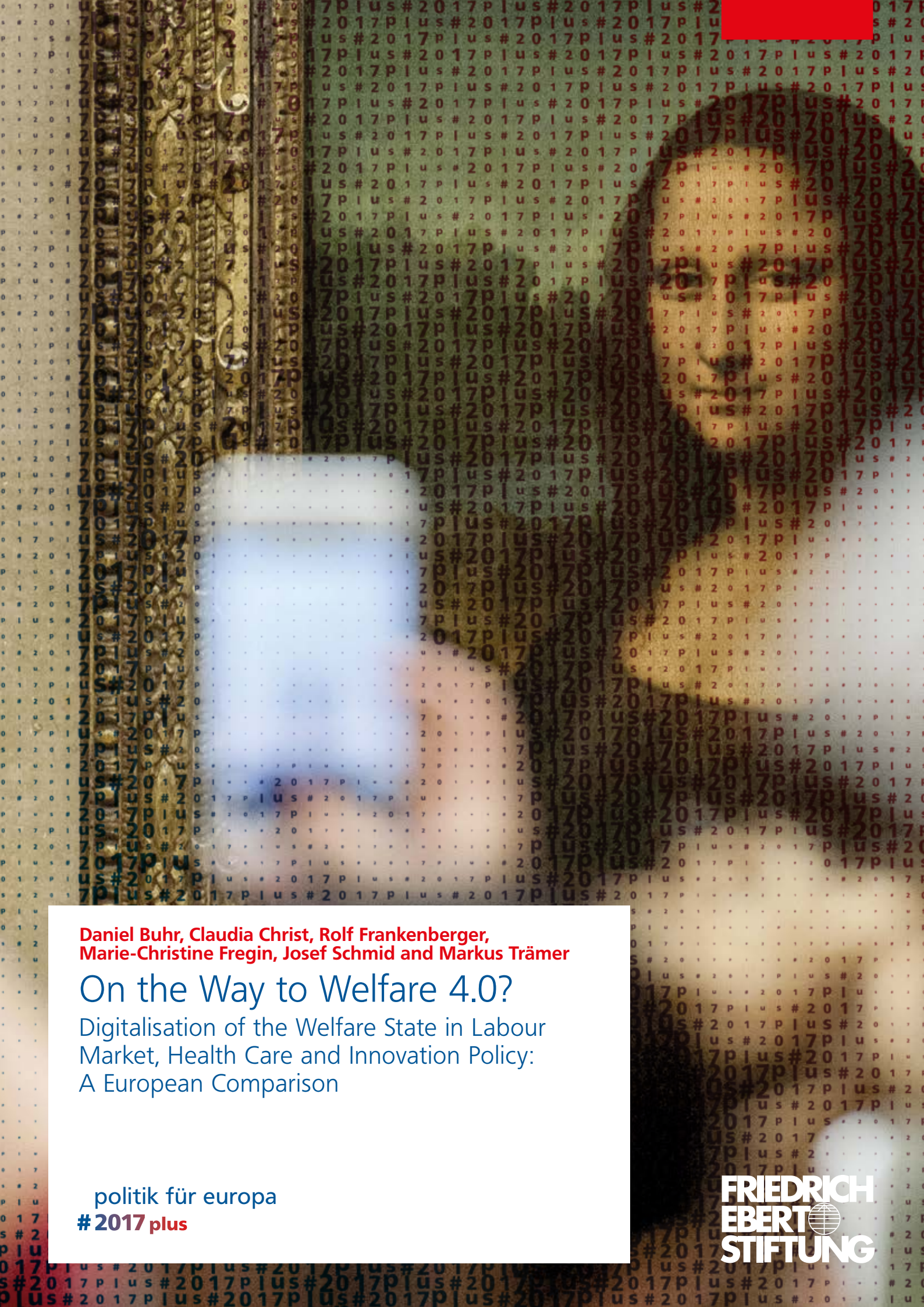

Daniel Buhr, Claudia Christ, Rolf Frankenberger, Marie-Christine Fregin, Josef Schmid and Markus Trämer

On the Way to Welfare 4.0?

Digitalisation of the Welfare State in Labour Market, Health Care and Innovation Policy: A European Comparison

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INTRODUCTION

Increasing digitalisation is penetrating all areas of the economy, society and politics. This is triggering changes in many areas, which will naturally also affect welfare states. Digitalisation is changing not only industrial production, but also how participation in politics and society is organised; how states and governments provide social services; how participation in the labour market works; how health care services are delivered; and so on. Whereas some studies focus on the risks of digitalisation for the labour market and predict an "end of work" (cf. Frey/Osborne 2013; BMAS 2015), other authors highlight the opportunities that digitalisation offers for social innovation (Buhr 2015; 2016). Such opportunities can be harnessed by means of targeted coordination and change-management if Industry 4.0 also becomes Welfare 4.0. There is currently no in-depth research available into the **consequences of digitalisation** in and for contemporary welfare states and their adjustment towards Welfare 4.0. However, a number of fundamental questions need to be answered. What effects might digitalisation have on health-care systems? How is labour market policy changing? What role does innovation policy play? How far have developments in individual welfare states progressed? What further developments can we expect? And how will the key players in the relevant policy areas react to these?

The questions raised are examined in this study conducted by a group of political scientists from the Eberhard Karls University Tübingen on behalf of the Friedrich-Ebert-Stiftung. Under the title On the Way to Welfare 4.0?, both the status of digitalisation and its effects on the fields of labour market, health-care and innovation policy are examined. The analysis focuses on a comparison of seven welfare states: Estonia, France, Germany, Italy, Spain, Sweden and the United Kingdom. In addition to this comparative study, individual country reports are available that look more closely at the status of welfare state digitalisation (see Buhr/Frankenberger 2016; Buhr/Frankenberger/Fregin/Trämer 2016; Buhr/Frankenberger/Ludewig 2016; Christ/Frankenberger 2016; Fregin/Frankenberger 2016; Schmid/Frankenberger 2016; Trämer/Frankenberger 2016). Together, the studies provide answers to the overarching question of how digitalisation can also result in modernisation of the welfare state, and what needs to be done to ensure that technical innovation can also lead to social progress.

1

WELFARE STATES IN TIMES OF DIGITALISATION

With the increasing digitalisation and interconnectedness of business and society in the twenty-first century, the capitalist production regimes of contemporary industrial societies are changing fundamentally. In particular, the technical and social innovations of Welfare 4.0 are a key challenge for contemporary societies. On the one hand, these innovations create new opportunities for cooperation and production, while, on the other hand, they force these societies to adapt. This requires people to have special knowledge, skills and abilities so that they can function in the "new digital world". More and more tasks are being performed by machines and new tasks for people are emerging that demand new skills.

The technological revolution not only influences production regimes and individuals, but also has a far-reaching impact on society as a whole and on social protection systems. If the production regime changes, this generates specific problems, difficulties and needs that need to be compensated for by the state and society. This usually takes place via welfare systems because capitalism and welfare state are two sides of one and the same coin (Offe 1972). Both systems – the industrial production system and the welfare state redistribution system of social protection – are subject to digital change. However, whereas production systems change and adapt rapidly, the redistribution systems of welfare states are path-dependent and persistent. As a result, existing welfare state structures are coming under pressure and having to adjust. Here, digitalisation essentially has two different impacts on the welfare state. First, digital transformation is creating a new age of industrial production, "Industry 4.0". This can be termed an **external modernisation effect** on welfare states. By altering production and disseminating information and communication technologies and automation, new demands arise for labour in general and for employees in particular (cf. Autor/Price 2013). The processing of these changes and challenges needs to be supported by the welfare state.

Second, the digitalisation of the welfare state is causing **internal modernisation effects**. They are related, on one hand, to the digitalised administration of welfare and the technical environment, such as the proliferation of internet connections and broadband expansion. On the other hand, internal modernisation involves developing the individual skills and abilities that digitalisation requires with regard to information processing, in order, for example, to take part in the community and the labour market. The question of how the welfare state handles (new) social inequalities – known as the "digital divide" – and what solutions might be found to counter the effects of digitalisation goes hand in hand with this. If external and internal modernisation are in equilibrium, social innovation could also arise from technical innovation. This not only drives Industry 4.0, but also transforms the welfare state in the direction of Welfare 4.0. One objective of this study is to compare the development of external and internal modernisation in different welfare states. It will provide an insight into comparative welfare state research, which forms the basis for selecting the seven countries under examination. This is then substantiated and the methodology is explained.

THE WORLDS OF WELFARE CAPITALISM

In comparative welfare state research, a distinction is made between different types of welfare state. They reflect the relevant experiences of each state's national political and social history, as well as the political balance of power (Schmid 2010: 99). Here, the emphasis is on the schema proposed by Danish sociologist Gøsta Esping-Andersen (1990), which resonated widely and is still of great significance today. His "three worlds of welfare capitalism" categorise states as either "liberal", "conservative" or "social democratic". Each of these types follows a historically evolved development path and has its own logic with regard to the organisation of social policies, pattern of social stratification and inequality (in particular in the employment system), and forms of social integration or exclusion (Schmid 2010: 100).

Esping-Andersen (cf. 1990) defines three dimensions that have different effects on the different welfare types: decommodification, stratification and residualism.

Decommodification refers to the relative independence of the social security of the individual from the pressures and risks of commercially oriented ("market") policy- and decision-making. In other words, the higher the level of decommodification, the lower the individual's dependence on selling work

as a commodity in order to secure their own survival. This is achieved via the type and amount of social security benefits.

Stratification refers to the vertical and horizontal economic and social segmentation of society. This involves describing social inequality in terms of income and social status. By providing social security systems and benefits, the welfare state is an instrument of redistribution "to influence and, where applicable, correct the social inequality structure" (Esping-Andersen 1998: 39). At the same time, different types of welfare state themselves generate a specific form of stratification.

Residualism is understood as the specific interplay between market, state and family with regard to individuals' social security and therefore the extent to which the state intervenes in this mixed relationship between private and public provision.

Esping-Andersen (1990) used the above dimensions to develop three ideal-types, which will be discussed below.

The emphasis in a "liberal" (or "Anglo-Saxon") welfare state model is on a hands-off state social policy that focuses on those deemed most in need, supports the welfare production functions of the commercial sector and leaves other welfare production to private providers and the family (Schmidt 2004: 807). The overall decommodification effect is weak, with social entitlements set at a low level and means-tested on a case-by-case basis. There is a stigma attached to applying for such entitlements (Schmid 2010: 101). One example of this type is the United Kingdom. Others include Canada, the USA and Australia.

The "conservative" (or continental European) welfare states are based on strong state social policy in which the emphasis is on insured individuals maintaining their status. Such states are characterised by a Bismarck-style social insurance model in which the socio-political role of commercial interests is usually low, while that of the family is prioritised in accordance with the principle of subsidiarity (Schmidt 2004: 807). Associated with the principle of subsidiarity is the influential role of the churches, which also play a key role in ensuring that traditional family forms are preserved (Esping-Andersen 1998: 44). In contrast to the "liberal" model, the decommodification effect is more strongly developed and the state intervenes more strongly. Social rights are linked to class and status, which leads to the maintenance of status and group differences (Schmid 2010: 101). Examples of this welfare type include Germany, France and Austria.

"Social democratic" (or Scandinavian) welfare states are based on a social policy characterised by universalism, strong decommodification and ambitious ideas of equality and full employment. The aim here is to minimise dependence on commercial interests and family (Schmidt 2004: 807). Decommodification effects are most strongly felt in such states. Examples of this type are the Scandinavian countries of Sweden, Norway, Denmark and Finland.

