and symbols transmitted by digital platforms, but also the ability to interact socially and the ability to produce content and participate in digital life.

Formal education is a necessary but not a sufficient condition for meeting the skill demands of the digital society. The question is how to ensure that employees who have completed their formal education are properly equipped for changes in digital working life. Lifelong learning is seen a solution, on one hand, to help enterprises to cope and, on the other hand, to help individuals to strengthen the skills they need to successfully engage with the labour market in a rapidly changing society. At the individual level, lifelong learning means engagement in different forms of skill and competency development over the entire lifecycle (OECD 2020).

Support for workplaces in the introduction of new technologies and new ways of doing things is a further operational objective. Labour unions see that future success requires investments in research and innovation to facilitate and speed up economic growth, employment, productivity and skills formation. The problem is that in the most recent decade, investments in research,

development and innovation have actually been significantly reduced in Finland. Labour unions see that increases in productivity will only take place if the implementation of new technologies in the production process is supported by training and by stronger collaboration between different actors (for example, employers, employee organisations, educational institutions and lifelong learning providers). Since the most important changes in the utilisation of technology will take place in workplaces, labour market institutions must be at the forefront of development and provide policy tools to support the change. Labour unions emphasise that the unions are responsible for providing their members with the training they need to keep abreast of developments in working life. As indicated above, employees' participation rates in adult education (lifelong learning) are comparatively high in Finland.

Ensuring coherent and fair rules of play for a harmonized operating environment constitutes yet another programme objective. According to the labour unions, mutual trust and sufficient levels of employment and social security are central preconditions for a successful digital transition in society. There will be significant transformation, even disruptions. In such situations, security and societal stability must be ensured. Security is also an important value in relation to the handling and transferring of digital data. There also is a growing need for definitive rules on how to gain access to data, and governing who has the right to access individual data.

Finally, the unions' digitalization programme also entails working together towards better solutions. One central hallmark of the Finnish high-trust society is collaboration of social partners on issues relating to working life and the social protection of employees. This collaborative principle is still valid. Finland should aim for digital interfaces which enable collaboration between various public and private actors. 'Joint, open projects and open interfaces will ensure even better functioning services from the citizen and business perspective. Wicked problems require new solutions.' (Digitalising Finland 2019). In sum, to satisfactorily meet all the new challenges, innovation, education, research, data and labour market institutions must act together in a synergetic way.

The Covid-19 pandemic accelerated the expansion of teleworking, which had already previously become increasingly common. In the beginning of the 2010s, more than one fifth of all employees worked at a distance, either full time or part-time (European Commission 2021). Thanks to the high level of digitalisation, the Finnish Covid-19 strategy was successful. When the pandemic hit, almost all civil servants, teachers and experts in the knowledge sector started teleworking full-time. As many as 60 to 70 percent of all Finnish employees changed over to teleworking at the height of the pandemic. The share of teleworkers was actually the highest recorded in the world. Furthermore, the use of digital public services increased significantly after the outbreak of the epidemic. In education, distance learning was introduced at the national level in the primary and secondary schools as well as in the universities. Thus, teleworking was mainly used in knowledge-intensive occupations, in education and the public services. Needless to say, however, teleworking

was not possible in such private services as the retail trade, industrial manufacturing or construction. In principle, labour unions had a positive attitude towards teleworking.

There are pros and cons of teleworking. Such practices make it easier to adapt employees' use of their own time to needs in their personal life or family life. The flip side is how to disconnect from work. However, in the Finnish case, this does not seem to be a major issue for employees. Collective agreements handle the issue rather well. All the employees and experts interviewed emphasised that they have strong rights to electronic downtime, while persons in leading positions are more vulnerable to constant electronic availability.

Section 3.3 Electricity production and distribution sector

3.3.1 Collective bargaining in the sector

Employees in the electricity sector belong to a number of different trade unions. The Finnish Electrical Workers' Union [*Sähköliitto*] is the biggest trade union solely representing the interests of electrical workers. The union was founded in 1955, when it split from the Metal Workers' Union. *Sähköliitto* is a member of the Central Organisation of Finnish Trade Unions [Suomen ammattiliittojen keskusjärjestö, SAK] and has about 35,000 members. Electrical workers employed by municipalities or other public bodies may be represented by JHL, representing all professionals working in municipalities, for the Finnish state and in private welfare services, and the students in these sectors. Therefore, the Electrical Workers´ Union and representatives of JHL both conduct negotiations with employer organisations.

