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What about Welfare 4.0?

INTRODUCTION

Internet of Things and Work 4.0, E-Health and E-Government: increasing digitalisation is about to enter 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 production and consumption, 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 healthcare services are delivered and so on (Buhr *et al.* 2016). While a lot of studies in this area initially focused on the opportunities for productivity and economic growth, others predominantly address the risks of digitalisation for the labour market and predict an ‘end of work’ (see Frey and Osborne 2013; Brynjolfsson and McAfee 2014). Besides this debate, there is currently little 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, economy and the labour market? How far have developments in individual welfare states progressed? What further developments can we expect? And how will policymakers in the relevant policy areas react to these changes?

This paper will discuss these questions. The analysis is based on a study design by Claudia Christ, Marie-Christine Fregin, Rolf Frankenberger, Markus Trämer, Josef Schmid and myself (Buhr *et al.* 2016) and focuses on a comparison of seven welfare states: Britain, Estonia, France, Germany, Italy, Spain and Sweden. One objective of this study is to compare the development of, as we call it, 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.

DIGITALISATION OF THE WELFARE STATE

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. More specifically, the technical and social innovations of these developments – that are often framed as Industry 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’. A growing number of (routine) tasks are being performed by machines and new tasks for people are emerging that demand new skills.

In short, what is often referred to as the fourth industrial 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 have to be adjusted. Here digitalisation essentially has two different impacts on the welfare state. Firstly, 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 (Autor 2015; Arntz *et al.* 2016). The processing of these changes and challenges needs to be supported by the welfare state.

Secondly, the digitalisation of the welfare state is causing internal modernisation effects. They are related, on the 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 is 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.



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COMPARING WELFARE STATES

In comparative welfare state research, a distinction is made between different types of welfare state (Buhr and Stoy 2015). They reflect the relevant experiences of each state’s national political and social history, as well as the political balance of power (Schmid 2010). Here the emphasis is on the classic 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). Esping-Andersen (1990) defines three dimensions that have different effects on the different welfare types: decommodification, stratification and residualism.

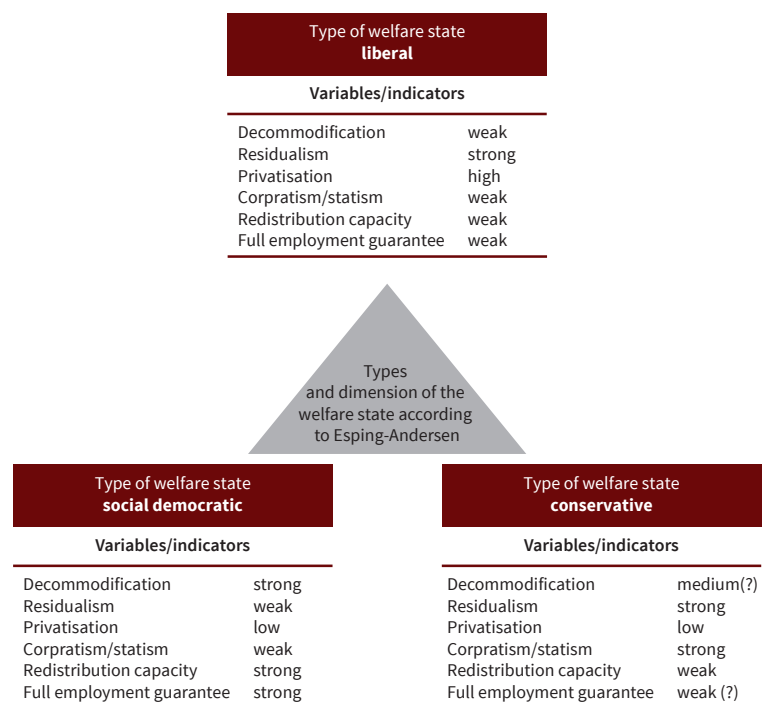
Decommodification refers to the relative independence of the social security of the individual from the pressures and risks of commercially oriented (‘market’) policy and decision-making. In other words, the higher the level of decommodification, the lower the individual’s dependence on selling work as a commodity in order to secure their own survival. This is achieved by 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 (Schmid 2004). 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). One example of this type is Britain. Others include Canada, the United States and Australia. The conservative (or continental European) welfare states are based on strong state social policy which emphasizes 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 (Schmid 2004). 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). 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). 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 (Schmid 2004). Decommodification effects are most strongly felt in such states. Examples of this type are

Figure 1
Types and Dimensions of Welfare States According to Esping-Andersen



Source: Schmid (2010).

the Scandinavian countries of Sweden, Norway, Denmark and Finland.