Figure 1 (from Schmid 2010: 100; Schmid/Buhr 2015) summarises the key features of the three types of welfare state systematically compared in triangular form. This clearly shows Esping-Andersen's ideal categorisation and indicates the mixed forms that actually exist.

Figure 1
Types and dimensions of welfare states according to Esping-Andersen

Type of welfare state liberal

Variables/indicators	
Decommodification	weak
Residualism	strong
Privatisation	high
Corporatism/statism	weak
Redistribution capacity	weak
Full employment guarantee	weak

Type of welfare state social democratic

Variables/indicators	
Decommodification	strong
Residualism	weak
Privatisation	low
Corporatism/statism	weak
Redistribution capacity	strong
Full employment guarantee	strong

Type of welfare state conservative

Variables/indicators	
Decommodification	medium (?)
Residualism	strong
Privatisation	low
Corporatism/statism	strong
Redistribution capacity	weak
Full employment guarantee	weak (?)

Source: Schmid 2010: 100.

In the meantime, Esping-Andersen's approach has been extended to include two additional welfare state types: first, the rudimentary or "Mediterranean" welfare state type, which expressly includes the countries of southern Europe (Spain, Portugal, Greece, and to some extent Italy), and second, the post-socialist welfare state type found in the transitional political systems of central and eastern Europe.

The Mediterranean welfare state is characterised by the stronger role of the family and the lower level of social benefits (Leibfried 1990; Lessenich 1995). Social security systems in this group of countries are typically only partly developed and welfare entitlement has no legal basis (Schmid 2010: 107). In this context, it should also be noted that this group consists of less industrialised, structurally weak and poorer countries in which only relatively low incomes are generated commercially (ibid.). One specific feature of this type is the high degree of employment protection (Karamessini 2007).

The collapse of the Soviet Union and the transformation of its former member states have resulted in a further welfare model being added. Götting and Lessenich (1998) describe the post-socialist welfare state as an authoritarian remodelling of the social democratic welfare type (ibid.: 272). The transformation towards a welfare system in accordance with the western European model is described as gradual and features both old and new characteristics. According to Götting (1998), the post-socialist states are a mixed form: "the post-communist welfare states are currently institutional hybrids" (ibid. 274).

METHODOLOGY

To answer the core research questions of this study, a comparative design was selected. This process examines in particular the development paths and responses of various welfare states to the challenges and opportunities of digitalisation. The focus is is to determine how Industry 4.0 becomes Welfare 4.0. Based on the three (now five) worlds of welfare capitalism, seven countries were chosen and individual case studies were initially conducted on each of them. This study also provides a comparative analysis and consequent recommendations for further action.

Countries were selected on the basis of the various welfare state types distinguished by Esping-Andersen and Lessenich, with examples of each of the five types included in the examination. Germany and France represent the "conservative" welfare state type, Sweden the "social democratic" welfare model and the United Kingdom the "liberal" welfare state. Estonia is primarily considered to be a post-socialist welfare state given its collectivist welfare structures in many areas, even if the country today exhibits a number of "liberal" characteristics following the comprehensive economic and social state reforms that took place after independence: a very low proportion of social spending (14.8 per cent of GDP), above-average income inequality, a very low level of organisation of workers and only a very weak institutionalisation of labour market relationships. Spain and Italy are included here as examples of the "Mediterranean" welfare state. While Spain is a classic representative of this type, Italy may also be considered a "conservative" welfare state, given the dominant role of social insurance and, at the same time, the fairly passive role of the state. There is disagreement among researchers over this classification, however. According to Ferrera (1996; see also Lynch 2014), Italy belongs to the group of "Mediterranean" welfare states, but the latest social state reforms point towards a gradual departure from this in the direction of the "conservative" model. Table 1 summarises the selection of case studies, with Estonia and Italy in italics to emphasise their hybrid status.

Table 1
Countries examined and their welfare models

States	Welfare model
"Liberal" welfare state	UK
"Conservative" welfare state	Germany, France
"Social democratic" welfare state	Sweden
"Mediterranean" welfare state	Spain, *Italy*
"Post-socialist" welfare state	*Estonia*

Source: own compilation.

An overview of the core indicators of each country's political system, economic performance, status of digitalisation and level of spending in individual policy areas compared with the EU28 can be found in Table 2 (see page 8). Here, considerable differences become apparent, not only with regard to the status of digitalisation, but also in terms of state organisation, economic output, spending on labour, innovation and social matters, and other parameters that provide the framework for the digitalisation of the welfare state.

The analysis covers three policy areas that are strongly influenced by digitalisation and for which digitalisation offers strong innovation potential: labour, health care and innovation. In preparing the study a two-stage methodology was adopted. First, primary sources and secondary literature were analysed in the individual policy fields in order to identify relevant reforms and developments. In the second stage, structured interviews were conducted with experts between August and October 2016 and analysed to extrapolate the role and views of the relevant players in each policy area. In Section 3, the results of the study are presented in comparative form for each of the individual policy areas.

Table 2
Status of digitalisation and level of spending in individual policy areas

	Germany	Estonia	France
State form	Federal democratic republic	Democratic republic	Semi-presidential democratic republic
State organisation	Federal	Unitary	Unitary
Party system	Multiple-party system	Multiple-party system	Multiple-party system
Election system	Personalised proportional representation	Proportional representation	Majority voting system
EU member since	1 January 1958	1 May 2004	1 January 1958
Inhabitants per km^2	226.6	30.3	104.5
Urbanisation (% of the population)	75	68	80
Welfare regime	Conservative	Liberal/post-socialist	Conservative
Interpersonal trust (index: 0=no trust; 10=complete trust)	5.5	5.8	5
Income inequality (distribution quintile)	5.1	6.2	4.3
Spending on social security in % of GDP	29	14.8	33.7
GDP per capita (in purchasing power standards, index: EU=100)	125	74	106
Growth rate (real GDP compared to prior year)	1.7	1.4	1.3
Budget deficit/surplus (in % of GDP)	0.7	0.4	–3.5
Productivity nominal per worker (index: EU=100)	106.6	69.7	114.4
Harmonised unemployment rate	4.2	6.8	10.5
Trade union organisational degree (0–100)	18.13	5.65	7.72
R&D overall expenditure (in % of GDP)	2.87	1.44	2.26
Share of 20-24-year-olds with secondary level II as a minimum	77.1	83.4	87.2
Tertiary degrees in MINT subjects (per 1,000 graduates)	16.2	13.2	22.9
DESI index (0–1; 1= digital society)	0.57	0.59	0.51
Share of regular internet users (16–74 years, %)	84	86	81
Internet access density (% of households)	90	88	83
Share of households with broadband connection (%)	88	87	76
Share of companies with broadband connection (%)	96	97	96

Source: Unless specified otherwise: Eurostat; http://www. ec.europa.eu/eurostat; 3 October 2016; data of 2016 or next year available; data on the welfare status type: http://www.learneurope.eu/ index.php?cID=300; 3 October 2016; data on the degree of urbanisation: data.worldbank.org; 3 October 2016; data on trade union density: OECD, https://stats.oecd.org/Index.aspx?DataSetCode=UN_DEN; 3 October 2016. Data digitalisation: Digital Economy and Society Index (DESI) 2016, http://ec.europa.eu/digital-agenda/en/digital-agenda-scoreboard; 28 September 2016. Own presentation.

Italy	Sweden	Spain	United Kingdom	EU28
Parliamentary republic	Constitutional monarchy	Constitutional monarchy	Constitutional monarchy	x
Unitary	Unitary	Federal	Unitary	x
Multiple-party system	Multiple-party system	Multiple-party system	Multiple-party system	x
Majority voting system and proportional representation	Proportional representation	Proportional representation	Majority voting system	x
1 January 1958	1 January 1995	1 January 1986	1 January 1973	x
201.2	23.8	92.5	266.4	116.7
69	86	80	83	74
Mediterranean	Social democratic	Mediterranean	Liberal	x
5.7	6.9	6.3	6.1	5.9
5.8	3.8	6.9	5.2	5.2
29.8	30	25.7	28.1	28.6
95	123	92	110	100
0.7	4.1	3.2	2.2	2.2
–2.6	0	–5.1	–4.4	–2.4
106.5	113.2	102.6	102.6	100
11.4	7.2	19.5	4.8	8,6
37.29	67.26	16.88	25.14	x
1.29	3.16	1.23	1.7	2,03
80.1	87.3	68.5	85.7	82.7
13.2	15.9	15.6	19.8	17,1
0.4	0.67	0.52	0.61	0.52
63	89	75	90	76
75	91	79	91	83
74	83	78	90	80
94	97	98	96	95

2

THE STATUS OF DIGITALISATION ACROSS EUROPE

The European Commission is prioritising digitalisation in the ongoing development of the European Union at social and economic level. As early as June 2014, Commission President Jean-Claude Juncker defined the direction of his term in office as follows: "I am convinced that we must use the outstanding opportunities presented by digital and limitless technology in a much better way." The creation of the digital single market has been one of the priorities of the European Commission since 2015. A number of core objectives were set out in the Digital Single Market Strategy for Europe. As well as creating trustworthy and powerful technical infrastructure and reducing digital barriers and the digital divide, key targets include improving digital skills among citizens and administrations, investing in research and development and enhancing digital public services. To accompany the process of digitalisation, a monitoring instrument was implemented in the Digital Economy and Society Index (DESI), which enables individual countries' progress to be benchmarked (cf. European Commission 2015; DESI 2016).[1] Examination of the comparative data on the status of digitalisation across EU states reveals sometimes huge differences between the aspirations and reality of digitalisation. Even average data speeds in broadband and mobile networks (see Figure 2) and the shares of fast broadband connections (see Figure 3) vary widely between countries. The average data speed in the EU28 was 14.01 Mbps (megabits per second) in the first quarter of 2016, and 12.4 Mbps in the mobile network (cf. Akamai 2016). While the Nordic countries of Sweden, Finland and Norway, as well as Belgium and the United Kingdom – and to a lesser degree Germany – have above-average speeds in both broadband and mobile networks, it is mainly the southern European states such as Greece, Croatia and Italy, as well as France that clearly need to catch up to some extent in both areas.

Even if the EU member states fare relatively well by international comparison in terms of technical infrastructure and are generally ranked in the third of the world, there is also considerable need to catch up, particularly in the area of connectivity. However, technical infrastructure is only one of many factors that are important for the development of a digital society. If the dimensions used in the DESI (2016) are included – human capital, actual internet use, integration of digital technologies into the economy and development of digital public services (e-government) – then additional, often very specific differences become apparent between the member states. Overall, the data reveals the extent to which and the areas in which Europe as a whole is still far from being advanced in terms of digitalisation (cf. Figure 5).

The fact that the digitalisation of the economy – as well as the fostering of citizens' digital skills and the general development of human capital – is key to increasing welfare and driving the EU's economic development becomes clear, for instance, when examining the connection between the level of integration of digital technologies and economic output as measured by GDP per capita (see Figure 4). States with better integration of digital technologies also tend to have higher economic output and vice versa.

Closer examination of the development of the states under survey in terms of DESI dimensions shows the specific strengths of individual countries, which can serve as best practice examples for other states if they are adjusted to the conditions of the welfare state in each case. While Sweden, for instance, is a leader in all dimensions and deemed to be a digitalisation pioneer, Estonia and Spain have clear strengths in the area of e-government and e-administration, and the United Kingdom and, again, Estonia are strong when it comes to human capital and internet use. In general, it can be observed that the least advanced areas are – with the exception of Sweden and to a lesser degree Germany – the integration of digital technologies into the economy (the core of Industry 4.0) and the development of e-government across the EU (see Figure 5). But what do the digitalisation profiles of the seven states examined here look like in detail, and what are the countries' strengths and weaknesses?