Previously, collective bargaining was conducted in a more centralised way. Gradually, bargaining processes have become more decentralised, and within the Electrical Workers´ Union there are various smaller branches that conduct their own negotiations. The Electrical Workers´ Union represents those sectors at the bargaining table. The main negotiation partners are the Service Sector Employers (PALTA), the Electrotechnical Employers' Union (STTA) and the Energy Industry. For the time being, the bargaining process seems to be settled and no major changes are taking place.

3.3.2 Role of and importance assigned to digitalisation in the national industry-wide agreements

Digitalisation is not an issue covered by the Electrical Workers´ Union agreements. The word is not used in the texts of the collective agreement. Neither is telework mentioned at all. However, the general agreements on working hours, wages, various types of compensation, development of skills and employer-provided education, workplace health and good conduct indirectly cover digitalisation and its impacts.

3.3.3 Labour union approaches and priorities for the collective bargaining agenda on digitalisation

The joint memorandum of agreement on digitalisation (see Section 3.1.) also covers the Electrical Workers' Union (via JHL). Thus, what the general agreement says on approaches and priorities also applies to the Electrical Workers' Union. The main priority is that discussion should be based on social dialogue at the central, branch and enterprise levels.

3.3.4 Conclusions on the sector

All modern societies are heavily dependent on electricity. The future is electric and new ways of producing electricity are rapidly developing. The ongoing Russian war against Ukraine has strengthened the 'green transformation' and the wish to halt fossil-based electricity production. New applications of solar and wind energy are intensifying the transition towards green energy. As described in Section 2.2.2, one important potential benefit of digitalisation is its ability to break down boundaries between energy sectors, enabling integration and cooperation of various actors and systems. For example, it is now easy to load the extra electricity produced by customers' solar panels to the main grid, or sell the surplus electricity to other users. Furthermore, the use of IoT in property maintenance technology (prop-tech), i.e. new technology to manage and control various functions in houses and apartments (heating, cooling, air conditioning, and all kinds of consumption of electricity) is a growing business with limitless possibilities.

Section 3.4 Public administration sector

3.4.1 Collective bargaining in the sector

The public sector employees are unionised in different trade unions that, in turn, are linked to the three central confederations of trade unions. In the SAK, public administration employees are represented by the JHL, with its 170,000 members. In the lower white-collar STTK, public administration employees are represented by Tehy (with 160,000 members), Super (60,000 members), Jyty (50,000 members), Pro (120,000 members) and Kela employees (4,500 members). Finally, within the upper white-collar Akava, public administration workers are represented by the Trade Union of Education (122,000 members), Academic Engineers and Architects in Finland TEK (70,000 members) and the Finnish Medical Association (26,000 members).

The trade union Pro (2020) represents the interests of various categories of private and public sector employees: people working in wood processing, banking and insurance, media and ICT and transport, as well as in the chemical, food, textile, building and technology industries. Pro also includes workers in public sector institutions and employees in private sector social service firms. Therefore, Pro carries out negotiations with a number of different employer federations, such as Technology Industry, as well as Palta, representing the public sector (mainly state) employers (Pro

2020. This bargaining, and the collective agreements reached, are at sectoral level. Just like Pro, JHL represents various categories of public sector (state and municipality) employees, such as nurses and practical nurses as well as other persons working in the social, health care and hospital sector. The negotiations are conducted at the sectoral level between JHL and Local Government Employers in Finland or between JHL and Palta (Service Sector Employers) (JHL 2022; Palta 2017).

The year 2022 has been rather conflictual in the health care sector in Finland. Therefore, both JHL and Pro have been busy in negotiations on collective agreements for nurses and practical nurses. The reasons for the disputes and issues concerned are described in section 3.5 below.

3.4.2 Role of and importance assigned to digitalisation in the national industry-wide agreements

See section 3.3.2 above

3.4.3 Labour union approaches and priorities for the collective bargaining agenda on digitalisation

See Section 3.3.3 above

3.4.4 Conclusions on the sector

Digitalisation is not seen as a threat in the public sector. Union density among public sector employees is rather high. In that sense digitalisation is not a threat at all. In the interviews conducted, trade union leaders emphasise that thanks to digitalisation, it is far easier for them to be connected with the employees they represent than previously during the 'paper and phone' era.

Section 3.5 Health care sector

3.5.1 Collective bargaining in the sector

The main bargaining processes and partners are discussed above in Section 3.1.