Figure 1 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.

In the meantime, Esping-Andersen's approach has been extended to include two additional welfare state types: firstly, the rudimentary or 'Mediterranean' welfare state type, which expressly includes the countries of southern Europe (Spain, Portugal, Greece, and to some extent Italy), and secondly, 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. 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 (Schmid 2010). 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): the post-socialist welfare state. It is described as an authoritarian remodelling of the social democratic welfare type. Its transformation towards a welfare system in accordance with the western European model is a gradual one and encompasses both old and new characteristics, which makes it to an institutional hybrid.

To answer the core research questions of this study, a comparative design was selected. This process specifically examines the development paths and responses of various welfare states to the challenges and opportunities of digitalisation. Based on the five worlds of welfare capitalism cited above, seven countries were chosen and individual case studies were initially conducted on each of them. Germany and France represent the conservative welfare state type, Sweden the social democratic welfare model and Britain 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 percent 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 as 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, however, disagreement among researchers over this classification. According to Ferrera (1996) and 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 gives 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. 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.

DIFFERENT PATHS TO WELFARE 4.0 – LABOUR AND HEALTH

The increasing digitalisation of value-added networks and the greater use of new technologies, flexible production processes and new work forms are leading to changes in welfare state architectures (Schmid 2010). It tackles various policy fields, starting with the labour market, over to education, science and innovation up to health and social care.

Labour

As the central location for distributing life opportunities and social security in contemporary capitalist market societies, the labour market is affected by digitalisation and automatisisation in two ways: firstly, and as mentioned before, these technological developments are drivers of structural change; and secondly, these developments enable new ways to organize work that could lead to a growing number of short hirings, zero-hour contracts and other forms of labour-on-demand.

The rise of digitalization and automation, artificial intelligence and robots triggers a downsizing of a variety of routine tasks traditionally performed by humans. Famous claims have been made that half of all jobs in industrialised countries are so susceptible to automation that they will disappear in the next two decades (Frey and Osborne 2013). However, automation will affect certain tasks, not whole occupations. In many occupations, tasks that can be automated through new technology are bundled with tasks that are inherently difficult to automate. With this approach, the share of jobs threatened by new technology more closely resembles the pace of structural change we are used to. Furthermore, we must not underestimate human creativity, nor the human ability to find new desires that needs to be fulfilled. Jobs will disappear, but new jobs, occupations and companies will emerge on the same time. Therefore, labour market policies will have to be even more far-sighted, since real employment security

Table 1
Status of Digitalisation and Level of Spending in Individual Policy Areas (2016)

