Nordic Council of Ministers

THE NORDIC FUTURE OF WORK

DRIVERS, INSTITUTIONS, AND POLITICS

First project report from

THE FUTURE OF WORK: OPPORTUNITIES AND CHALLENGES FOR THE NORDIC MODELS

The Nordic future of work

Drivers, institutions, and politics

Jon Erik Dølvik and Johan Røed Steen

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Preface

This is the first report from the project, "The Future of Work – Opportunities and Challenges for the Nordic Models" 2017–2020, funded by the Nordic Council of Ministers and organized by Fafo Institute for Labour and Social Research, Oslo. This Nordic cooperation effort is inspired by the Global Future of Work project organized by the International Labour Organization (ILO) in the context of its 100th Anniversary in 2019.

This Nordic Future of Work project (NFoW) has been assigned to develop and disseminate policy-relevant knowledge, and aims to stimulate public debate and exchange of ideas and experience among actors and stakeholders across the Nordic countries. The project is organized in cooperation with more than 25 researchers from all the Nordic countries and a reference group set up by the Working Life Committee of the Nordic Council of Ministers. An overview of the project plan is found in Chapter 6.

In accordance with the project call, this initial report focuses on the drivers and trends foreseen to shape the future of work. Further, in order to provide a common framework for subsequent reports' analyses of the impact of these drivers and trends on Nordic working life, we outline the main traits of the Nordic models and some recent developments in Nordic working lives. The report is based on two workshops in Pillar I of the project (see Chapter 6) and a review of relevant literature on the topic. We have benefitted from conversations with, and input from, central actors and stakeholders on a series of international/Nordic conferences on the future of work over the past year, including the conference arranged by the Swedish Government in Stockholm 14–15 May 2018. The report has benefitted from valuable inputs and feedback from researchers associated with the project. Thanks to all that generously have shared their insights with us. We would like to thank Tuomo Alasoini, Anna Ilsøe, Kathrin Olafsdottir, Bertil Rolandsson, and Tomas Berglund for the enthusiastic support and comments. We are also thankful for the inspiring dialogue with the members of the project reference group and for their useful comments on an earlier draft. A special thanks to its secretary, Tryggvi Haraldsson, and Jens Oldgaard and Cecilie Bekker Zober, Nordic Council Ministers, for their smooth handling of all issues pertaining to the organization of the project. As always, the authors are solely responsible for the content of the report, including any flaws that might occur.

Oslo, November 2018

Jon Erik Dølvik and Johan Røed Steen

Summary

How will work and working life in the Nordic countries change in the future? This is the overriding question in the project "The Future of Work: Opportunities and Challenges for the Nordic Models" (NFoW) commissioned by the Nordic Council of Ministers. This initial report describes the main drivers and trends expected to shape the future of work. Further, the report reviews the Nordic models' main distinctions and recent working life developments in the Nordics, and points to the kind of challenges the future of work may pose to the Nordic models.

There is a variety of factors that influence changes in working life, in the past, at present, and in the future. Too often, debates about the future of work narrowly focus on changes in technology, whereas other important factors influencing working life tend to be ignored or underscored. Yet, in the literature on the future of work, there is a growing consensus regarding the main drivers – or megatrends – that are expected to shape future developments. In line with the ILO Global Commission on the future of work (ILO 2018), we highlight four such megatrends: Globalization, technology, demography, and climate change:

- *Demographic change,* stemming mainly from ageing and migration, will substantially reduce the workforce relative to the dependent elderly population. While the working age population in EU/EEA will shrink by circa 45 million 2016–2080, mostly before 2050, the elderly (65+) will increase by over 50 million. The largest increase will be seen among the very old (85+). This contributes to a radical rise in the old-age dependency ratio from 29% to 50% (Eurostat 2018). Although the demographic changes, except in Finland, will be milder in the Nordic countries, growing labour shortages and strengthened competition for labour within the single market can be expected to limit the supply of labour available to the Nordics from sending countries in the EU. Concurrently, urbanization is foreseen to accentuate geographical disparities in national labour markets. In view of the rapid growth in the working-age population in other regions and Africa in particular, both pull-and push-factors are likely to maintain strong pressures for immigration to Europe.
- *Climate change* and its consequences, e.g. in the form of floods, draughts and extreme weather, may spur humanitarian crises and migration waves from vulnerable countries, and heighten uncertainty of economic prospects. The measures needed to mitigate global warming will further entail pressures for rapid restructuring in various industries, companies, and communities – also in the Nordic countries. Transitions to renewable energy sources and low- or zero emission transport and production will require major changes in companies and supply chains. Adjustment measures including relocation and rebuilding of

infrastructure, housing and production sites will affect working life and jobs also for many Nordic citizens. While most estimates indicate that this transition to a greener economy will contribute to a modest increase rather than a decrease of jobs, it will certainly be a challenge to ensure that the workforces involved are granted the support, training, and means needed to master the changes in their work and livelihoods.