Despite the relatively centralised wage negotiations in the public health and social care sector, there have been variations in the wages set by the different municipalities. The aim of the Sote reform (see Section 2.3.10) is to harmonise wages and salaries between welfare counties. The question is how this should be done.

The issue has caused disputes between the trade unions (mostly Tehy representing nurses and Super representing practical nurses - for a closer discussion on these unions, see Section 3.2).

Salaries in the public social and health care sectors are lagging behind the salary levels in private sector occupations with similar levels of average educational attainment to nurses. In Finland,

nurses have lower tertiary level (polytechnics / university of applied sciences) educational diplomas. Furthermore, experienced nurses in hospitals often carry out some tasks that used to be the sole responsibility of medical doctors. Whereas a doctor earns €7,500 per month, the median monthly salary for experienced nurses is €3,300 and the median monthly salary for practical nurses is €2,700. The average electrician's monthly wage is €3,400. The median income for all Finnish employees is €3,200 per month (Elo 2022).

In their 'Sote rescue programme', the labour unions Tehy and Super demanded 3.6% increases in annual salaries for five consecutive years, in addition to the usual contractual increases. The demands were motivated by salary comparisons and the increased workload due to the Covid-19 pandemic. The employers, representing the public sector, did not accept the demands. To boost their demands, Tehy and Super decided to launch various industrial action measures that took place until the labour unions and employers concluded an agreement in October 2022.

3.5.2 Role of and importance assigned to digitalisation in the national industry-wide agreements
See section 3.3.2 above

3.5.3 Labour union approaches and priorities for the collective bargaining agenda on digitalisation
See section 3.3.3 above

3.5.4 Conclusions on the sector
The main challenges and opportunities for the trade unions are not related to digitalisation. Digitalisation is a secondary issue. The main sectoral challenges are the shortage of labour in the social and health care sector. Furthermore, the huge Sote reform raises many questions. What does it mean for smaller local hospitals and their employees? What will happen to all the municipal employees when they are employed by welfare counties? How to harmonise salaries between different sectors and actors within a county and between counties? Those are the biggest questions that the major sectoral labour unions (Tehy, Super, Jhl, Pro) will wrestle with over the coming years.

As regards possibilities for combining digitalisation and trade union activism, digitalisation is seen as improving the connections between the union representatives and their constituencies.

In its commentary on the national digital strategy, Tehy (2022) raises important issues. While some of them are specific to the health care sector, others have a wider social bearing. Clearly, the development of new digital platforms is not enough. Neither is it sufficient for employees in the social and health sector to master all the ICT technologies used in their workplaces. Effective

utilisation of digital services requires skills and knowledge also for clients. People must be guaranteed sufficient digital skills so that everyone has the opportunity to benefit equally from these services. It is particularly important to note the special needs of those in a vulnerable position (the elderly, immigrants, people with disabilities and other special groups), who may not have sufficient resources to acquire digital skills or equipment. Digitalisation and robotics make the work of employees in health care and the public services easier, but at the same time, sufficient resources must be guaranteed to support employees' digitalised work. In the future, it is important to invest in the availability and accessibility of services in such a way that citizens receive services equally.

Section 3.6 Overall sectoral cross-cutting conclusions

Digitalisation will change the methods and the content of employment in all sectors. There is virtually no sector that will not be impacted by digitalisation. As discussed above, the three sectors focused on in this report do however use digital tools differently and for different purposes. Consequently, attitudes on digitalisation vary significantly between the sectors.

Although all sectors of economic activity are impacted by digitalisation, and will be much more so in the future than now, collective agreements are silent on this issue. The reason is not that the social partners involved in the bargaining processes are unaware of the huge importance of digitalisation. Rather, there seems to be tacit mutual trust that digitalisation, its positive and negative sides, can be properly handled in dialogue between the social partners.

SECTION 4. RECOMMENDATIONS TO NATIONAL AND EU STAKEHOLDERS

Section 4.1 Recommendations to national stakeholders

The central idea in democratic societies is that all voices must be heard, and all persons must have the capabilities to participate in their society (see, for example, Townsend 1979; Sen 1992, 2010; Nussbaum 2011). In her book *Creating Capabilities*, Martha Nussbaum (2011) argues that the baseline for evaluating the degree of social inclusion is to ask what opportunities are available to each person, that is, what is each member of the society able to do and be. Thus, people must have the capabilities to master their own lives and participate in society at all levels. Nussbaum distinguishes between two different forms of poverty of agency: the agency that is linked to the individual's own capabilities (internal capability) and the agency that is related to social and political institutions and everyday practices, including employment, education, consumption, and political participation.