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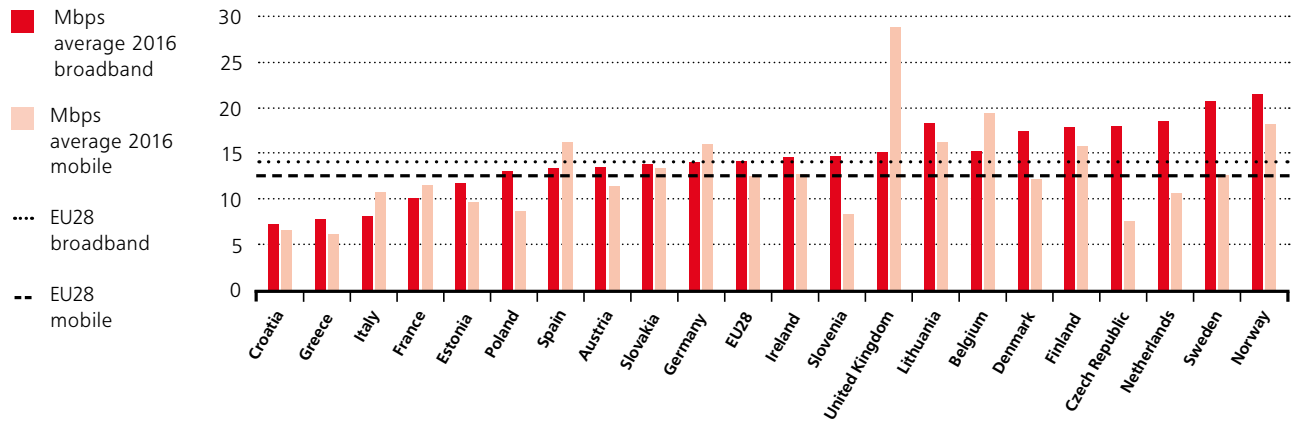
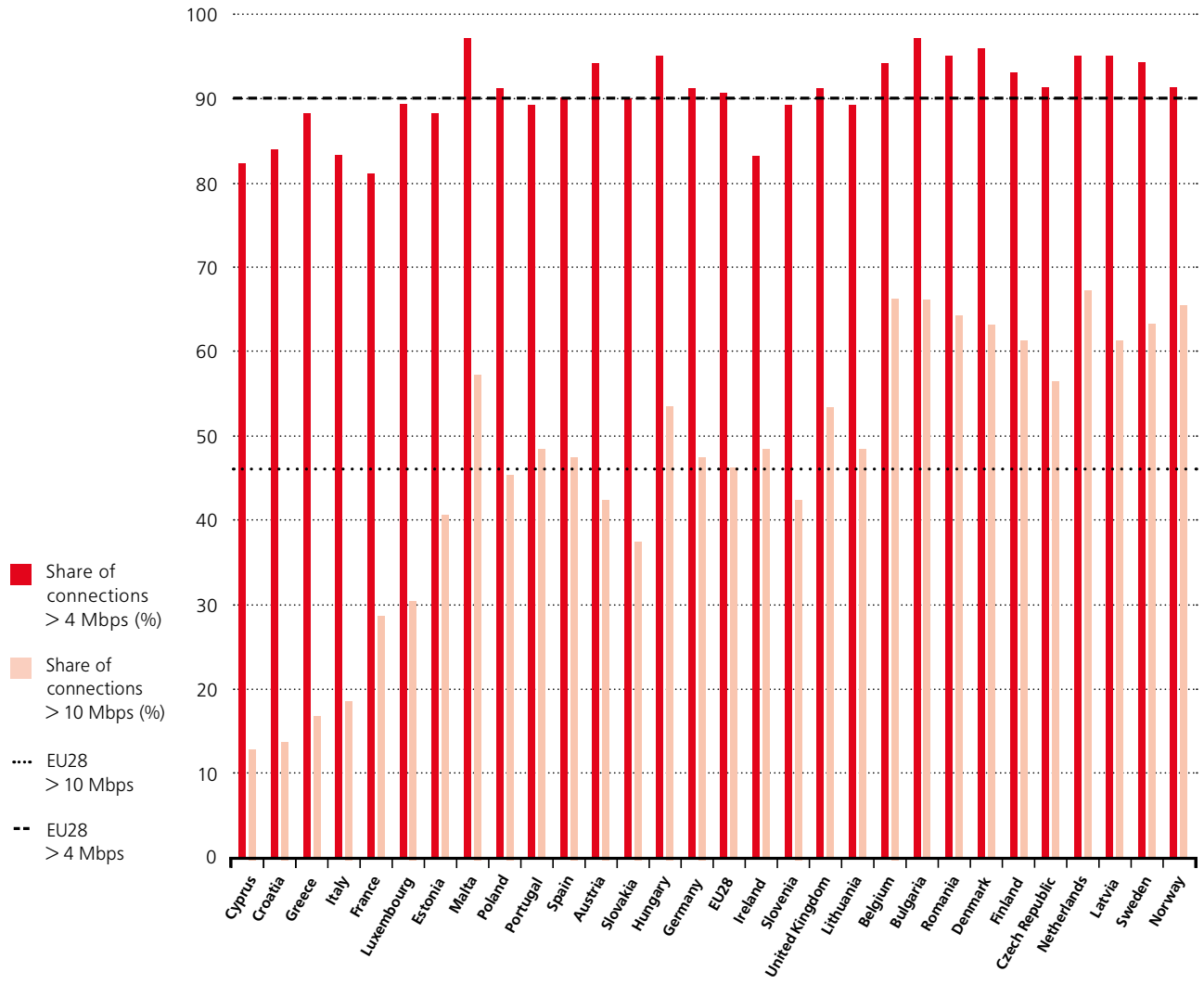
1 The DESI is an index consisting of five dimensions. It examines how EU states are developing to become a digital society. The index developed by the EU Commission (DG CNECT) comprises connectivity, human capital, internet usage, integration of digital technologies and digital public services (e-government). The index varies between 1 and 0, with 1 as the highest score. Source: http://ec.europa.eu/digital-agenda/en/digital-agenda-scoreboard; 28 September 2016.

Figure 2
Data speeds compared across the EU28: average Mbps



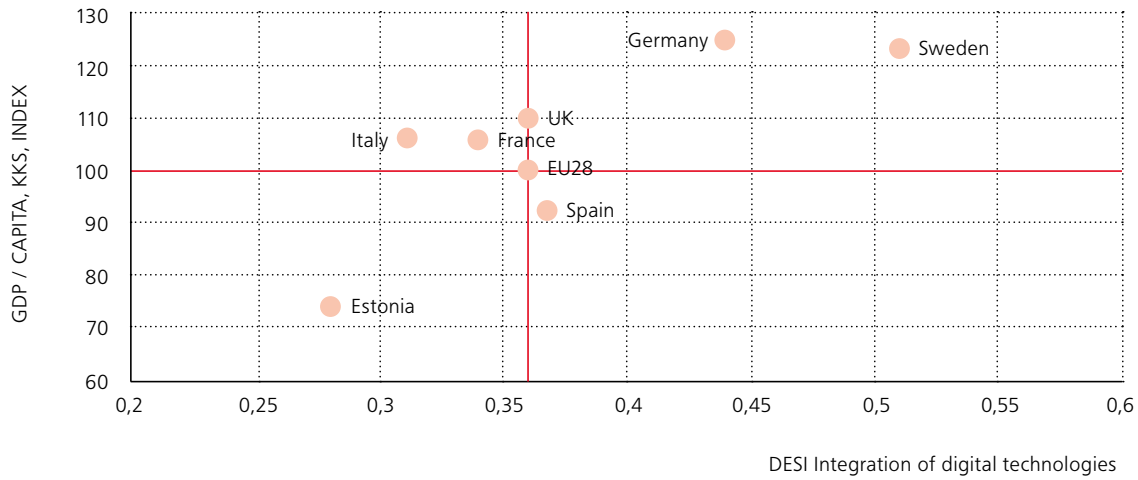
Source: own compilation based on Akamai 2016.

Figure 3
Data speeds by EU28 comparison – shares of fast connections



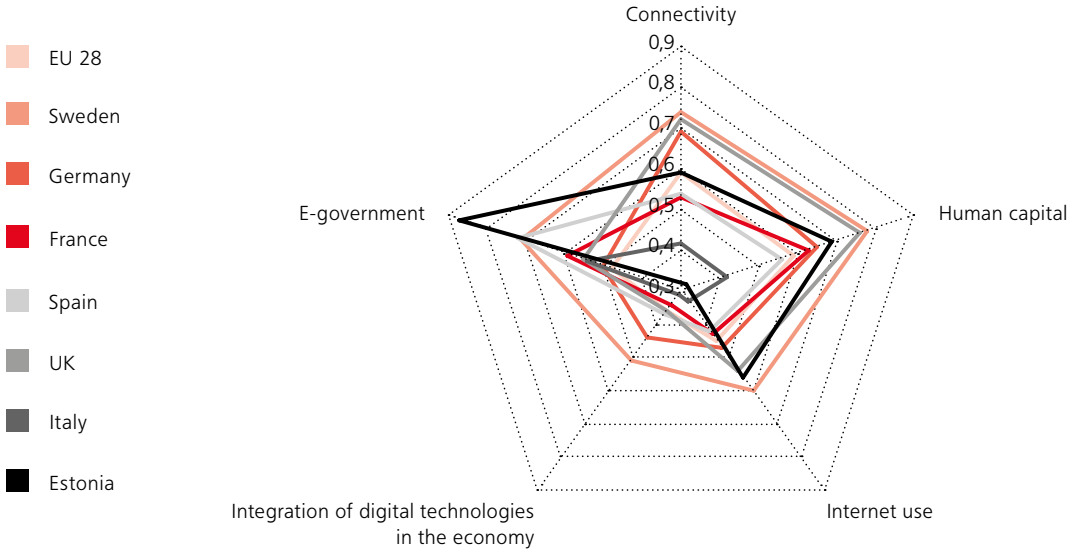
Source: own compilation based on Akamai 2016.

Figure 4
Comparison of the digital economy and economic productivity



Source: own presentation based on the 2016 DESI and Eurostat.

Figure 5
Comparison of the digital economy and society



Source: own presentation based on the 2016 DESI.

Estonia is deemed to be a digitalisation pioneer. It is above the EU average in all sub-indices and shows a high growth rate. While Estonia is the leader when it comes to the development of digital public services and private use of the internet, however, it does need to catch up in terms of integrating digital technologies into the economy, on which it ranks only twenty-second in the EU (2016 DESI).

Digital inclusion of citizens is particularly positive. In 2000 the Estonian parliament introduced a basic right to internet access for all citizens. The parliament also decided that the IT infrastructure must be upgraded every seven years to guarantee progress. This commitment can be seen, for example, in the country's pioneering and extensive broadband infrastructure, even if this has been stagnating a little for a few years and still covers only urban areas. More than 11 per cent of the Estonian population, however, are still waiting for high-speed internet, well above the EU average of 3 per cent (2016 DESI). By contrast, the country comes fourth among EU countries in terms of mobile broadband connections, which is due to the low cost of mobile telephone and internet use and the wide availability of WLAN networks. If additional indicators are included in addition to the purely technical parameters, Estonia ranks seventh in the 2016 DESI, and along with Germany, Austria and the Netherlands is among the states that have made particularly good progress in developing the digital economy.