- *Globalization* of production, trade, direct investment flows, and finance are long-term trends that, alongside European integration, have been virtually taken for granted. But the recent backlashes illustrated by Brexit and protectionist outbursts from different world corners, suggest that partial reversal or deceleration of globalization cannot be precluded. Reliant on predictable frameworks for international exchange, the small, open Nordic economies have benefitted significantly from globalization. In a context of continued financial instability and rising debt internationally and nationally, a break-up or undermining of the multilateral, international governance regimes would imply more unpredictable economic, regulatory, and environmental prospects, and entail harmful effects for Nordic working lives. Although a new dimension of globalization is opened up by digitalization and increased interconnectedness, the changing forms of competition and power emerging with the winner-takes-all dynamics of the digital market place seem to disempower nation-states and require more, not less, multilateral cooperation and regulation of the international economy.
- *Technological change*, including rapid progress in areas such as computing, robotics, artificial intelligence and biotechnology – encapsulated in the notion of a fourth industrial revolution – is increasingly framing debates on the future of work. Though technological innovation as such is nothing new, the expanding possibilities of digital technology may enable rationalization, automation and fragmentation of work on an unprecedented scale. The exponential increase in computing power coupled with ever improving algorithms, networks, and big data is accompanied by a rise of global mega-corporations benefitting from decreasing marginal costs – i.e. increasing returns to scale – and a winner-takes-all advantage, granting them quasi-monopolist market power and capacity to circumvent national jurisdictions. Concurrently, computerization of cognitive as well as manual routine tasks, along with digital platforms matching tasks and labour in new ways, is foreseen to foster increased polarization, outsourcing, and parcelization of work. Most jobs will be influenced, many transformed and some lost. The jury is still out regarding the net employment effects and the depth and pace with which such changes will spread. However, in combination with the transition to a greener economy, it seems clear that we are entering a period of intensified restructuring of working life where the demand for retraining, life-long training, and employee mobility will increase. A key question is whether the Nordic work life models can continue to handle restructuring and introduction of new technologies in cooperative, efficient and inclusive ways. Placed among the best in international rankings of digitalization, innovation, human resources, trust, and belief in technological progress, the Nordics may appear better equipped for

> the transition to a digital and greener future of work than most comparable countries. Yet, in several ways, the changes flowing from the digital shift are likely to challenge cornerstones of the Nordic labour and welfare models, built around the wage earner relationship, where the value of egalitarian distribution and power relations has been appreciated as a comparative advantage. If the trajectory of (radical) digital disruption materializes and middle-skill jobs – the stronghold of trade unions and collective agreements – are hollowed out, there is indeed a risk that the recent rise in inequality is amplified and that we "are going towards a more divided society" (Stiglitz 2018).

In several contributions to the future of work debate, the potentially divisive effects of digitalization and artificial intelligence referred above are assumed to be reinforced by the other megatrends so that rising inequality is singled out as an independent megatrend in itself (see World Economic Forum 2018). In this report, however, we regard rising inequality as a potential endogenous outcome rather than an exogenous given – that is, dependent on the political and institutional frameworks within which the future of work evolves. Contrary to the view that more inequality is inevitable in globalized economies, Barth and Moene (2012) have shown that the most globalized, open economies tend to have the smallest inequalities.

The impact of the megatrends on work is neither unidirectional nor independent of human agency. Sometimes they pull in opposing directions, some trends may prove weaker than expected, and some may even go in reverse. Further, the opportunities and threats they pose to jobs and working conditions depend on market conditions, the responses of economic and social actors, and the way they are filtered by institutions and policies varying across industries, regions, countries and model types. Therefore, the future of work is hardly pre-determined by technological or other megatrends. Their effects will be shaped by politics and institutions and are likely to evolve along divergent national trajectories and differ across industries and groups of employees.