Internal capabilities are obtained through the multifaceted interactions between social background, the educational system, the labour market, and other social processes and institutional arrangements. A society may be good at producing internal capabilities for individuals but may not offer channels to use those capabilities fully. Thus, individuals' internal capacities are not enough to realise full participation. The same goes for upskilling one's capabilities. Upskilling, for example, is an individual's process of improving her digital capabilities in order to participate in employment. However, societal practices and institutional hindrances may prevent even people with a high level of capabilities from fully participating and utilising their skills. Such thwarting practices may be related to gender, ethnicity, numerous other factors, and multifaceted interactions between all relevant factors.

Combined capabilities require both internal capabilities and institutional arrangements. There may be societies that have universally open institutions (e.g., the labour market), but which do not invest in generating internal capabilities (e.g., through education). Thus, both internal capabilities and enabling societal institutions and practices are necessary to achieve combined capability. According to Nussbaum, it is the ultimate task of the government to create social institutions where people can use their capabilities and actively support skill-building. The latter task mostly falls to the educational system, including early childhood schooling, basic and secondary education, vocational education, and university-level education. In a rapidly changing world, this means the continuous acquisition of new skills and lifelong learning. It is important to remember that employers also provide opportunities for life-long learning in many countries and have upskilling schemes to mitigate the mismatch between the skills required by companies and the skills provided within the educational system.

At a general level, Finland should be prepared for change and remember that digitalisation and artificial intelligence are above all means of improving people's lives. We should look for models by which citizens participate and contribute to society as the amount and importance of paid work possibly decreases. Even if livelihood could be secured by paying out basic income or other means, this alone is not enough. Therefore, it is necessary to think about the social division of labour, shorter working hours and various new forms of participation in labour markets and in society in general.

Regarding social policy and employment in digital society, the important issue is how social policy solutions support employment and participation in society. Decent economic security is necessary but is not a sufficient condition for employment and participation. Income security can be in the form of universal basic income (UBI) or in the form of a universal income guarantee safeguarding a decent livelihood for those who are unable to financially support themselves. However, a decent level of income is a necessary but not a sufficient condition for full participation in society. Income transfers must be accompanied by a wide array of services to improve the lot of those who experience various barriers to employment (see Ylikännö and Kangas 2021) Barriers can be related to health issues, as well as to a lack of the skills needed in an increasingly digitalised society and labour market.

- More effective coordination of income transfers and social, employment, health care and educational services is needed to create a sufficient platform for fulfilment of combined capacities.

- A wide array of services is needed to strengthen the internal capacities of those who experience various barriers to participation in employment or in society in general.

In present-day society, digital literacy is an essential precondition (or internal capacity) for full societal participation, in the sense that people must have sufficient capacities to participate in working life and more generally to cope in society. Digital literacy includes two central aspects. The first aspect is the capacity to read and critically evaluate what one has read. This aspect pertains to all information available in digitalised form, through all possible digital channels. Regarding acquisition and implementation of new digital technologies and software, the usual processes by which this takes place seem to be organised in a manner which is excessively top-down in nature. Usually, an employer simply declares that a new digital system will be taken into use. Employees are forced to simply adapt to these changes.

- Digital literacy must be included in curricula at all levels of education.

- Life-long learning in general, and employer-provided training in particular, must better take into consideration individual needs.

- Special measures should be planned and taken to enhance participation of those who have inadequate digital skills. As a rule, those who have digital skills currently participate much more in further education, whereas those lacking skills participate much less.

- The process of acquisition of new technologies is too much of a top-down process. Such processes should include more genuine dialogue.

The second major aspect to successful social participation relates to skills in digital writing and in telling stories in digital forums. Such skills become increasingly relevant when services traditionally provided face-to-face (such as health care, mental health care services, etc.) are digitalised. This issue is most important in the public services and to some extent also in employment services, as well as in health care.

Perhaps the biggest digitalisation-related challenge in Finland is posed by the social and health care reform (Sote). At present, it seems that the various welfare counties are developing their own digital platforms to collect and store the massive amounts of data and to ensure smooth utilisation of the registers needed to provide health care services. There is a need for training both in the use of systems and in data management, as well as in compliance with confidentiality rules. The EU's general data protection directive also implies new needs for training.