Estonia has long played a leading role in Europe in the area of digital administration. The first, early step towards digitalisation of broad parts of the administration was the decentralised online platform "X-Road" that was rolled out in 2001. It now covers some 1,000 institutions and offers a wide variety of digital services. In the meantime, many e-services have been set up: for instance, nearly every Estonian has an e-ID card, which has also been available on mobile phones since 2007 (e-Estonia 2016). Furthermore, Estonians have been able to make payments by mobile phone since 2002, process their entire tax returns online for many years and even vote online since 2005 (initially in municipal elections). In the 2015 European elections one in nine votes was cast electronically, and in the parliamentary elections on 1 March 2015 one in five voters used the internet to cast their vote.

France has some catching up to do in terms of digitalisation by European and international standards, in terms of both technology (for example, connection speeds) and the social aspect of digitalisation (for example, the level of internet use and digitalisation of the economy). This is seen particularly in the usage profile and speeds of broadband connections. Although 100 per cent of households are connected to broadband lines, they are used by only 71 per cent. At an average IPv4 connection speed of 9.9 Mbps, France comes third last in Europe. However, the country is making some efforts to improve connectivity (Akamai 2016).

Over and above the technical shortfalls, there is a considerable need for France to gain ground in developing a digitalised society. France comes only sixteenth in the 2016 DESI and is among the countries falling behind in their development, along with Poland, the Czech Republic, Hungary and Slovakia. Even if performance in terms of human capital (twelfth) and e-government (thirteenth) is slightly above average, France fares badly on the 2016 DESI, not only with regard to connectivity (where it is ranked twentieth) but also in integrating digital technologies into the economy (eighteenth) and usage of the internet (seventeenth). Some 81 per cent use the internet, but only 57 per cent have basic digital knowledge. The share of ICT specialists in the workforce is relatively low, at 3.5 per cent.

Even though France has launched some very high-tech initiatives, such as the Tour de France digitale, France digital,2 the Plan Très Haut Débit and the Mission France Très Haut Débit (Ministre de l'Économie 2013), it still lacks a digital development strategy that encompasses all dimensions (2016 DESI). With its Digital Strategy of May 2016, the French government has implemented the Digital Agenda for Europe and has thereby addressed social, as well as economic and technical digital development.

Germany still has potential for broadband expansion and for the development of mobile networks. This is despite its being well developed in the area of digitalisation. Some 98 per cent of German households have broadband connections and 84 per cent use them. With an average IPv4 connection speed of 1.9 Mbps, however, Germany is well behind leading countries such as South Korea (29), Norway (21.3) and Sweden (20.6). In terms of mobile speeds, Germany is also a middle-ranking player in Europe with an average of 15.7 Mbps (Akamai 2016).

Nevertheless, Germany is among the EU leaders in the areas of human capital, internet use and digitalisation of the economy thanks to its rapid and positive development in recent years. If social and economic factors are taken into consideration, Germany's digital development is among the best in Europe. Although Germany is only ranked mid-way in the 2016 DESI (ninth position), it is classified as progressive ("running ahead").[3] As far as integrating digital technologies into the economy is concerned, Germany ranks seventh and shows positive development in all areas. For instance, 56 per cent of companies use digital exchange of information. Further German strengths are the broad proliferation of digital skills among the population, the high number of internet users and their broad range of activities. Only in the area of e-government does Germany still have considerable room for improvement.

With its 2014–2017 High-Tech Strategy and Digital Agenda, the Federal Government is trying to take advantage of the opportunities of digitalisation in Germany. Here, the German strategy is broadly defined and ranges from promoting the population's digital capabilities (digital knowledge society) to extending digital infrastructure (for example, the draft law for facilitating the expansion of digital high-speed networks), supporting digital working (Industry 4.0, IT summit) and digital integration (citizen dialogue) and driving digital administration (Digital Administration 2020, National e-Government Strategy 2014).

Italy is one of the latecomers to digitalisation, which is reflected in its ranking of twenty-fifth in the 2016 DESI, with an index value of 0.4. Here, the development of human capital (twenty-fourth), usage of the internet (twenty-eighth) and the integration of digital technologies into the economy (twentieth) are the main dimensions on which Italy fares comparatively badly. Last year the country made little progress on most indicators.

One exception is the stronger role of e-commerce in the sales volumes of small and medium-sized enterprises (SMEs). The country also fares slightly better for digital public services (seventeenth). Considerable progress has been made in the area of electronic information and communication technologies (ICT). Broadband usage is low for TV connections (only 53 per cent of households), but the situation is far better when it comes to mobile broadband connections. Accordingly, the use of internet services of low.

At the end of 2008, the government rolled out the Digital Italy plan with the aim of digitalising the entire communication infrastructure. In 2010 the EU's ambitious Digital Agenda was integrated into the plan. In addition, investments are planned in infrastructure, electronics and software services. Some 20 major national telecommunications providers have also signed a memorandum of understanding for the development of new-generation networks, with speeds in excess of 100 Mbps.

2 See http://francedigitale.org

3 The Networked Readiness Index also puts Germany in a more (by European comparison) medium-level ranking of 16/139 in 2016 (see Baller et al. 2016: 16). In the DIGITAL 2015 location index, Germany also lies in the middle with a ranking of 6 out of 10 (see BMWi 2015: 8).

One of the highlights of the development is the SPID (Sistema Pubblico Identità Digitale), the Italian digital identity, which was rolled out in March 2016 and should allow password-protected access to all public online services, such as tax returns. Private service providers (for example, banks) should also be able to use the SPID (cf. 2016 DESI). As well as digitalising in the narrower sense, the subject of smart cities is attracting attention in Italy. To date, some 1,300 projects in the areas of energy efficiency, mobility, renewable energies, lighting and waste disposal have been supported, and trailblazers such as Milan and Turin have made good progress towards becoming smart cities.[4]

Spain is catching up in terms of digitalisation and usually ranks around the middle on relevant indicators. According to the 2016 European Innovation Scoreboard, Spain is a "moderate innovator" (EC 2016: 1). In the DESI index, the country ranks fifteenth and is classified as "catching up". After the economic slump following the financial and economic crisis, the first positive signs of development are becoming apparent. Spain is even above the EU average for the integration of digital technologies into public administration (e-governance and e-administration). Some 77 per cent of households currently have access to fast broadband connections of at least 30 Mbps, although there are huge differences between regions and between urban and rural areas. However, only 54 per cent of Spain's population between 16 and 74 years of age has at least basic digital skills. The country is also below the EU average for internet usage (2016 DESI; 2016 EC EDPR).

In accordance with the objectives of the Digital Agenda for Europe, Spain developed an Agenda Digital para España, which was adopted in February 2013. This national strategy is aimed at driving the provision of digital services, promoting digital skills, inclusion and employability, expanding the digital economy and administration and, not least, extending fibre optic networks. The agenda serves as an umbrella for all government activities and sets targets up to 2020. The Ministry of Industry, Energy and Tourism (Ministerio de Industria, Energía y Turismo) is jointly coordinating implementation of the measures with the Ministry of Finance and Public Administration (Ministerio de Hacienda y Administraciones Públicas). In addition, an e-governance plan for 2015–2020 has been adopted (Plan de Transformación digital de la Administración General del Estado y sus Organismos Públicos). As part of the "digital by default" strategy, key public services are to be used digitally in the future. Spain's SMEs fare particularly well with regard to electronic accounting systems.

Sweden has been at or near the top of international digitalisation rankings for years, including the World Economic Forum's Networked Readiness Index and the International Telecommunication Union's 2016 IDI IT ranking. Sweden's very good performance at a technical level – by European and global standards – is matched in terms of social and economic performance. Sweden thus comes third behind Denmark and the Netherlands in the current DESI (2016) with an index value of 0.672 (out of 1), placing it far above the EU28 average.

Sweden leads the way in particular in the areas of human capital, internet usage and e-government, although there is still clear potential for development in high-level industrial usage. Development in Sweden has also slowed compared with other countries, such that it is now one of the countries classified as "lagging ahead". Given its high level of development, however, this is hardly surprising and also applies to other strong performers, such as Finland (2016 EDPR).

As encouraged by the European Commission, Sweden is pursuing a Digital Agenda. Following on from previous strategy papers (on national broadband strategy, e-government strategy, ICT for a "greener" administration, e-health strategy and so on), the government published a Digital Agenda with the title "ICT for Everyone – A Digital Agenda for Sweden" as early as 2011. It calls for every area of social and economic life to be able to benefit from the opportunities offered by the latest ICT. This Digital Agenda is supplemented by a strategy for regional growth and a national innovation strategy. The main objective of the digital agenda is to provide 90 per cent of all private households with broadband transfer speeds of at least 100 Mbps by 2020. By 2013, more than 98 per cent of all workplaces and private households already had access to 4G mobile communication networks (2016 GTAI).

The United Kingdom is one of the countries seeing positive development in both mobile and broadband. It is catching up rapidly with the leading nations in terms of digitalisation, particularly due to its performance in mobile internet: 85 per cent of households use broadband networks and 87 per cent of mobile communications users have mobile broadband (Akamai 2016). While the United Kingdom is only in the wider group of leading countries for broadband connection speeds, the country is the global leader in mobile connectivity with an average rate of 27.9 Mbps.

If economic, social and political aspects are taken into consideration alongside technical issues, the United Kingdom is among the European leaders, ranking sixth in the 2016 DESI index. However, despite huge progress in recent years, it recorded below-average growth rates by EU standards in 2016. As a result, it is one of the countries classified as "lagging ahead", along with Finland, Denmark and Sweden (2016 DESI). Internet usage in particular showed an improvement: minor improvements can also be found in the areas of human capital (third) and internet usage (eighth), while the integration of digital technologies into the economy (fifteenth) and politics (sixteenth) is treading water and no noteworthy progress was made in connectivity in 2016. Particular problems include comparatively high costs, low speed, the lack of ICT experts and the below-average use of new technologies by businesses.

To drive the development of the digital society, a national digital strategy is currently being developed within the framework of the Digital Agenda for Europe, which will pool and enhance existing initiatives. This includes the digitalisation of public administration in accordance with the Government Digital Strategy presented in November 2012. Core elements are a comprehensive domain (www.gov.uk) and the UK Verify single sign-on system, which covers 20 public services. Furthermore, the Information Economy Strategy set out by the government, business and academia is to address key challenges such as the lack of skilled workers, infrastructure, internet security and market failure. The Information Economy Council – consisting of representatives from politics, industry and academia – monitors implementation. The Digital

4 See www.italiansmartcity.it

Skills Strategy agreed in July 2014 is designed to address identified skills shortages and the Digital Economy Strategy rolled out in 2015 will strengthen the digital sector and accelerate innovation.