European countries have developed a variety of labour and welfare models, of which the Nordic models have been viewed as distinct from the liberal labour markets and residual welfare states of the Anglo-Saxon countries, and the more state-regulated labour markets and occupation-based welfare systems of the continental countries. In the triangular Nordic model premised on interaction between markets, institutions, and politics, a precondition is that the actors are able to secure coordination and coherence between the basic policy areas or pillars: (1) responsible macro-economic policies, (2) coordinated, multi-tiered collective bargaining and labour relations; and (3) universal welfare states geared to promote skill formation and labour market participation (Dølvik *et al.* 2015). The interplay between market competition, solidaristic wage setting, participative company relations, and the welfare state's income security has been regarded as an important driver of industrial restructuring, innovation, and mobility. As Nordic trade unions have embraced technological change, competition in liberal product markets has spurred reallocation of labour and capital into the most productive firms (Erixon 2011), and active labour market policies have assured unions of the benefits of

productivity-oriented cooperation at workplace level – a typical Nordic example of "politics with markets" (Jørgensen *et al*. 2009).

Although the Nordics have been renowned for their flexible adjustment capacity (Katzenstein 1985), the past decades of labour market internationalization, occupational and technological change, high immigration, and financial unrest have shown that the Nordic resilience and adaptability cannot be taken for granted. The challenges emerging in the future of work will come on top of – and interact with – unresolved current problems with stagnant employment rates, integration and marginalization, union decline, erosion of workplace relations, rising household debt, and growing disparities. Without anticipating the results of the ensuing studies in the NFoW-project, it seems reasonable to suggest that among the preconditions for a successful Nordic passage into the future of work, the following three are likely to be central:

- Given the predicted occupational polarization and decline of middle-skilled jobs associated with further digitalization, huge efforts are likely to be required in occupational training and re-skilling to prevent growing skill-mismatches, wage gaps, and exclusion in the lower end of the labour market. Given that the majority of the workforce in the 2030s is already in work, better arrangements and capacity for life-long training seems particularly warranted. As educational systems are often poorly equipped to fulfill this task, new solutions may be needed. One possible way foreward may be that the social partners, supported by the state, could find new, inventive ways to resolve this issue, as exemplified by recent initiatives in Iceland and Denmark.
- Given the prospects of more non-standard work and fragmentation of employment relationships driven by digitalization and new business concepts, adjustments seem needed to align the systems of social insurance and labour protection to the needs of those falling outside the Nordic wage earner model. This is important to prevent new forms of marginalization and inequality – not least among the growing immigrant populations. A precondition is, however, that proper arrangements for distribution of the value added provided by use of novel technologies, including those enabling increasing returns to scale, are in place – at company level, nationally, and transnationally. This points to the need for maintenance and renewal of the redistributive function of the taxation systems.
- Given the restructuring foreseen during the leap into the carbon-free, digitalized economy of the future, a critical question is whether the social partners and the micro tier of the Nordic model still will be up to the task. With the potentially detrimental organizational consequences expected from further outsourcing and division of work into mini-jobs or "gigs" in digitalized, transnational production systems, it won't be easy for the collective actors to reverse the erosion of the Nordic model seen in several sectors. International experience suggests that such a turn-around requires support from the state in making organizing feasible and attractive. If the cooperative workplace labour relations wither, the energy and trust needed to engage in demanding and potentially risky processes of innovative adjustment might dwindle.

Whereas Nordic working lives have been privileged by their strong and adaptive institutions, they are now apparently entering a phase where their ability to master the emerging challenges increasingly will depend on the actors' capacity to foster *institutional innovation*. Be it in the areas of life-long learning, protection for new categories of workers, inclusion of groups with poor or no formal schooling or prevention of rising inequality and ensuring that all economic actors contribute to the common good, the preparations needed to become fit for the future of work will entail engagement in imaginative renewal and reconstruction of the institutions that we once inherited from the pioneers of the Nordic model.

1. Introduction

How will work and working life change in the future? Will new technologies destroy large numbers of jobs and propel joblessness or will rising productivity and value added spur creation of more, new and better jobs? Which kinds of work and skills will decline, and which will grow? How will the changes affect labour markets, work environments, working conditions, employment relationships, and the regulation of working life? Will the Nordic model become a casualty, an obstacle or a resource in the changing future of work? These are the kinds of questions the project "The Future of Work: Opportunities and Challenges for the Nordic Models" is commissioned to examine. In this initial report, we describe the main drivers and trends expected to shape the future of work, outline central features of the Nordic working life model, and conclude by pointing to the kinds of pressures for change and renewal the future of work may pose to the Nordic models.