	Germany	Estonia	France	Italy	Sweden	Spain	UK	EU28
State form	Federal democratic republic	Democratic republic	Semi-presidential republic	Parliamentary republic	Constitutional monarchy	Constitutional monarchy	Constitutional monarchy	
State organisation	Federal	Unitary	Unitary	Unitary	Unitary	Federal	Federal	
Party system	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple	
Election system	Personalised proportional representation	Proportional representation	Majority voting system	Majority voting system & proportional representation	Proportional representation	Proportional representation	Majority voting system	
EU member since	1 Jan. 1958	1 May 2004	1 Jan. 1958	1 Jan. 1958	1 Jan. 1995	1 Jan. 1986	1 Jan. 1973	
Inhabitant per km ²	226.6	30.3	104.5	201.2	23.8	92.5	266.4	116.7
Urbanisation (% of population)	75	68	80	69	86	80	83	74
Welfare regime	Conservative	Liberal/post-socialist	Conservative	Mediterranean	Social democratic	Mediterranean	Liberal	
Interpersonal trust index ^{a)}	5.5	5.8	5.0	5.7	6.9	6.3	6.1	5.9
Income inequality (distribution quintile)	5.1	6.2	4.3	5.8	3.8	6.9	5.2	5.2
Spending on social security (% of GDP)	29.0	14.8	33.7	29.8	30.0	25.7	28.1	28.6
GDP per capita (in PPP, EU=100)	125	74	106	95	123	92	110	100
Real GDP growth rate (%)	1.7	1.4	1.3	0.7	4.1	3.2	2.2	2.2
Budget deficit/surplus (% of GDP)	0.7	0.4	-3.5	-2.6	0.0	-5.1	-4.4	-2.4
Productivity nominal per worker (EU=100)	106.6	69.7	114.4	106.5	113.2	102.6	102.6	100
Harmonised unemployment rate (%)	4.2	6.8	10.5	11.4	7.2	19.5	4.8	8.6
Trade union organization degree (0-100)	18.13	5.65	7.72	37.29	67.26	16.88	25.14	
R&D overall expenditure (% of GDP)	2.87	1.44	2.26	1.29	3.16	1.23	1.70	2.03
Share of 20-24-year-olds with secondary level II as a minimum	77.1	83.4	87.2	80.1	87.3	68.5	85.7	82.7
Tertiary degrees in MINT subjects (per 1.000 graduates)	16.2	13.2	22.9	13.2	15.9	15.6	19.8	17.1
DESI index (0-1; 1=digital society)	0.57	0.59	0.51	0.40	0.67	0.52	0.61	0.52
Share of regular internet users (16-74 years. %)	84	86	81	63	89	75	90	76
Internet access density (% of households)	90	88	83	75	91	79	91	83
Share of households with broadband connection (%)	88	87	76	74	83	78	90	80
Share of companies with broadband connection (%)	96	97	96	94	97	98	96	95

Note: ^{a)} 0 = no trust. 10 = complete trust.

Source: Buhr *et al.* (2016) based on various data bases including Eurostat, World Bank and OECD.

will not lie in the job you have, but in the jobs you can get. And here, some people (highly-skilled) are much better prepared for this than others (low-skilled), which could lead to growing inequalities.

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 (i.e. Germany, France, Italy) 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 (see SBTC). Digitalisation in this situation does not alter

the demand for work equally across all skills levels, but tends to have a polarising effect instead. While demand rises in highly-skilled areas, it falls for non-manual routine work (Arntz *et al.* 2016). This is because “new production technologies, in particular information-processing technologies [caused by digitalization] 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 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 and one of the crucial fields of future welfare state action. In knowledge societies and high-tech industries in particular, education is not only cru-

cial 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.

Most governments in Europe 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 and click-workers working as self-employed individuals) in existing security systems.

Digitalisation has the potential to increase productivity and could therefore boost demand and create new professions and activities. If appropriate investment is made, this can even 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. Given that 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 life-long learning for low-skilled workers, as well as for older workers.

Digitalisation brings new opportunities, but also entails risks. Societies that want people to take professional risks therefore require social security systems that are able to cushion such risks. In short, 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. Because new social risks require new ideas to ensure a social security net, the long-term question that needs to be asked 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.

Health and Social Care

Digitalisation also changes the health and social care systems, which are already one of the largest employers in most of the welfare states. Digital services are entering the market and starting to monitor our behaviour: apps count our steps, wearables measure our blood pressure. Customised and personalised 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 i.e. doctors) or possession without ownership (lots of data lie with lots

of doctors, care organisations and hospitals). With the growing risk of cyber crimes, however, topics like data safety and security will probably enter the political agenda in a growing number of states in the near future.