3

LABOUR MARKET POLICY

Labour market policy includes all state measures to secure jobs, increase employment opportunities for job seekers and improve working conditions (see Schmid/Buhr 2015: 151). In all the countries examined, management and design responsibilities lie with the labour ministries at national level. While "conservative" welfare states, such as Germany, and to a lesser degree the "Mediterranean" welfare states regulate their labour markets relatively strictly, "liberal" regimes such as the United Kingdom give commercial interests a lot more leeway. Together with education policy, labour market policy provides key infrastructure and makes important contributions to education and training (see Schmid 2010). As a result of this policy approach, labour and production processes are structured and regulated social processes (cf. Naschold 1985: 28; cited from Schmid/Buhr 2015: 151). However, they are permanently being changed by digitalisation, automation and everything associated with them. Both the demand for skills and the labour supply are undergoing changes. Although Industry 4.0 has so far had only a moderate impact on the demand for labour in all the countries examined, it is having consequences for work and employment. Technological change is not having the same effect on everyone and is in fact polarising. While demand for skills in high-skilled occupations is rising, it is falling for non-manual routine jobs in particular. What is easy to learn is also easy to automate (cf. Acemoglu/Autor 2011; Autor/Price 2013). Associated with this is a shift or change in income inequality that can partly be explained by the hypothesis of "skill-biased technological change" (SBTC). According to this theory, new production chains require new knowledge in information-processing computer technologies. These complement higher-skilled areas of work, largely replace non-manual routine work and thereby contribute to a polarisation of labour in demand (see Groß 2015: 217). As a consequence, society's digital divide can itself bring about the dangers of work casualisation, particularly for employees in low-skilled and low-pay work. This means that the change in production regime also creates challenges for education and labour market policy. Internationally, it is apparent that labour market policy environments have changed fundamentally in recent years (compare the "reconfiguration of rights and responsibilities and the 'expect and encourage'" work culture, as evidenced, for example, in Germany with Hartz IV). Based on an active labour market policy model, workers are supposed to obtain labour market security primarily through employability and lifelong learning. In theory, this makes education and skills the target dimension of (labour market) policy measures. With the digitalisation and proliferation of electronic ICT, we are on the cusp of a fourth industrial revolution, which will result in huge upheaval in the manufacturing sector. Not only are people globally networked and connected to one another at all times, but increasingly machines are too (Buhr 2015). It is still unclear what the employment balance of the digital economy will look like. However, it is certain that Industry 4.0 will also involve Work 4.0. New work models are being created (telework, cloudwork, crowdwork and so on) and working hours are becoming increasingly flexible and undefined. Work 4.0 does not (yet) describe the reality in all businesses, though. The concept points more to the need to design new policies and highlights the new challenges that the welfare state must address. In the digital agendas of all seven countries examined, work and training staff to deliver the skills now required assume a key role. The following sections provide an overview of labour market policy developments in relation to digitalisation in the seven countries examined. In one aspect, the German agenda stands out in particular: it looks at the consequences of digitalisation and Industry 4.0, seeks social dialogue and expressly focuses on people.

The labour market in Estonia has a high level of dualisation: highly-skilled and well-paid employees live mainly in urban areas, while in rural areas, those with lower skills are often affected by long-term unemployment. Labour market policy has always taken a neoliberal approach; for example, the influence of the social partners is rather weak. Only one in 10 employees is a member of a trade union. From the start of the European economic and financial crisis, Estonian labour market policy has been strongly shaped by the Danish and Dutch "flexicurity" model. Unemployment benefits are financed via state spending and are rather low at only about 4 euros a day. By contrast, considerable resources have been invested in the expansion of digital skills. The 2014–2020 Lifelong Learning Strategy, which the Estonian parliament adopted in

2014, and the 2015 Adult Education Act and Professionals Act are designed to ensure that the needs of the labour market are better met in future with regard to digitalisation.

In **France** the 2015 "Industrie du Futur" initiative provides a good example of the country's comprehensive social dialogue. Government and trade unions have developed a joint concept that will promote research into the role of people in digitalised working environments. In addition, measures are simultaneously being developed that provide for the creation of training places in the digital economy (AHK France 2016). The labour market reform launched in 2016 is aimed at reducing the high unemployment rate and, in particular, the constantly high youth unemployment rate, thereby tackling one of the country's biggest current problems. In particular, the training and ongoing professional development of skilled experts is seen as a prerequisite for the digital transformation of the economy and society. With regard to the proportion of highly skilled workers qualified in mathematics, IT, science and technology (the so-called MINT subjects), France is already in a good position as it has the second highest proportion of young workers of this kind in the EU (EC EDPR 2016).

In **Germany** the Federal Ministry of Labour and Social Affairs (BMAS) has launched a comprehensive – partly public, partly technical – dialogue that particularly involves designing new "decent work" models and setting the rules for future working environments in a forward-looking manner. The debate began with the Work 4.0 green paper. At the end of 2016, the dialogue is to conclude with the Work 4.0 white paper, which should make government action and intentions transparent. In addition, trade unions and employers' associations are involved in various activities, among other things to demonstrate ways in which employees can benefit from the new developments (cf. Degryse 2016). Currently, 12 per cent of jobs in Germany have activity profiles which have a high likelihood of automation. These include in particular jobs done by low-skilled and low-paid workers (BMAS 2015). IT experts, by contrast, are a young professional group that has very good prospects in all industries, although there is a low proportion of women.

Italy, hard hit by the financial and economic crisis, is also grappling with a persistently high level of youth unemployment. Although the indications are now pointing towards an upturn in the economy, the country is proving to be most competitive in labour-intensive low-pay industries involving only low or medium levels of technology. After the crisis, structural reforms in the labour market were implemented, including the loosening of fixed-term contracts. The Jobs Act achieved positive results in terms of the number of employment contracts. However, at the same time labour market dualisation is getting worse. What is more, there is an inflow of (often illegal) migrants and widespread domestic migration from the south of the country. Liberalisation is accompanied by weak productivity growth and falling investment in R&D. There are also weaknesses in the education and training system: pupils leave school early and participation in college education and lifelong learning is well below the EU average.

Statistical authorities currently point to positive developments in **Spain**, but the labour market continues to be highly dualised. Above all many young adults, including those who are highly skilled, have to remain in precarious, often also informal employment. Unemployment benefits are low, and the primary source of support is the family. Especially young, highly skilled adults are therefore forced to seek work outside Spain. However, this is problematic as they are key to Spain`s innovation potential. In 2012 comprehensive labour market reforms were introduced, which are aimed at making the labour market more flexible and strengthening active labour market policy measures. Protection against dismissal have been loosened and, in turn, companies are expected to hire more employees in permanent jobs. This move has been successful to some extent, but there are shortcomings in particular in the population's digital skills. The proportion of ICT specialists in the overall workforce is relatively low (EC EDPR 2016). The country is now faced with a double challenge: it needs to make up for shortcomings and prepare for the future. This process must also involve coordinating the supply of and demand for skills between educational institutions and companies.

The labour market in **Sweden** is characterised by high participation in employment (particularly among women), a high level of education and a relatively high willingness to invest in education and research. As in most Nordic countries, the trade unions organise unemployment insurance and in turn receive state subsidies (Förster et al. 2014). The payment of unemployment benefits comes virtually entirely from state spending. However, inequality and poverty are also increasing in Sweden. In recent years, the number of short-term and temporary employees and of low-skilled and badly paid jobs has risen. For that reason, the government appointed an independent commission in spring 2015 to analyse the future of work and the effects of digitalisation in the country. In Sweden it is also expected that digitalisation will make many non-manual activities superfluous. At the same time, the size of the ICT sector is now nearly twice the EU average. To maintain the inclusive nature of the Swedish welfare state, trade unions in particular are considering a more flexible education policy and a stronger universal social insurance system. The Swedish government also supports international cooperation.

The labour market in the **United Kingdom** has been very dynamic in recent years. In September 2016 the unemployment rate was only 4.9 per cent. At the same time, however, fragmentation of the labour market is increasing. More and more people are working in what are euphemistically referred to as "non-typical" employment relationships, which are often more of a dead-end than a stepping stone. In public service there are ever fewer jobs due to privatisation. Digitalisation is playing a crucial role in these rapid changes. It is estimated that up to 35 per cent of jobs in the United Kingdom will be subject to further automation in the next few decades (Deloitte 2014: 8). Highly skilled, social and creative jobs are becoming increasingly important. A current interministerial report on Digital Skills for the UK Economy offers a number of recommendations, including introducing girls and young women to technical jobs, reforming curriculums and coordinating training more effectively with the needs of the digital economy.

Continued digitalisation is creating major challenges for society. The most important of these relate to labour market policy and to labour and social rights. The capacity of the

various welfare regimes to protect against social risks – for example, those arising from unemployment – varies between countries. For that reason, the divide in material inequality is widening more in "liberal", "Mediterranean" and "conservative" welfare states than in "social democratic" ones. In the coming years, it will be one of the core tasks of governments to drive digitalisation as consistently as possible and simultaneously to strengthen inclusivity in labour markets and welfare states. The aim must be to capitalise on the opportunities of digitalisation. The routes to achieving this are not obvious, and thus they need to be actively sought out.

4

HEALTH CARE POLICY

Digitalisation is affecting health care policy in different ways. Tele-healthcare – in the form of transmitters, sensor mats and smart meters – makes it easier to care for people at home for longer. Apps and wearables allow people to monitor their own bodily functions, including when exercising, and patient records are gradually being digitalised, making them available for big data analysis. These data can, in turn, be used to offer customised treatment or improve disease management for entire population groups and thereby allow patients to live longer and self-sufficient lives. However, these hopes and wishes are also accompanied by fears over data protection, the confidentiality of employees' health status or even the dehumanisation of care. However, these fears need not materialise if the digitalisation process is oriented towards people and their needs and preferences. Here, the countries examined in the study have already reached various stages of this process.

For all the countries examined, it can be concluded that digitalisation will drastically change how welfare states will deliver services and which services they will deliver in the future, as well as how these services are funded and organised. Here, digitalisation interacts with the decision-making processes and institutions of welfare states. Comparing the selected states in terms of the structure of responsibilities in the health care sector, it is clear that health care systems vary according to the degree to which decision-making and the funding and organisation of services are centralised. In Italy, Spain and Sweden, the regions (and municipalities) play a key role in financing, planning and implementing health care policy. In Estonia and France, responsibilities are more centralised, while in Estonia the provision of services has been largely privatised, although supposedly monitored by local authorities. Germany is a special case in that health care is subject to competing legislation. Many actors (service providers, funding bodies and politicians) are involved in the decision-making process and service provision takes place at decentralised levels, with regional authorities responsible for planning and implementation. In the United Kingdom, health care is devolved to the four individual countries, but centralised within them and managed operationally at country level. In nearly all countries (except Estonia), there is a mix of service provision by public and private agencies.

By contrast, **Estonia** is commonly referred to as a digitalisation pioneer. There is also evidence of this in health care policy. In 2005, a forum was set up – the Estonian e-Health Foundation – whose task is to coordinate health care digitalisation. This has already met with tangible success. In 2008, Estonia was the first country to implement a nationwide standardised system of electronic patient files to store the medical records of all citizens (Electronic Health Record, EHR). Both doctors and patients have access to the electronic medical records, although patients can restrict access. More than 70 per cent of Estonians use the EHR (e-Estonia 2016), although the elderly, especially in rural areas, are more likely to have problems using it in terms of both technical access and skills. For that reason, the Estonian government launched an initiative in 2002 that is aimed at familiarising all groups of society with the internet as much as possible. The EHR also offers citizens the possibility of arranging doctors' appointments, receive reminders of appointments and have teleconsultations with attending doctors. Another key function is the electronic prescription of medication: 98 per cent of all prescriptions are now processed online via the X-Road system.

France has fallen behind in recent years in health care digitalisation. The country does not yet have a comprehensive digital-by-default strategy, but in recent years there have been a series of reforms that have yet to be evaluated. For instance, the action plan for the digital economy is designed to drive the promotion of digital instruments in the health care sector (cf. EC EDPR 2016). For that reason, the Agence national des systèmes d`information partagés de santé (ASIP Santé) was set up in 2009, a legally mandated organisation for developing and monitoring the use of IT systems, instruments and infrastructure in health care (ASIP 2009, 2013). In addition, in 2009 an act on telemedicine was adopted that rolled out teleexpertise, telemonitoring and teleconsulting. Pilot projects have been launched in some regions in recent years. The Programme hôpital numérique launched in 2012 paved the way for the digitalisation of hospitals. In 2013 the Ministry of Health published an initial e-health strategy, one of the consequences of which was the launch of the personal health record. In July 2016 this strategy was extended with the roll-out of the Stratégie nationale e-santé 2020 that is aimed at

driving modernisation of the French health care system (Ministère des Affaires sociales et de la Santé 2016). According to the Digital Agenda Scoreboard (2013 and 2015), France is a middle-ranking performer with regard to exchange of patient data and the use of electronic prescriptions, and below the EU average, for example, for online doctors' appointments. The key challenges for France are the use of big data for the development of individualised treatments and medication.