1.1 Not an entirely new issue

Ever since wage labour emerged as the dominant form of work in the Western world under the industrial revolution in the 18th century, the gap between the actual conditions of work and its potential for creating better livelihoods, societal development and human emancipation has been a central issue in public debate. The misery and exploitation of the wage-earner masses during the early phases of industrialization eventually sparked class conflict and political struggles that changed our societies in profound ways. The "labour issue", the organization of work, and the distribution of its outcomes have – in the past and present – been constitutive of key institutions in our political economies and prompted strong scholarly engagement. Since Dickens and Marx described the lives of wage earners under the industrial revolution and placed their future prospects at the heart of the evolving social sciences, the successive transformations of work, production technology, and labour relations have caused heated political and scholarly debates about the ways to secure proper and just conditions. In the late 19th century, such debates spurred the establishment of labour parties, trade unions, and employer organizations, which became pivotal in shaping the institutions regulating industrial disputes and the worker and welfare rights that, in recent times, have been renowned as the Nordic model.

1.2 Multiple drivers influencing the future of work

There are a variety of factors that influence changes in working life – currently, in the future and in the past. Too often, debates about the future of work narrowly focus on changes in technology – e.g., today's focus on digitalization – while other important dynamics that already are at work and will continue influencing working life tend to be ignored. Examples could be demographic change – ageing and migration – and changes stemming from global warming and globalization. Likely to reinforce the recent widening of wage and income gaps, the impact of such "megatrends" on work is neither unidirectional nor independent of political agency. They often pull in divergent directions, some trends prove weaker than expected, and some even reverse. Moreover, the opportunities and threats these trends pose to jobs and working conditions depend on economic conditions, the responses of economic actors, and the ways they are filtered by institutions and policies, varying across industries, regions, countries and social model types. That is, the future of work is not pre-determined by technological or economic megatrends. Their effects will be shaped by human agency and are likely to evolve along divergent national trajectories and differ across industries and groups of employees.

1.3 A Nordic perspective on the future of work debate

The evolution of the Nordic model has been a success story, combining high levels of growth, productivity, education, and employment – also among women – with lower levels of inequality than any comparable models. Today, in the aftermath of the Great Recession, which caused record-high unemployment and severe welfare cuts throughout Europe, it cannot be taken for granted that this success will persist in the decades to come. In a context where migration, ageing, digitalization, climate change and globalization fuel trade conflicts and political unrest, the future viability of the Nordic model as we used to know it has been called into question. Yet, the actors in Nordic working life are used to change, and have always seen cooperation on technologic development, productivity, and restructuring as a necessary means to foster growth, better jobs and welfare.

The past couple of years have brought a frenzy of conferences, analyses, and media upshots about the future of work – often painting dramatic scenarios about the decimation of jobs and fragmentation of work. In June 2019, the 100th Anniversary Congress of the International Labour Organization (ILO) will debate the "Future of Work" on the basis of a report that will be launched in January 2019 by a global commission headed by the PM of South Africa, Cyril Ramaphosa, and the PM of Sweden, Stefan Löfven – both prominent former trade union leaders.[1] The preparatory

[1] Cyrill Ramaphosa was leader of COSATU, the umbrella organization for South African trade unions, during the years of transition; Stefan Löfven was leader of the Swedish IF Metall during the financial crisis when they struck a path-breaking "crisis agreement" with Teknikföretagen in 2009, rescuing jobs and sharing the burdens of the 2008 financial collapse.

reports from ILO are sober in style, but the message is challenging. Large political efforts in renewing employment regulation and tax systems, revitalizing social dialogue, and investing in occupational skills and life-long learning are encouraged. Without these investments, the risk is that growing shares of the global workforce will experience rising inequality, polarization, joblessness, exclusion, and precarious livelihoods (ILO 2018).

While the Nordic countries seem, in many respects, better equipped than most other countries to handle such challenges, they also appear vulnerable to some of the trends highlighted in the future of work debate. For example, advanced universal welfare states predominantly funded by taxes on wage labour are dependent on high employment ratios, jobs with decent remuneration, and limited wage dispersion to fund the transfer systems and make work pay. In a context of ageing and growing immigrant populations, it is clearly a tall order for the Nordic region to achieve employment ratios comparable to those of the currently best-performing Nordic countries, Iceland and Sweden.[2] Further, the financial unrest, high migration flows, technological change, and restructuring of the past decades have revealed cracks in the well-regulated Nordic working life models. The hallmarks of encompassing collective agreements, strong organizations, workplace partnerships, compressed, decent wages, and flexible adjustment capacity can clearly no longer be taken for granted.

1.4 The scope of the project

The purpose of this project on the Nordic future of work (NFoW) is threefold: first, to analyse how Nordic working lives and the Nordic models are likely to be affected by the envisaged transformations of work over the next 15–20 years; second, to examine the responses and policy approaches governments, social partners and business actors develop to address the changes they foresee; and third, to explore possible needs and trajectories for renewal of the Nordic work and welfare models in the decades to come.