The Sote reform combines social and health care data with numerous other databases. The combination process creates better possibilities for developing more comprehensive digital services in public administration in general, and in public services in particular. The reform provides tools for more coherent and comprehensive analytics, improving the possibilities for evidence-based decision-making. In the best scenario, the Sote reform will thus strengthen the knowledge base needed to evaluate the cost-effectiveness of public services.

Regarding public services, the combining of databases will help clients with multiple intertwined problems. Clients no longer need to provide a multitude of documents, which will simplify and speed up decision-making processes. Regarding social and health care services, digitalisation facilitates more personalized, preventive, and predictive healthcare services. Combined digital data archives allow a more comprehensive view of a client's health status and wellbeing. Digitalisation also opens up innovative ways to merge individual 'my-data' for diagnosis, therapy, and care. Ample data allow more efficient predictive service designs, health coaching, and make it possible to derive individuals' health risks predicted on the basis of longitudinal personal health data. For all these hopes to be materialised, there is a need to:

- improve the sectoral coordination between different actors (such as social and health care, employment services, etc.).

- better coordinate digital platforms between welfare counties to make data exchange and information flows more seamless.

One specific group which tends to lack linguistic and digital skills are immigrants in general, and refugees in particular. Immigrants' employment rates tend to be 20 percentage points lower than among the native population in Finland. The same applies to people with disabilities, with employment rates in this group likely to be even further below that of the general population. In order to improve the situation, we should do the following:

- New digital technologies (for example, digital interpretation services, remote work, mobile work, and other digital employment arrangements) should be used to promote the inclusion of disadvantaged persons in the labour force.

Section 4.2 Recommendations to European stakeholders

The recommendations to European stakeholders are more or less the same as those geared to the Finnish audience. In the whole EU area, those with higher human capital tend to participate more in continuous education than those with lower human capital stocks. In the EU, there is a 28% gap in the participation rates in lifelong learning between those with tertiary education and those with lower educational attainments (OECD, 2021). Thus, those with higher skill levels are the most prone to be involved in lifelong learning, and thus accumulate advantages. Regarding Finland, the task for European-level policymakers and national labour market partners is to try to find effective policies to also enrol those with low digital skills in life-long learning.

SECTION 5. REFERENCES

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Annex 1. List of focus groups

ID	Gender	Age	Trade union affiliation	Sector	Occupation
FG1	Male	44	Central Organisation of Finnish Trade Unions	Central organisation of TUs; 22 August 2022; face-to-face; 75 minutes.	Development officer
FG2	Female	38	Trade Union for the Public and Welfare Sectors (JHL)	TU public sector employees; 9 September 2022; Teams; 90 minutes.	Researcher
FG2	Female	43	Trade Union for the Public and Welfare Sectors (JHL)	TU public sector employees; 9 September 2022; Teams; 90 minutes.	Officer
FG2	Male	51	Trade Union for the Public and Welfare Sectors (JHL)	TU public sector employees; 9 September 2022; Teams; 90 minutes.	Bargaining officer
FG2	Female	46	Trade Union for the Public and Welfare Sectors (JHL)	TU public sector employees; 9 September 2022; Teams; 90 minutes.	Collective agreement coordinator
FG3	Female	57	Kela employees	TU public sector employees; 9 September 2022; Teams; 80 minutes	Senior TU officer
FG3	Female	48	Kela employees	TU public sector employees; 9 September 2022; Teams; 80 minutes.	Senior TU officer
FG4	Female	55	(TEHY) The Union of Health and Social Care Professionals in Finland	TU Nurse; 22 September 2022; Teams; 75 minutes.	Head of the section
FG4	Female	56	(TEHY) The Union of Health and Social Care Professionals in Finland	TU Nurse; 22 September 2022; Teams; 75 minutes	Head of negotiations
FG5	Female	66	Trade Union Pro	TU public employees; 21 September 2022; Teams; 65 minutes	Head of the section