Germany has already had its first experience of the digitalisation of health care with the launch of the electronic health card, which was introduced following the health care reform in 2003. It is the "supporting pillar of the e-health concept in Germany" (Wemmel 2015: 6). The planned implementation in 2006, however, was not possible due to technical delays, incompatible schedules, blockades and coordination issues among the consortium partners of the operating company tasked with implementing the health card, Gematik. Only in 2011, following changes to the provisions of the testing procedure and a reduction in the scope of the card's functions (master data storage) were the first health cards issued. Electronic communication in health care will in future be driven by the storage of emergency data, patient records and medication plans. However, the infrastructure for this is very demanding, particularly with regard to IT security. Furthermore, all players need to be included in the infrastructure via "connectors" and thereby make the various IT systems mutually compatible. By setting deadlines and introducing penalties, the new e-Health Act, which came into force on 1 January 2016, is aimed at putting in place a roadmap for health care digitalisation. Germany has made only slow progress for the past decade and risks falling behind in this area, particularly because the actors in the scheme's self-regulation are blocking one another. For that reason, digitalisation in the health care sector in Germany is still relatively in its infancy. While individual players indeed use digital technologies, there has been hardly any progress in networking these actors with one another, which is a vital criterion for Healthcare 4.0.

In **Italy** there are major differences between northern and southern regions in terms of digitalisation of the health care system, with northern Italy being particularly well developed. Here, the digital environment has been gradually improving since 2008. By introducing national regulations on e-health, the Ministry of Health is trying to implement new ways of organising and providing medical services, rationalising investments in health care and achieving synergies via a standardised strategy. This is to be achieved against a background of high public spending on health care, on one hand, and increasing demand for services from an ageing population, on the other. There is also a focus on greater social justice, which involves, in particular, making it easier to access services and treatment (especially in southern Italy) and taking account of the increasing mobility of patients and specialists (cf. Di Carlo/ Santarelli 2012; Donatini 2015). Italians can already view their data online and change their GP by smartphone. Progress is also being made in the digitalisation of medical files. The public health system (ASL) is managed by the regions. Five regions (Trentino, Lombardy, Tuscany, Emilia-Romagna and Aosta Valley) are pioneers in digitalisation. Some regions have developed IT networks to facilitate communication between doctors, paediatricians, hospitals and territorial services. These networks enable the automatic transfer of patient records and the services provided. Furthermore, there is a gradual switch from hardcopy to electronic prescriptions. Although many practices have rolled out solutions such as systems for booking online appointments, the government's current austerity policy – which has hit public health care funding hard – means that it is now mainly private doctors' practices that are investing in digital solutions (Scheid 2016).

In terms of digitalisation, **Spain**'s health care is seen as very advanced by European standards. Two areas in particular have experienced major progress in digitalisation: (1) electronic prescriptions and orders and (2) electronic medical records (cf. EC EDPR 2016). In 2010 minimum standards for the (electronic) documentation of medical records were defined as part of the national Historia Clínica Digital del Sistema Nacional de Salud (HCDSNS) strategy. The Ministry of Health (MSSSI) is collaborating with the public law body "red.es" on the standardisation of electronic documentation and is aiming for nationwide standardised use of the medical terminology database SNOMED CT. This records the content of medical statements in a standardised and comprehensive form and thereby enables information to be exchanged even across (national) borders. In addition, there is a national strategy (Plan Avanza 2) for expanding the use of ICT in the health care sector. The Ministry of Industry, Energy and Tourism, the MSSSI and the regional health services are working together on an online health care programme (cf. MSSSI 2010). So far, however, the national e-health strategy has not been adopted (cf. EC EDPR 2016) and the exchange of medical data between regions is also still managed in very different ways. The systems in Galicia and the Basque Country are particularly advanced, whereas Catalonia has a closed system that permits virtually no exchange of data with other regions.

By international standards, health care in **Sweden** is well structured, albeit very hospital focused. Sweden can also be considered a pioneer in the digitalisation of health care. To drive this development, the regions and provinces, the municipalities' umbrella organisation, the private health care employers' association and the Swedish Pharmacy Association set up a national cooperation structure known as "Carelink" back in 2000. The country was also a pioneer in its early adoption of national electronic patient records, which was implemented between 2008 and 2012. The first step on the road to networked health care at national level was taken by investing in the digital infrastructure and standardising organisation in the regions. Regions across the country were then networked with one another based on unified standards. Today all health care facilities in Sweden are networked, with data from the source systems virtually merged using a comprehensive patient management system. Online and password-protected, the Nationell Patientöversikt (NPÖ) gives all authorised individuals access to the desired data at the click of a mouse. Many processes have now been almost entirely digitalised. Already 98 per cent of all prescriptions are forwarded online to pharmacies or are accessible via a central database (eHälsomyndigheten 2016). Patients will only be able to interact directly with the NPÖ in the near future, but nearly all citizens have given their consent to participating in the programme (Klein 2016). The NPÖ forms the basis for the further expansion of digitalisation, which is also

supported and coordinated by its own authority, the Swedish eHealth Agency (eHälsomyndigheten 2016).

The **United Kingdom** is one of the countries that have already made relatively good progress towards digitalisation. A number of reforms to the welfare state have been launched in recent years that will drive the digitalisation of services, including in health care. In addition to the Government Digital Strategy, the Department of Health and the core player in British health care, the National Health Service (NHS), have drawn up digitalisation strategies and plans. In the case of the NHS, which was fundamentally reorganised in 2012, these strategies and plans were integrated in the 2014 "Five-Year Forward View" planning document. Here, measures towards digitalisation include electronic assessment of specialists' services, promotion of health apps, electronic storage of medical records (by NHS Spine and the N3 network), online booking of appointments and doctors' prescriptions, support for public e-learning and better support for staff dealing with digital technologies (NHS 2014: 31 et seq.). The processing and merging of patient data for analysis purposes is to be carried out by the care.data program. Due to concerns over the usage rights, however, the program has been suspended until further notice. The National Information Board has been tasked with finding alternatives. The Department of Health launched the "3millionlives" initiative in 2011 to promote the use of tele-healthcare. The programme initially was aimed at benefiting up to three million people. In 2014 the campaign was redesigned and renamed "Technology Enabled Care Services" (cf. Hampson et al. 2015: 11).

5

INNOVATION POLICY

If we see innovation policy as the consistent merging of industrial, structural, research and technology policies, the roots of this policy area can be traced back to the 1950s. In particular, the technology race that began in the 1960s encouraged most modern industrial nations to set up research and technology policy programmes (for example, nuclear power policy in Germany). These were initially seen as industrial policy, and as a state reaction to the failure of the market. Furthermore, most state efforts since then have mainly targeted the supply side of technological development. Social innovations, the demand side and public procurement, however, play a subordinate role in most European states, contrary to US policy approaches.

In **Estonia** responsibilities for innovation policy are spread across various ministries, but lie largely with the Ministry of Education and Research (Haridus- ja Teadusministeeriumi) and the Ministry for Economy and Communications (Majandus- ja Kommunikatsiooniministeerium). The country's expenditure on innovation policy is below average by international standards. This is also seen in the amount spent on research and development in the national economy overall. It is striking that this has been falling in Estonia for several years, with R&D expenditure dropping from 2.31 per cent of GDP in 2011 to 1.44 per cent in 2014, at a time when it rose to over 2 per cent in the EU28.

Estonian innovation policy is also oriented towards digitalisation – and in particular towards the promotion of entrepreneurship. As such, the Estonian economy is based on a large number of SMEs and has an above-average number of entrepreneurs. In addition Estonia offers so-called "e-residency", which is open to foreign citizens and seeks to create a more positive environment for foreigners to start up businesses and facilitate bringing workplaces to Estonia.

In its 2020 Digital Agenda, the government is pooling its measures for improving the ICT infrastructure in order to drive Estonia's competitiveness. Specifically, it plans to expand the broadband network, increase transfer speeds and strengthen the role of digital signatures. Since 2014 Estonia's innovation policy measures have followed two medium-term (2014–2020) policy strategies, the Estonian Research and Development and Innovation Strategy and the Estonian Entrepreneurship Growth Strategy. These set the target of increasing research and development spending by 2020 to 3 per cent of GDP (Lisbon target), two-thirds of which is to be funded by business. Given how this percentage has been falling significantly over the past five years, this target seems quite ambitious. Estonia does, however, consistently rely on support from European structural funds to expand its research and development. Here, the current operating programme for Estonia specifies that 4.4 billion euros will be available in the current funding cycle, of which 3.53 billion euros alone will come from the European Cohesion Fund and are specifically earmarked to improve the Estonian economy's innovativeness.

In **France** the traditionally strong role of the state in innovation policy has diminished significantly in recent years, with new players, programmes and regulations becoming involved. The coordination of French innovation policy is overseen by the Ministère de l'Enseignement supérieur et de la Recherche. Due to the numerous overlaps with other policy areas, other ministries play a major role, such as the Ministère de l'Economie et des Finances, under whose management, for example, the Nouvelle France Industrielle programme was adopted in September 2013. Since April 2015, this programme has been called "Industrie du Futur" and seeks to harness the opportunities of the fourth industrial revolution, as Germany did in 2010 with "Industrie 4.0", the United Kingdom in 2011 with the "High Value Manufacturing Catapult" programme and Italy in 2012 with the "Fabbrica del futuro" programme.

Here, the government is focusing on "grands programmes", which have initially benefited mainly large companies. More recently, however, the French government has been counteracting this more strongly, for instance with considerable tax cuts for companies investing in research and development. In terms of tax incentives for research investment, France now leads the OECD countries. SMEs, in particular, have benefited most from research and development credits, accounting for 80 per cent of them in 2013 (AHK 2016).

The tasks of innovation policy in **Germany** are spread across several levels (vertically) and various ministries (horizontally). Unlike other countries, however, there is no central institution in Germany (for example, an innovation council or innovation

agency) that coordinates innovation policy. In order to better coordinate the innovation policy of the responsible federal ministries (for example, BMBF, BMWi), the Federal Government launched its High Tech Strategy' (HTS) in 2006, subsequently revised in 2010 and 2014. The HTS pursues a more mission and demand-driven approach than the former policy and will be expanded to become a comprehensive cross-sector innovation strategy dealing with both technical and social investments (Buhr 2016).

With its "2014–2017 Digital Agenda", the Federal Government, as indicated above, now attaches greater importance to the opportunities and challenges that go hand in hand with digital change (EFI 2016). At national level, the precursor to the Digital Agenda was essentially the Internet and Digital Society Commission of Enquiry, which existed from 2010 to 2013 and gave recommendations on further policy development in its final report. The Digital Agenda sets out digital policy principles, from which development opportunities for individual policy areas are derived (digital infrastructure, digital world, public administration, digital participation, education, European and international development). The agenda is managed jointly by the Ministry of the Interior, the Ministry of Transport and Digital Infrastructure and the Ministry for Economic Affairs and Energy. This group of three managing ministries makes coordination difficult. In spring 2016 the BMWi presented the 2025 Digital Strategy, which ties in with the Digital Agenda. The Digitalisation Action Programme sets out the 2025 Digital Strategy in more concrete terms by specifying and prioritising tasks. Consistent use of digitalisation to modernise the welfare state is, however, not yet reflected in the Digital Agenda or in the structure of its management.