The aim of the NFoW project is:

- First, to map the global drivers behind the changing future of work;
- Second, to study the consequences of digitalization, changes in contract forms, independent work, and new agents – such as platforms and crowd-workers – for employment, the labour market, skill requirements, work organization, health and safety, employment relations and equality; and
- Third, to analyse, in this view, the possible needs and tools for renewal of the Nordic health and safety regimes, labour law and employment and welfare regulations: that is, the viability and avenues for reform of the Nordic model as such.

[2] By 2017, the employment rate in Finland (i.e. the employed share of people of working age, 15–64) was almost 7 percentage points lower than in Sweden (77%), and, in Norway and Denmark, it was almost 3 percentage points lower. By comparison, Iceland (86%) was 9 percentage points ahead of Sweden.

The project is organized in seven pillars, addressing (i) The main drivers of change; (ii) Digitalization of traditional forms of work; (iii) Self-employed, independent and atypical work; (iv) New labour market agents; (v) Occupational health; (vi) Labour law and regulations; and the final report discussing (vii) The Nordic model and the future of work. To provide a knowledge base that can inform and stimulate action-oriented public debates here and now, we have chosen a medium-term time perspective: 15–20 years. This is sufficiently far ahead to help the actors escape from their everyday quandaries, while making the future near enough for them to realize that if they want to do anything about it, they'd best find out how and start today. With such a perspective, it is more important to have a rough idea of the direction in which things are moving than detailed information about what may or may not occur in the distant future. Cautioning against overly techno-optimistic or determinist perceptions of future developments and arresting "myths" and exaggerations may, in such a perspective, be more helpful for making wise choices than knowing all the latest details about artificial intelligence or robotics. The project will therefore seek to emphasize strategic factors and levers that can be subject to political or organized actor influence. What can these actors do to shape the broader frameworks and parameters influencing the future of work, within which the specific processes and outcomes of technological and other changes are likely to unfold?

1.5 The purpose of this initial report

This aim of this initial report is to describe the main external drivers and megatrends expected to influence the future of work. Further, in order to provide a common framework for discussing how the future of work may affect Nordic working lives specifically, we also outline the main distinctions and recent developments of the Nordic working life models. The report is the main output of the NFoW project's inception phase: *Pillar 1 – The main drivers of change*. As such, it is also meant to serve as a common frame of reference for the project's further contributions to developing knowledge, joint learning, public debates, experience exchange, and dialogue among stakeholders across the Nordic boundaries.

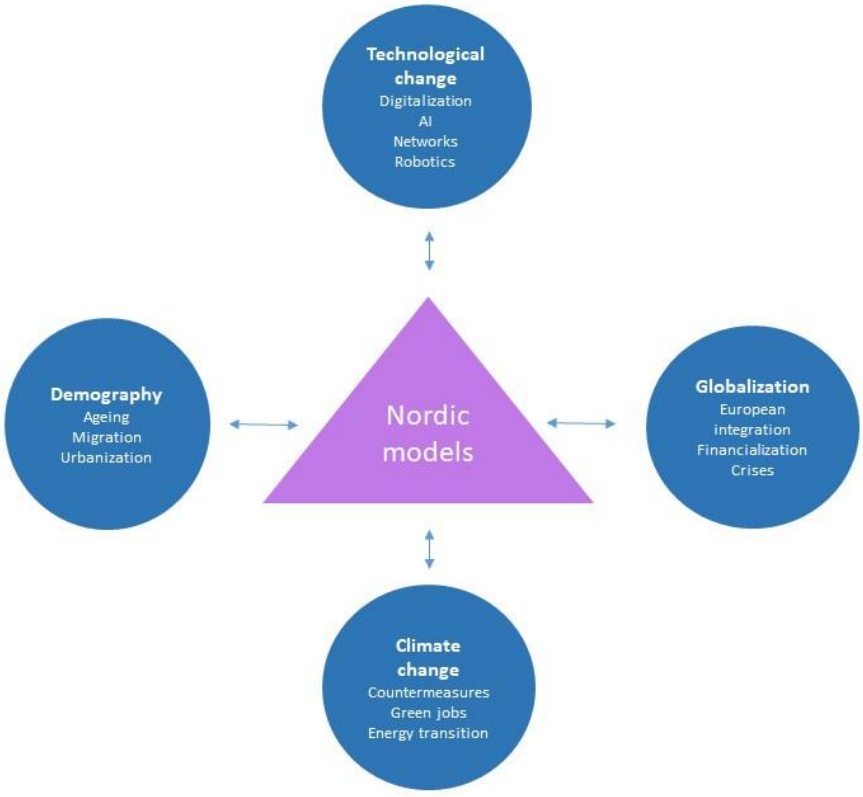
In the remainder of this report, Chapter 2 presents the main international drivers and megatrends expected to influence work in the future, according to the research literature. Chapter 3 looks into the impact of emerging technologies on employment and work. In Chapter 4 we describe the main traits and distinctions of the Nordic models, and reviews some of the working life changes that have occurred as a result of recent encounters with international trends of change. Chapter 5 provides a tentative overview of some of the challenges we believe the future of work may imply for the Nordic models and their traditional means of handling restructuring. Finally, Chapter 6 gives an overview of the structure, content and work tasks of the NFoW project from its start in late 2017 until its planned end in 2020.