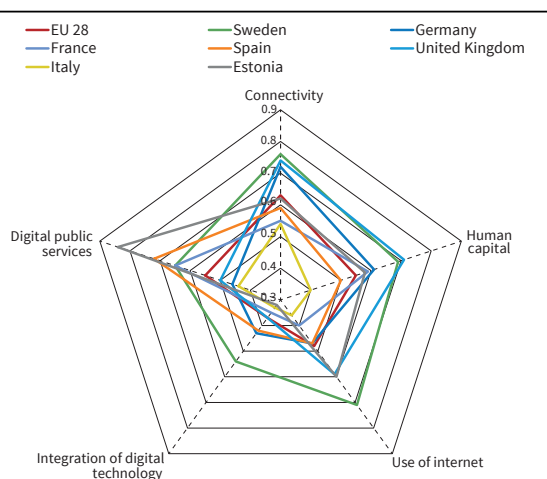
This is one side of digitalisation. The other is better quality of life due to improved and more convenient medical and care services, including in rural and sparsely populated areas, if they are equipped with the appropriate digital infrastructure, like for instance in Denmark, Finland, Sweden, Estonia or Scotland. This is because the digitalisation of health care offers huge opportunities. It could e.g. make it possible to avoid multiple examinations, cumbersome documentation and bureaucracy, and therefore lead to cost savings. In addition, it could improve diagnosis, prevention, treatment and medication; it could connect and dovetail formal with informal care-givers in order to improve and reduce the burden of social care; and it could lead to more efficient processes, shorter waiting times and approaches, and thereby more time for people and person-centered services.

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 their 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 through the use of internet connections in general to health services in particular. Here, Italy and Estonia represent two contrasting case studies. It is striking that those countries that have strong administration units and 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 Britain 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 seen in Spain and Italy. It seems that a mix of centrally determined requirements and operational autonomy at a regional and local level is indeed conducive to achieving objectives.

DIGITALISATION AND WELFARE STATES – EQUAL OR UNEQUAL?

Digitalisation is giving rise to challenges of varying intensities in the different welfare state models. Firstly, as Figure 2 shows, the countries examined occasionally differ widely in terms of the degree of digitalisation in economy and society that they have already achieved, from setting up and expanding digital infrastructure to building digital human capital, integrating digital tech-

Figure 2
Comparison of the Digital Economy and Society Index 2017



Source: EC DESI (2017).

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nologies into the economy and driving digital public services. 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. Secondly, depending on the type of welfare state, there are also different challenges in terms of content. Measures which are comparatively easy to integrate for one welfare state may have a centripetal effect in others. 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 the 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 Table 2).

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 consistently modernising its welfare state internally. Sweden can therefore be considered a pioneer of Welfare 4.0. Similarly, Estonia and Britain, with their relatively good levels of network coverage and progress in digital public services, are taking the

route of internal modernisation and benefiting greatly from this in the areas of connectivity and digital public services. However, it is also becoming apparent that the much stronger stratifying effect of post-socialist (Estonia) or liberal (Britain) 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 entails.

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. On the 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, are leading to the further stratification of these societies. At the same time, the 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.

CONCLUSION

Can digitalisation bring about economic and social progress as well as equality? Perhaps it could, but not to the same extent in each and every welfare state setting. The Scandinavian welfare states (Sweden, Denmark, Finland, Norway) seem to be in a beneficial position since the internal modernisation of these welfare states is already on a higher level than in most of the liberal, Mediterranean, post-socialist and conservative welfare states. It may therefore be wise for governments and public administrations to focus more on these internal modernisation effects, by using digitilisation to modernise the health, care and education system, for instance, and to foster equal access to these services throughout society, for people that live in cities as well as in rural areas.

This requires, however, in some of these welfare states to shift away from strict financial and austerity policies in order to allow policy makers to become more active again and invest, for example, in innovation, research and education, in social as well as digital infrastructure.

This could perhaps be the vision of Welfare 4.0: enhancing our welfare states in such a way that they absorb the risks of growing flexibilisation on the one

Table 2
Modernisation and Social Inequality
Comparison of interactions

		Modernisation	
		External	Internal
Social inequality	Low		Sweden
	Medium	Germany France	UK
	High	Italy Spain	Estonia

Source: Buhr et al. (2016).

hand, and offer us new ways of harnessing the opportunities of working without space and time constraints on the other, which could be an important prerequisite for social progress too, enabling as many people as possible to lead an independent and self-determined, active and healthy life.

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