In **Italy** the central player in innovation policy is the Ministry for Education, Research and Universities (MIUR). It is responsible for national and international scientific activities, funding universities and research facilities and supporting public and private research and technical development. The Ministry of Economic Development (MISE) manages industrial innovation (Modena 2001). Although the "PNR 2014–2020" national research programme was announced some years ago, it has still not been officially approved. At 1.29 per cent, Italy's state R&D expenditure is still well below the 2020 target of 1.53 per cent. In addition, the share of gross domestic expenditure on R&D by businesses is also low for an industrialised country. According to information provided by the Italian Association for Industrial Research, AIRI, companies invested about 8 billion euros in R&D, of which 1.1 billion euros went into ICT.

There are also critical weaknesses in managing and organising the R&D system, as well as massive regional inequalities in favour of the north. Another problem is the lack of networking in industry and the low level of risk capital. The education system is a strength, however, with around two million students enrolled at 95 universities (66 public and 29 private). In addition, there are major state research agencies such as the National Research Council (CNR), the Italian Space Agency (ASI) and the National Institute of Health (ISS).

In terms of Industry 4.0, there are some interesting developments and projects. In particular, major companies in the vehicle, aviation and space industries – many of which supply German industry – are technological frontrunners. There is an especially large number of Industry 4.0 cluster initiatives, although these activities are restricted mainly to the north of the country.

The innovation system in **Spain** has well-developed structures, especially in education and research, but these have been badly hit by the austerity measures implemented in response to the financial and economic crisis. There is only limited evidence of a coordinated policy. Instead, Spain's innovation policy is highly fragmented and locally organised. For instance, the autonomous regions are in charge of funding universities and have key responsibilities for the industrial sector. The Ministry of Economy and Competitiveness (MINECO) is the key player at national level. In addition, the Ministry of Industry, Energy and Tourism (MINETUR) gives targeted support to the industrial sector. The 2011 Science, Technology and Innovation Act (Ley de la Ciencia, la Tecnología y la Innovación, 14/2011) now governs the promotion of R&D and makes provision for two public-private agencies to promote innovation and development. Assigned to MINECO is the CDTI (Centro para el Desarrollo Tecnológico Industrial), which is responsible for promoting R&D. In addition, the research agency AEI (Agencia de Investigación) will in future play a major role and promote outstanding research projects.

To strengthen digitalisation and industry, MINETUR recently set up a line of funding. The Agenda para el Fortalecimiento del Sector Industrial en España (Secretaría General de Industria y PYME; MINETUR 2014a) is aimed at reindustrialising the country and increasing the competitiveness of Spanish companies in the global market. The second line of funding approved in October 2015 is expressly dedicated to digitalisation. The Initiativa Industria Conectada 4.0 is aimed at driving the digital transformation of Spanish industry by means of a joint action plan with the public and private sectors (cf. EOI 2015). In addition, the relevant stakeholders (businesses, trade unions, universities and research institutes) are involved in developing future strategy. The main aim of the initiative is to strengthen competitiveness through investment and the use of new technologies, with a particular focus on SMEs and micro enterprises.

Sweden's innovation system is considered, on one hand, to be one of the most successful in the world. For instance, state expenditure on research, industry and regional growth has risen constantly since the late 1990s, and from 2.5 to 4.3 per cent of the budget between 1997 and 2014 alone (from 0.8 to 0.9 per cent of GDP). On the other hand, Sweden has a relatively low return on innovation, as seen in its rather moderate productivity figures. A large proportion of Sweden's R&D expenditure is on ICT, where there is now a special focus on Industry 4.0. Initiatives are, however, strongly geared towards technological development.

The weaknesses of the Swedish innovation system include the fairly modest transfer of basic research into innovations that are then successful in the market. One explanation of this is often found in the rather heterogeneous management of the innovation system, which is also reflected in innovation policy (OECD 2016). Here, responsibilities have traditionally been widely distributed. The Swedish Ministry of Education and Research is responsible for education, research and development. Responsibility for innovation and industrial R&D continues to lie primarily with the Ministry of Enterprise, Energy and Communications. In addition, there are a number of

advisory committees and agencies that mainly pursue research policy tasks. These include the Science Council (VR), the Research Council for Working Life and Social Research (FAS), the Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas) and the Government Agency for Innovation Systems (VINNOVA). This makes it difficult to coordinate innovation policy. The Swedish government responded to this situation in October 2014 by launching the National Innovation Council (Nationella Innovationsrådet). Chaired by the Prime Minister, the Council consists of representatives from government, employer associations, trade unions and the research community and has its own resources. The Council has set itself the ambitious target of developing a new innovation strategy and reviving innovation policy. This can also be seen in the appointment for the first time of a minister responsible for innovation (Ministry of Enterprise and Innovation). Here, the Swedish government is also aiming to generate targeted state demand via an innovative public procurement system, overseen by a dedicated minister and with its own administrative body (Andersson 2016; Edquist 2016). The Swedish government hopes that the considerable state and municipal budget funds for public procurement (between 65 and 85 billion euros) can be used to drive innovation.

State innovation policy in the **United Kingdom** focuses in particular on two key players: the Department for Business, Innovation and Skills, established in 2009 and replaced by the Department for Business, Energy and Industrial Strategy in 2016, and the state innovation agency Innovate UK, which is attached to this department. Their work is supported by committees that offer additional expertise (Council for Science and Technology, Parliament Office for Science and Technology). To coordinate innovation policy, the Department for Business, Innovation and Skills published a plan in 2014 entitled "Our Plan for Growth: Science and Innovation". In addition, Innovate UK published a "Digital Economy Strategy" in 2015, which is aimed at supporting the British economy through innovations using digital technologies. This served to some extent to lay out in concrete terms the declarations of intent contained in the department's innovation plan. The core points of the strategy are maintaining a strict user focus, promoting sustainability, driving growth in infrastructure and ecosystems and creating a positive environment for and supporting innovators. This includes focusing on digital health care services.

In the United Kingdom, over 100 technology parks (for example, UKSPA) and more than 50 university technology transfer facilities (for example, NCUB, AURIL) play a key role in helping relevant actors, especially universities and businesses, to network with one another. In addition, 11 "catapult" centres have been set up to support early-stage innovation and support businesses in the commercialisation of research (see NESTA 2015).

6

DIGITALISATION AND WELFARE STATES – EQUAL OR UNEQUAL?

The increasing digitalisation of value-added networks and the greater use of new technologies, flexible production processes and new work forms is leading to changes in welfare state architectures (cf. Schmid 2010: 112). The effects of this development can be seen in all three policy areas examined in this study.

As the central location for distributing life opportunities and social security in contemporary capitalist market societies, the **labour market** is particularly affected by digitalisation. The welfare state is supposed to counteract inequalities by redistribution and protecting against certain risks. At the same time, the welfare state itself is based on social stratification, which more or less privileges gainful employment. Digitalisation results in new challenges. Particularly stratified welfare states are more likely to produce a digital divide between those who have the necessary skills to find their way around the digital environment and those who do not have those skills and are therefore more exposed to the dangers of work casualisation (cf. SBTC). Digitalisation in this situation does not alter the demand for work equally across all skills levels, but rather has a polarising effect. While demand rises in highly skilled areas, it falls for non-manual routine work (cf. also OECD Skills Outlook 2013, 2015). This is because "new production technologies, in particular information-processing technologies" caused by digitalisation "make, on one hand, many unskilled tasks unnecessary but require, on the other hand, corresponding knowledge and skills to apply those technologies" (Groß 2015: 217).

One central requirement in all the countries examined is for young people – above all – to acquire the skills necessary for Work 4.0 in a digital economy. This means that the interfaces between the labour market and education, in particular, become relevant. Against the background of digitalisation and Industry 4.0, education policy becomes one of the crucial fields of future welfare state action. The reform of training programmes is high up on the political agenda in all the countries examined. The aim is to better align labour market demands with the supply of skills. Here, an active labour market policy is required that relies more strongly on "encouraging" rather than "expecting". For the active social state, education is a vital component (cf. Schmid 2010: 441). Especially in knowledge societies and high-tech industries, education is not only crucial for the innovation potential of a society but also important for social inclusion. This applies increasingly to countries such as Spain, Italy and France that are affected by constantly high youth unemployment. Governments are addressing the situation with reform programmes aimed mainly at attaining more flexibility and less regulation, but also activation and skills measures. In all the countries examined there is evidence of an increase in "atypical" employment relationships. These often go hand in hand with precarious employment careers and restrictions on integrating into social security systems. Here, ways must be found to include new work models (for instance, crowd-workers working as self-employed individuals) in existing security systems. Because new social risks require new ideas for ensuring a social security net, the long-term question we have to ask is whether and how we might design a social security net that is decoupled from work and how we might arrive at EU-wide regulations.

In short, innovation, digitalisation and Work 4.0 bring new opportunities, but also risks. Societies that want people to take professional risks therefore require social security systems that are able to cushion such risks. For that reason, social rights should belong to people, not to jobs. Traditional categories such as employee and employer are breaking down due to new work models. Working is becoming more mobile, more flexible and less contained. This can be positive, for instance in achieving a better work–life balance, but also negative if the boundaries between work and leisure become blurred. Clear rules are required here. Particularly for employees who are not present in the work place, we need to find new ways of organising trade unions, representing interests and – in the German case – enabling worker participation. At the same time, the interests of the core workforce must be protected. In designing the labour markets of the future, it is also important to avoid a further wage polarisation.

Digitalisation increases productivity and therefore also has the potential to boost demand and create new professions and activities. If appropriate investment is made, this can result in employment growth. Rising demand for workers, however, is to be expected mainly in areas that require greater

skills. Decent jobs need inclusive growth. Because professions and activities can be automated in different ways, all the welfare states examined here require solutions for all those who lose out in the digitalisation process. This requires greater investment in professional development and lifelong learning for low-skilled workers, as well as, for instance, for older workers.

Digitalisation also changes the policy area of **health care**. Digital services (for example, smart watches) are entering the market and starting to monitor our behaviour: apps count our steps, wearables measure our blood pressure. What will happen if the data collected are forwarded to health insurance providers and systematically analysed, and if an individual's behaviour then becomes subject to active health policy measures in accordance with the "expect and encourage" model? Customised medicine offers the opportunity to provide optimal support, but is a concern if this data are made available to employers, for instance. For that reason, the data must be owned by the patient, but this is only the case in very few welfare states in reality, although the same applies in the analogue world. For the most part, patient data involve ownership without possession (that is, the data, including analogue data, lie with doctors) or possession without ownership (lots of data lie with lots of doctors, care organisations and hospitals). However, only those who can be sure that their personal data are actually theirs and secure will accept the use of digital health applications and welcome, wherever possible, the patient-related merging of all the available health data. This is one side of digitalisation. The other is better quality of life due to better and more convenient medical and care services, including in sparsely populated areas if they are equipped with the appropriate digital infrastructure. This is because the digitalisation of health care offers huge opportunities. For instance, it avoids multiple examinations, cumbersome documentation and bureaucracy; it improves diagnosis, prevention, treatment and medication; and it leads to more efficient processes, shorter waiting times and approaches, and thereby more time for people.

Using digital technologies requires digital literacy, in other words, basic skills that enable people to draw the greatest benefit from these new technologies. For citizens to be interested in these technologies, however, they need to recognise what the benefit is for them or how these innovations could specifically improve day-to-day life. If citizens are less prepared for digitalisation and do not have the basic skills required, digitalisation will not be able to achieve its full potential, whether from use of internet connections in general through to health services in particular. Here, it is irrelevant how well e-government services are developed. Here, Italy and Estonia represent two contrasting case studies.