2. The future of work: Main drivers and trends

Working life and labour markets are currently undergoing major processes of change. In the debates and literature surrounding the future of work, a certain consensus seems to be emerging regarding the main forces or drivers expected to influence future developments. Often labelled "global megatrends", these drivers are continuous and ongoing processes regarded as crucial for the development of working life in most modern economies. The ILO Global Commission on the future of work identifies four such megatrends: globalization, technology, demography, and climate change (ILO 2018).

The Nordics are at the forefront in adopting new technologies and are experiencing accelerating digitalization of work. In parallel, policy changes are rapidly being made to address ageing populations and increased migration, and also (increasingly) to combat and adjust to climate change. These megatrends – as well as related and underlying trends such as urbanization, European integration and financialization – will certainly impact the future of work and the Nordic models in the decades ahead (Figure 2.1), though the looming question is how. While globalization continues to propel the restructuring of world production and trade patterns, sweeping demographic change and (efforts to curb) global warming will engender major shifts in labour supply, care burdens and means of production. Adding to these long-term trends, new digital technologies with the potential to revolutionize the ways we work are already changing work organizations, the demand for skills and labour markets.

Figure 1.1: Main drivers and megatrends



The aim of this chapter is to provide an overview of the main global trends assumed to influence working life in the decades ahead. The possible implications of these megatrends for the functioning of the Nordic models are discussed in Chapter 4.

2.1 Powerful demographic waves: Ageing and migration

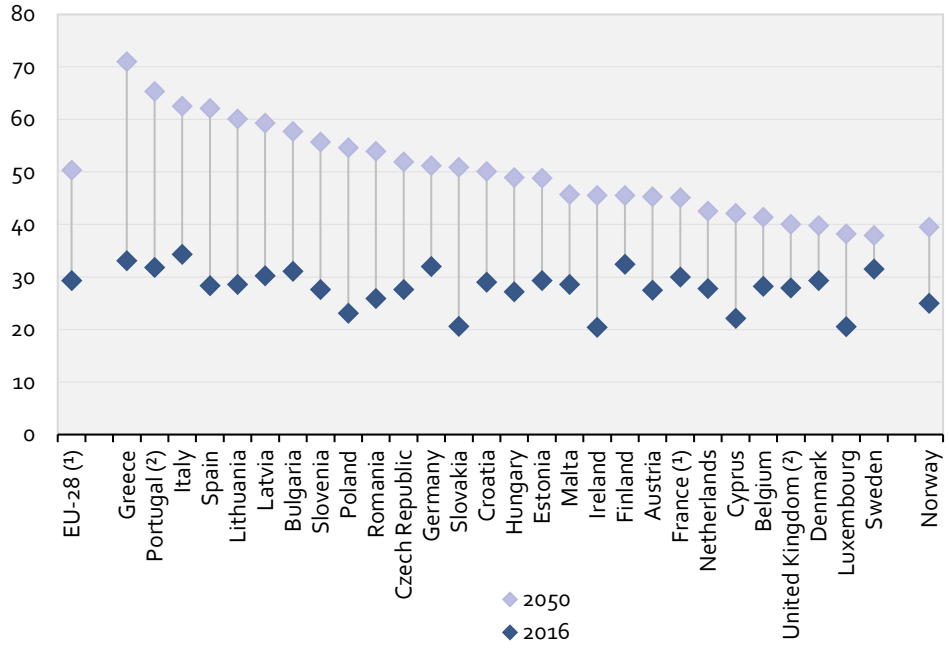
Demographic changes are highly predictable – except for migration trends – and will, according to all estimates, entail a drastic decline in the working-age population share and an even stronger rise in the share of elderly citizens in Europe in the coming decades. Eurostat projections[3] indicate that the EU-28 working-age population will fall from 65% of the population in 2015 to 55% in 2080. The main drop will occur before 2050 (Eurostat 2018). Germany alone will see a decline of 9 million between 2016 and 2040, a 22% drop. While the share of children will change only modestly, the share and number of the elderly population (65+) in Europe will rise dramatically, from 98 million