Annex 2. List of focus groups

ID	Gender	Age	Institution*	Sector**	Occupational group ***	Position****	Date	Method*****
INT1	Female	52	(TEHY) The Union of Health and Social Care Professionals in Finland	Health and Hospital	TU Nurse	Nurse in health care centre	30 September 2022	face-to-face
INT1	Female	50	TEHY	Health and Hospital	TU Nurse	Senior nurse	17 December 2022	Zoom
INT1	Male	34	TEHY	Health and Hospital	TU Nurse	Nurse in hospital	21 September 2022	Teams
INT1	Female	51	TEHY	Health and Hospital	TU NUrse	Nurse in hospital	21 September 2022	Teams
INT1	Female	43	TEHY	Health and Hospital	TU Nurse	Nurse in surgery	17 December 2022	Zoom
INT1	Female	41	TEHY	Health and Hospital	TU Nurse	Nurse in emergency	17 December 2022	Zoom
INT1	Female	63	Union of Practical Nurses SuPer	Health and Hospital	TU Practical nurse	Nurse in hospital bed ward	17 December 2022	Zoom
INT2	Female	56	Trade Union Pro	Public administration	TU public employees	Senior officer	8 September 2022	Face-to-face
INT2	Male	27	Pro	Public administration	TU public employees	Data manager	8 September 2022	Face-to-face
INT3	Female	66	Pro	Public administration	TU public employees	Senior officer	21 September 2022	Face-to-face
INT4	Female	57	Kela employees	Public administration	TU public employees	Senior officer	21 September 2022	Face-to-face
INT4	Female	46	Pro	Public administration	Public administration	Expert on services	21 September 2022	Face-to-face

All the appendix tables are based on the researcher's own calculations from the Finnish DigiQual survey data.

Appendix Table 1.   Digitalisation and organisation of work in the electricity sector; distribution of responses to questions on work tasks, content of work and work satisfaction (%).

Items on the content of work	Strongly disagree	Somewhat disagree	Neither nor	Somewhat agree	Strongly agree
Digitalisation has improved…					
- job quality	14	19	23	36	8
- productivity	16	13	21	36	15
- quality of service to users	16	8	48	23	5
- cooperation with colleagues	15	13	22	37	13
- autonomy to schedule work tasks	15	17	26	31	10
- coordination of tasks with colleagues	13	12	30	35	11
- overview of implementing my tasks	18	11	33	32	7
- supervisor's assessment of my job	13	17	36	23	11
- colleagues' assessment of my job	15	14	44	21	6
- possibilities to focus on significant aspects in my job	21	18	17	33	12
-external users' assessment of my job	15	15	38	21	11
- working conditions	17	14	32	34	4
- wages	23	19	34	20	4
Digitalisation has…					
- decreased time used for routines	20	24	20	25	12
- increased pace / intensity in work	11	14	25	24	26
- increased time to control job tasks	10	23	31	19	18
I am satisfied…					
- my job is better now	18	13	46	20	2
- my job is more interesting and attractive now	16	13	32	32	8

Source: Q22_8, Q22_9, Q23_3, Q23_5, Q23_6, Q24_1, Q24_2, Q24_3, Q24_4, Q24_5, Q24_6, Q24_7, Q24_8.

Appendix Table 2. Digitalisation and working time in the electricity sector, distribution of responses to questions on working hours, overtime work and time used for commuting (%).

Items on working hours	Digitalisation has…				
	Significantly decreased	Somewhat decreased	Neither nor	Somewhat increased	Significantly increased
- working hours	0	5	74	17	5
- paid overtime	1	3	87	8	1
- unpaid overtime	2	2	79	14	3
- unsocial working time	0	6	76	16	2
- breaks and time for rest	2	23	69	7	0
- commuting time to work	5	7	85	3	0
- commuting time to customers	5	6	82	7	1

Source: Q25_1, Q25_2, Q25_3, Q25_4, Q25_5, Q25_6, Q25_7.

Appendix Table 3. Digitalisation and experiences of monitoring, harassment and verbal violence in the electricity sector (%).

Items					
Digitalisation has increased	Strongly disagree	Somewhat disagree	Neither nor	Somewhat agree	Strongly agree
- monitoring of employees	11	5	36	31	18
- harassment from colleagues	22	14	50	8	5
- verbal / physical violence from clients	24	12	54	7	4
- verbal / physical violence from colleagues	19	14	54	7	6

Source: Q35_7, Q35_8, Q35_9, Q35_10.

Appendix Table 4. **Opinions** **on** **employer-provided** **education** **and** **training** **in** **the** **electricity sector (%).**

Items					
Employer-provided training	Strongly disagree	Somewhat disagree	Neither nor	Somewhat agree	Strongly agree
- sufficiently takes into consideration my needs	22	28	35	13	1
- strengthened my skills and career prospects	6	7	35	45	7
- opens up possibilities in my current workplace	19	15	47	18	1
- opens up possibilities outside my current workplace	13	9	40	33	5
- will not change anything for me	11	14	42	19	14
- reduces my job security in the future	18	20	46	10	6

Source: Q30_2, Q30_3, Q30_4, Q30_5, Q30_6, Q37_28.