It is striking that the countries that have strong administration units and that have tried to manage digitalisation top down in large-scale projects are those in which the debate about small-scale innovations is more prominent. Here, the problems experienced in Germany and the United Kingdom with health cards, the disappearance of patient data and records and general data protection problems in the NHS with care.data provide particularly noteworthy examples. On the other hand, decentralised states struggle with translation problems and fragmentation when implementing digitalisation, as the examples of Spain and Italy show. Here, a mix of centrally determined requirements and operational autonomy at regional and local level is indeed conducive to achieving objectives.

When managing this process, some states rely on specific coordination committees or agencies. Examples here are the Estonian e-Health Foundation or the Swedish organisation Carelink. Both are national collaborations. The Estonian organisation is under the management of the Estonian Ministry of Social Affairs, with clinics and universities also involved. The Swedish organisation is a collaboration between regions, provinces, municipalities, the private health care employers' association and the Swedish Pharmacy Association. By contrast, when it introduced the health card, Germany relied entirely on the usual corporate health care players, with more or less no involvement of state offices (for example, district health authorities in the area of public health care, the federal states in the area of inpatient care and prevention or health care legislation at federal level). Assuming that national collaborations focus on the common good (given that the players around the table do not all have diverging interests), it is particularly striking how Germany experienced long periods during which the various players sought to block one another in the course of the introduction of the health card. This means that states initially try to fall back on tried-and-tested governance models when managing such change (Germany: corporatism; Estonia: centralisation; Sweden: state-focused corporatism), some of which were appropriate for the task and situation (Sweden, Estonia) and some of which were not (Germany).

Digitalisation is giving rise to challenges of varying intensities in the different welfare state models. First, the countries examined occasionally differ widely in the degree of digitalisation in the economy and society that they have already achieved, from setting up and expanding digital infrastructure to building digital human capital, integrating digital technologies into the economy and driving e-government. Irrespective of the type of welfare state, then, the key aim must initially be to establish high-speed networks across all states and to promote human capital. Second, depending on the type of welfare state, there are also different challenges in terms of content. Measures that are comparatively easy to integrate for one welfare state may have a centripetal effect in other welfare states. For instance, the issue of employment protection in a period of decentralised, flexible and digital work in "liberal", "conservative", "Mediterranean" and "social democratic" states will require different solutions. Applying dimensions of internal versus external modernisation, on one hand, and social inequality, on the other, we can construct a model that systematically shows the interactions between digitalisation and the welfare state and in which we can position the states that have been examined (see Figure 6). Here, the countries are categorised largely in line with the clusters in Figure 5 that show the connection between economic output and digitalisation of the economy. This model will subsequently be broken down according to the policy fields examined in this volume.

Comparison reveals that Sweden has the lowest level of social inequality due to the high redistributive capacity of its social democratic welfare state. It is also proactively and con-

Figure 6
Modernisation and social inequality: comparison of interactions

		Modernisation	
		external	internal
Social inequality	low		Sweden
	medium	Germany France	United Kingdom
	high	*Italy* Spain	*Estonia*

Source: Authors' presentation.

sistently modernising its welfare state internally. Sweden can therefore be considered a pioneer of Welfare 4.0.

Similarly, Estonia and the United Kingdom, with their relatively good levels of network coverage and progress in digital public services, are taking the route of internal modernisation and benefiting very much from this in the areas of connectivity and e-government. However, it is also becoming apparent that the much stronger stratifying effect of post-socialist (Estonia) or "liberal" (United Kingdom) social security systems does not cancel itself out. In fact, it is actually accentuated if it is not accompanied by targeted welfare state measures. Estonia, in particular, is struggling with the effects of a strongly dualised labour market and the social inequality that this brings with it.

By contrast, the "conservative" welfare states of Germany and France are more strongly driven by external modernisation effects. The welfare state subsequently adjusts to the external challenges of Industry 4.0. Here, the question of recalibrating society's internal redistribution of labour and welfare benefits becomes one of the key issues.

The "Mediterranean" welfare states of Italy and Spain face the biggest challenges. Here, on one hand, social inequality is high and exacerbated by the effects of the economic and financial crisis, particularly in Spain. On the other hand, external modernisation effects, especially on the labour market, lead to further stratification of these societies. At the same time, systematic digitalisation of the welfare state offers great development potential, especially with regard to integrating digital technologies into industry, building human capital and driving digital public services. Spain, for instance, is taking the route of digitalising public services as a possible strategy for coping with the consequences of the economic crisis and with latent modernisation problems. It is now slowly catching up.

Innovations will help us to actually utilise the opportunities of digitalisation, even – and perhaps in particular – against a background of increasing inequality. However, the above benefits will not come from technical innovations alone. Rather, they are the product of technical and social innovations: newly established practices, services and organisational forms. Such innovations are occurring increasingly in networks comprising many different players and are being co-produced by users and practitioners. The "classic" innovation process of closed innovation (according to Schumpeter) is directed mainly inwards: attention is given to customers' wishes (problem information) during the process, but the solution is developed internally within the company. Social and technical innovation in the digital world, however, calls for different models. As such, the concept of open innovation (Chesbrough 2003; Chesbrough/Vanhaverbeke/West 2014; cf. also Hippel 1988, 2005) aims at getting customers or patients to provide not only the problem information but also the solution information. Even in large multinational companies there is no longer enough information available internally to solve problems. The knowledge of other, external players needs to be incorporated: of universities and research laboratories, of customers and patients, and also of other companies and possible competitors. Organisations therefore need to develop interaction skills in order to benefit from the advantages of this open innovation process – and to be able to innovate in the first place.

The capacity to innovate is fostered by being knowledgeable and able to combine different types of knowledge. For that reason, a society's ability to innovate is also made up of different types of capital. One might take the Institute for Innovation and Technology's innovativeness indicator as an example (iit 2014):

- human capital – the value of workers' skills and knowledge (from training and professional development as well as lifelong learning);
- complexity capital – the variety of useful knowledge that allows workers to create complex products;
- structural capital – the ability to pool knowledge within organisations;
- relationship capital – the value of the network of relationships; the ability therefore to pool knowledge across organisational borders (very relevant for open innovation in particular).

Here, for example, we can see that Germany derives its strength particularly from its high level of complexity capital. The other types of capital – human capital, structural capital and relationship capital – are, however, much less prevalent there than in Sweden (Buhr 2014). The high levels of human, structural and relationship capital found in the Nordic countries are due to the relatively high quality of communal life (cf. for instance

Bertelsmann Radar 2016), which appears to play a role in enhancing both the functioning of democracy and the development of the capacity to innovate. This social cohesion can also be measured via social relationships (social networks, trust in fellow citizens, acceptance of diversity), connectedness (identification, trust in institutions, sense of justice) and focus on the common good (solidarity and helpfulness, acceptance of social rules, social participation). On this basis, social cohesion is strongest in Scandinavia (Denmark, Norway, Finland and Sweden). These values are therefore interesting because they correlate very positively with other values, such as the size of GDP, the European Commission's DESI – which we have referred to repeatedly here – and the World Bank's Knowledge Index (World Bank 2012). This latter index records how far countries have progressed towards becoming knowledge societies. The index pools information on education levels, the level of economic innovation and the infrastructure for information and communication technology. Here, a very distinct positive correlation can be seen, with the most innovative societies also being those that have strong social cohesion (Buhr 2014).

7

OPTIONS AND RECOMMENDATIONS FOR STRUCTURING WELFARE 4.0

In conclusion, we propose a number of options, as follows.

1 PROMOTING SOCIETY'S CAPACITY TO INNOVATE

In the age of digitalisation, a society's ability to innovate starts with the digital infrastructure. This means fast internet, with blanket coverage. Learning and thinking in networked connections must also be activated. For innovation and labour market policy, this means both investing in innovations and promoting the ability to make use of them actively in the society (human capital). However, it also includes analysing and structuring the consequences of innovations in advance and with the involvement of potential users (structural capital). In this way, employees become innovation drivers and not the driven. The idea here is to enable innovation through participation and thereby rely on open and social innovations (relationship capital), in particular in the care and health area.

2 DEVISING A POLICY FOR A SOCIAL EUROPE

Innovation processes can result in social progress. For that reason, the debate must also be intensified at European level. Societies in the individual member states are already strongly interconnected through the single market alone, and are thereby also affected by social standards, opportunities and limitations in other member states. Modernisation of societies then means promoting not only economic growth but also social progress (Andersson et al. 2016). Social standards are not downsides for economic growth, but rather form the foundation of innovative societies in which both producers and users benefit from faster, more successful and more customised innovations. This also means that more investments are needed, especially in the digital infrastructure, to modernise the economy and the social state. However, this requires shifting away from the strict financial and austerity policies so that states can become more active again and invest, for example, in innovation, research and education. If the EU is to be a project of international solidarity and of common economic and social progress, innovative processes for social progress must not remain limited to a handful of regions or nation states, but have to be promoted systematically and across the EU (Andersson et al. 2016).

3 CREATING SPACES FOR EXPERIMENTATION AND STRENGTHENING REGIONS

Something that works particularly well in the Scandinavian welfare state is management (for example, the National Innovation Council) and the interconnectedness of national and regional politics. On the ground, in the municipalities and districts, players have considerable scope for design and experimentation. This extends to directly demanding innovations at local level. The idea is to involve local users in trying out, testing and refining technical and social innovations. Positive experiences with innovative spaces for experimentation at a regional level need to be fed into dialogue at a European level (Andersson et al. 2016). They should be accompanied by collaborative research, applied and demonstration research, evaluation and acceptance studies, as well as the exchange of information with international partners. Bringing processes at a local level closer to one another and combining them to form a joint European policy framework would improve the opportunities for implementing and expanding innovations beyond those regions that already are strong in innovation and would make a further contribution to greater cohesion and social solidarity.

4 PROMOTING (FURTHER) EDUCATION, SKILLS AND SCIENCE

In the digital world, in particular, the half-life of knowledge, skills and abilities is becoming shorter and shorter. This means that the (further) education and knowledge system has a key role to play: from early childhood education to the training of the most highly skilled (graduates); from formal learning to lifelong and informal learning; and from R&D cooperation struc-

tures between business and academia through to learning and innovation-promoting structures in companies. As such, nearly all the welfare states examined require better facilities in schools and universities, as well as reforms to training and professional development activities. They need to be encouraged and can then certainly be expected.

5 ANALYSING HOLISTICALLY – AND ACTING SYSTEMATICALLY

The interconnectedness of the three policy areas presented here (labour, health care and innovation) show that the issue of digitalisation requires perspective and a stakeholder network, on one hand, and more (or a different type of) coordination on the other – both horizontally and vertically, across levels and traditional ministerial boundaries. Thinking out of the box to create new things also requires new coordination platforms, such as the Swedish Innovation Council, in order to strengthen vertical coordination.

All of this requires an active state that not only provides a (digital) infrastructure, digital administration and comprehensive investments in research and education, but also ensures social and technical standards, general data protection and data security, as well as protection of intellectual property rights – and also knows how to use public procurement actively. This would not only open up leading markets for certain sectors, but potentially also permit a greater willingness to take risks in public administration. This could, in turn, help to support innovative processes in the public sector that are linked to certain social needs. For that reason, an authority should be established at national level that encourages municipalities to progress in terms of innovative public procurement (Andersson et al. 2016). For all these tasks, a welfare state is required that is able to proactively manage its responsibilities: one that makes use of the opportunities of digitalisation for its modernisation, and tries to better align and orchestrate its innovation policy with health care and labour market policies.

Can digitalisation bring about social equality? This is a vision we should continue to develop: by enhancing our welfare state in such a way that, on one hand, it absorbs the risks of growing flexibilisation and, on the other hand, it offers us new ways of harnessing the opportunities of working without space and time constraints – ways that ultimately bring about social progress. This could perhaps be the vision of Welfare 4.0.

Figures

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