[3] Main scenario, based on fertility and death rates evolving in line with observed trends in recent decades, and medium-range assumptions regarding net immigration (Eurostat 2018, Demographic changes–profile of the population).

today to 151 million in 2080 – that is, from 19% to 29% of the population, again mostly before 2050. Most of this increase will come among the very old (80+).

As a consequence, the EU *old-age dependency ratio* – the number of elderly divided by the number of people of working age – is projected to increase from 29% in 2016 to 50% in 2050.

Figure 2.2: Old-age dependency ratio in Europe 2016–2050



Source: Eurostat 2018.

Such sweeping changes are expected to create shortages of skills and labour in most European countries, and to increase the resources and labour needed to care for the elderly. Among the countries most affected will be Poland and the Baltic states, where rapid ageing comes with the drastic shrinking of the entire population and labour force. The prospects for future Nordic labour import from these countries thus appears grim, at the same time as competition for labour in Europe is likely to increase. The demographic dynamics in the Nordic region will pull in the same direction as in other European countries, but will be fortunately be markedly milder.[4]

Simultaneously, the *world population* is projected to grow from circa 7 billion in 2015 to almost 10 billion in 2050. While the population in Asia will increase modestly by around 850 million to 5.25 billion in 2050 – of which Western Asia (including the Middle East) accounts for circa 140 million of the increase – more than half of world population growth will occur in *Africa* (UN 2017). The African population will more than double from 1.2 billion in 2015 to 2.5 billion in 2050 (UN 2018). Due to the young age of the African

[4] As elaborated in Chapter 4, this is, except for Finland, due to previously higher fertility rates and somewhat younger populations, and – especially in Sweden and Norway – partly also to sizeable, younger immigrant populations.

population – with 3 out of 5 below 25 years of age in 2015 – the working-age population will soar from 425 million in 2015 to over 1 billion in 2050, and dependency ratios will fall. This represents a huge potential for economic growth accompanied by a surge in migration within Africa (ibid.). And, if job growth fails to match the soaring labour supply, the pressures for outward migration are likely to amplify as well[5] – possibly reinforced by detrimental global warming effects in the Sub-Saharan belt in particular.

2.1.1 Persistent migratory pressures

The world *population of migrants* had increased to 244 million by 2015 – up from 172 million in 2000 and corresponding to 3.3% of the global population (IOM 2018). The immigrant share of the OECD population has almost doubled, from 3.9% in 2000 to 7.1% in 2015. Seventy-seven million of the world's migrants, roughly 28%, have settled in Europe. Among the 150 million labour migrants around the world, 3/4 have moved to high-income countries. Approximately one-tenth of the global migrant population – or 22.5 million people – are categorized as refugees, and 2.8 million as asylum seekers (IOM 2018).

In the emerging context of the strong growth of working-age populations in developing countries (Africa in particular), shrinking and rapidly ageing European populations, and a huge gap in living conditions and job opportunities across the North–South divide, there will be strong economic push and pull factors operating towards increased migration to Europe. Global warming is also likely to indirectly amplify the push factors by contributing to increased political instability and conflict. As witnessed in the wake of the 2015 immigration wave to Europe, however, the extent to which migratory pressures materialize in the actual influx of people depends on the border control and immigration policies enacted at EU- and nation-state levels in Europe. These are presently subject to contested deliberation and political re-negotiation in most European capitals.

Any projections of future immigration entail high uncertainty; while actual inflows in the past decades have tended to exceed mainstream forecasts, and the IOM (2018) predicts further rises in international migration, the marked shift towards more restrictive policy stances in Europe introduces a further element of uncertainty regarding European immigration. The assumptions in the European demographic projections referred to above are, however, based on cautious premises regarding immigration, implying a gradual decline in annual EU net immigration from circa 1.5 million in 2016 to 1.16 million in 2030 (European Commission 2017). In the Nordic cases, this scenario presumes a reduction in net immigration to Sweden from 104,000 in 2016 to 57,000 in 2030, and only modest reductions from 2016 in the other Nordic countries.