Appendix Table 5. **Digitalisation and work-family-life balance in the electricity sector (%).**

Items:					
Digitalisation has…	Strongly disagree	Somewhat disagree	Neither nor	Somewhat agree	Strongly agree
- improved the balance between personal/family time and work time	18	16	36	22	6
- increased personal and family time	18	18	54	14	3
- not affected time outside work	12	15	35	15	24
- increased work time at the expense of family time	16	15	30	30	9
- meant that teleworking at home is difficult to combine with my household responsibilities	8	7	69	12	5
- meant that, when teleworking at home, it is difficult to differentiate between working time and personal time	8	3	59	17	13

Source: Q22_10, Q23_2, Q26_1, Q26_2, Q26_3, Q26_4, Q26_5.

Appendix Table 6. Digitalisation and organisation of work in public services, distribution of responses to questions on work tasks, content of work and work satisfaction (%).

Items on the content of work	Strongly disagree	Somewhat disagree	Neither nor	Somewhat agree	Strongly agree
Digitalisation has improved…					
- job quality	4	11	18	34	34
- productivity	6	9	16	29	40
- quality of service	3	12	12	39	34
- cooperation with colleagues	6	13	23	35	23
- autonomy to schedule work tasks	8	11	20	31	32
- coordination of tasks with colleagues	13	12	33	32	10
- overview of implementing my tasks	8	12	34	28	18
- supervisor's assessment of my job	9	10	32	30	20
- colleagues' assessment of my job	9	12	43	24	11
- possibilities to focus on significant aspects in my job	12	17	15	26	30
- users' assessment of my job	12	12	47	18	11
- working conditions	5	12	22	34	28
- wages in my sector	13	17	43	16	11
Digitalisation has…					
- decreased time used for routines	11	18	20	26	25
- increased pace / intensity in work	4	8	16	32	40
I am satisfied…					
- my job is better now	7	15	30	30	18
- my job is more interesting and attractive now	6	13	19	31	31

Source: Q22_8, Q22_9, Q23_3, Q23_5, Q23_6, Q24_1, Q24_2, Q24_3, Q24_4, Q24_5, Q24_6, Q24_7, Q24_8.

Appendix Table 7. **Digitalisation and working time in the public administration, distribution of responses to questions on working hours, overtime work and time used to commute (%).**

Items on working hours	Digitalisation has…				
	Significantly decreased	Somewhat decreased	Neither nor	Somewhat increased	Significantly increased
- working hours	1	2	83	11	4
- paid overtime	2	3	85	9	2
- unpaid overtime	2	1	83	11	4
- unsocial working time	2	1	78	15	4
- breaks and time for rest	7	26	60	7	1
- commuting time to work	37	11	49	2	1
- commuting time to customers	7	4	87	1	1

Source: Q25_1, Q25_2, Q25_3, Q25_4, Q25_5, Q25_6, Q25_7.

Appendix Table 8. **Digitalisation and experiences of monitoring, harassment and verbal violence in the public service sector (%).**

Items					
Digitalisation has increased	Strongly disagree	Somewhat disagree	Neither nor	Somewhat agree	Strongly agree
- monitoring of employees	3	6	34	30	27
- harassment from colleagues	40	13	37	8	2
- verbal / physical violence from clients	35	13	37	8	2
- verbal / physical violence from colleagues	42	11	38	7	2

Source: Q35_7, Q35_8, Q35_9, Q35_10.

Appendix Table 9. Opinions on employer-provided education and training on digitalisation in the public service sector (%).

Items:					
Employer-provided training	Strongly disagree	Somewhat disagree	Neither nor	Somewhat agree	Strongly agree
- sufficiently takes into consideration my needs	15	30	27	22	7
- strengthened my skills and career prospects	2	6	16	48	28
- opens up possibilities in my current workplace	16	16	33	25	10
- opens up possibilities outside my current workplace	10	14	35	30	11
- will not change anything for me	8	15	34	20	24
- reduces my job security in future	30	20	40	7	2

Source: Q30_2, Q30_3, Q30_4, Q30_5, Q30_6, Q37_28.

Appendix Table 10. Digitalisation and work-family-life balance in the public service sector (%).

Items:					
Digitalisation has…	Strongly disagree	Somewhat disagree	Neither nor	Somewhat agree	Strongly agree
- improved the balance between personal/family time and work time	5	9	20	23	44
- increased personal and family time	9	9	34	20	28
- not affected time outside work	15	20	22	18	26
- increased work time at the expense of family time	35	13	27	20	5
- meant that teleworking at home is difficult to combine with my household responsibilities	29	14	39	14	4
- meant that, when teleworking at home, it is difficult to differentiate between working time and personal time	33	13	27	19	8

Source: Q22_10, Q26_1, Q26_2, Q26_3, Q26_4, Q26_5.

Appendix Table 11. Digitalisation and organisation of work in health care, distribution of responses to questions on work tasks, content of work and work satisfaction (%).

Items on the content of work	Strongly disagree	Somewhat disagree	Neither nor	Somewhat agree	Strongly agree
Digitalisation has improved…					
- job quality	12	17	26	30	15
- productivity	17	14	32	24	13
- quality of service	26	21	25	18	9
- cooperation with colleagues	14	19	30	26	12
- autonomy to schedule work tasks	18	18	28	23	12
- coordination of tasks with colleagues	14	16	30	29	11
- overview of implementing my tasks	17	16	35	21	10
- supervisor's assessment of my job	16	14	34	24	12
- colleagues' assessment of my job	17	16	41	18	9
- possibilities to focus on significant aspects in my job	27	24	19	17	12
- users' assessment of my job	25	15	42	12	6
- working conditions	13	20	27	26	14
- wages in my sector	24	18	37	13	7
Digitalisation has…					
- decreased time used for routines	23	24	23	18	12
- increased pace / intensity in work	9	12	25	25	28
I am satisfied…					
- my job is better now	17	19	40	17	7
- my job is more interesting now	16	19	29	24	13

Source: Q22_8, Q22_9, Q23_3, Q23_5, Q23_6, Q24_1, Q24_2, Q24_3, Q24_4, Q24_5, Q24_6, Q24_7, Q24_8.

Appendix Table 12. **Digitalisation and working time in health care services and in the hospital, distribution of responses to questions on working hours, overtime work and time used to commute (%).**

Items on working hours	Digitalisation has…				
	Significantly decreased	Somewhat decreased	Neither nor	Somewhat increased	Significantly increased
- working hours	1	3	77	15	5
- paid overtime	2	2	81	12	3
- unpaid overtime	2	1	87	8	2
- unsocial working time	1	2	87	8	3
- breaks and time for rest	7	19	68	6	1
- commuting time to work	4	3	89	6	1
- commuting time to customers	2	3	92	3	1

Source: Q25_1, Q25_2, Q25_3, Q25_4, Q25_5, Q25_6, Q25_7.

Appendix Table 13. **Digitalisation and experiences of monitoring, harassment and verbal violence (%) in the health care sector.**

Items					
Digitalisation has increased	Strongly disagree	Somewhat disagree	Neither nor	Somewhat agree	Strongly agree
- monitoring of employees	5	7	40	26	22
- harassment from colleagues	26	10	49	10	5
- verbal / physical violence from clients	27	89	52	11	6
- verbal / physical violence from colleagues	27	7	50	12	3

Source: Q35_7, Q35_8, Q35_9, Q35_10.

Appendix Table 14. Opinions on employer.provided education and training on digitalisation in the health care sector (%).

Items					
Employer-provided training	Strongly disagree	Somewhat disagree	Neither nor	Somewhat agree	Strongly agree
- sufficiently takes into consideration my needs	19	26	37	16	2
- strengthened my skills and career prospects	7	12	28	38	16
- opens up possibilities in my current workplace	25	15	40	15	5
- opens up possibilities outside my current workplace	14	13	40	24	9
- will not change anything for me	5	12	38	19	26
- reduces my job security in the future	21	17	51	8	3

Source: Q30_2, Q30_3, Q30_4, Q30_5, Q30_6, Q37_28.

Appendix Table 15. Digitalisation and work-family-life balance in the health care sector (%)

Items					
Digitalisation has…	Strongly disagree	Somewhat disagree	Neither nor	Somewhat agree	Strongly agree
- improved the balance between personal/family time and work time	17	15	41	17	10
- increased personal and family time	21	11	57	6	4
- not affected time outside work	6	9	27	17	41
- increased work time at the expense of family time	26	11	42	16	5
- meant that teleworking at home is difficult to combine with my household responsibilities	13	5	70	7	5
- meant that, when teleworking at home, it is difficult to differentiate between working time and personal time	12	5	66	9	8

Source: Q22_10, Q23_2, Q26_1, Q26_2, Q26_3, Q26_4, Q26_5.