Irrespective of whether the EU/EEA countries succeed in keeping immigration at such moderate levels, the take-home lesson from the projections cited above is that the

[5] As an illustration, the Nigerian population alone will grow from 182 million to 398 million in this period. A recent survey among adult Nigerians (Africanbarometer Dispatch no. 23, 27 August 2018) indicates that 35% of the adult population has considered emigrating. 21% of those considering emigrating wanted to go to Europe and 32% to North America.

European population will be rapidly ageing in the next 15–20 years, while a shrinking European labour force will have to carry increased burdens in handling the rising old-age dependency ratios. This can be obtained through higher taxation, more private spending on elderly care and/or faster productivity growth enhanced by new technology. Simultaneously, Europe's immigrant populations will continue to rise – even if immigration is kept at low levels. This implies that, *ceteris paribus*, every bit of progress in integrating newly arrived immigrants in the coming years represents a multiple societal gain: that is, reduced welfare expenditure and dependency ratios, increased production and revenues, and, in all likelihood, improved lives for the immigrants, their children, and fellow citizens (NOU 2017:2). Indeed, the same pertains to the high shares of native citizens that have been excluded from or failed to gain foothold in European working life in the tumultuous past decades.

2.2 Climate change and countermeasures

Societal efforts to minimize carbon emissions and curb global warming are bound to attain increasing salience in future working life. Climate change and its effects – including soil degradation, atmospheric and water pollution and the loss of biodiversity – are likely to destroy jobs and livelihoods, most severely affecting already vulnerable groups and thus also likely provoking migration waves from the most affected areas. Changes in temperature, rainfall and sea levels, and more frequent extremes such as storms, floods and droughts will alter the conditions of production and work in many areas. Necessary countermeasures are likely to include major economic investments and adjustments in the energy sector, physical infrastructure, urban and city planning, construction, capacities for handling emergencies and changes in the agricultural sector to ensure resilience, productivity and sustainability.

Beyond the immediate consequences of climate changes, the necessary transition to a greener economy will affect many industries and employment therein, while new job and production opportunities will open up in other sectors. Meeting emission reduction targets will require significant restructuring efforts; branches dependent on non-renewable energy will face rising costs and job losses, while energy-intensive production is likely to face higher input prices and levies due to the adoption of greener economic and tax policies (France Strategie 2015). On the other hand, job growth is expected in industries related to the generation of renewable energy and carbon-free transport, while more eco-friendly retail, services, low-emission production and other "green" occupations that contribute to preserving or restoring environmental quality are expected to expand as consumer demand changes. The transition to renewable energy may thus present opportunities in countries that take a leading role, presenting considerable opportunities for growth and innovation in industries and companies able to respond to the demand for clean and renewable products.

The net employment effects of this transformation are largely expected to be positive, but effects will vary between countries, depending on their energy sources and production patterns and vulnerability to environmental consequences (ILO 2017;

Esposito *et al.* 2017). For instance, Norwegian working life is bound to undergo major restructuring when its petroleum-related activities are phased out. ILO estimates that climate change responses may create net employment gains of between 0.5% and 2% globally by 2030 (ILO 2018). Existing jobs will also need to be adapted to the requirements of a green economy. This will prompt adjustments in workplace environments and practices to adopt more energy efficient product design, production and organization, as well as changing skills and job profiles.

The foreseen green shift will influence the relative prices of means of production, further bound to instigate shifts in the economic division of labour, comparative advantages and global trade patterns, and hence international governance regimes.

2.3 Globalization: Accelerating or decelerating?

Technological shifts in transport and communication technology have, from the emergence of steam engines and the telegraph to social media and virtual reality, continuously been making the world "smaller" and more interconnected.

The long-term trend towards liberalization of international trade and foreign direct investment has benefitted small, open industrialized economies, especially those that have developed wage coordination, training and welfare systems, enhancing competitiveness while protecting their workforces against the vicissitudes of volatile world markets (Rodrik 1997; Ketels 2010; Barth and Moene 2013). The past decades' globalization of financial markets have had more ambiguous effects, however, as mirrored in the financial instability culminating in the Great Recession following the Lehman Brothers collapse on 9/11 2008. Finland, Norway and Sweden had already experienced the grave, long-lasting employment consequences of such financial crunches when their homemade bubbles burst around 1990. Denmark and Iceland went through comparable, though milder, setbacks during the recent financial crisis (Dølvik, Andersen and Vartiainen 2017; Òlafsson 2018). Thanks to their solid public finances and social systems, the Nordic economies weathered and recovered from these crises better than most other Western countries. The rise in private debt during the past decade of low interest rates nevertheless gives reason for concern (OECD 2018).

The Nordic economies and working lives have successfully benefitted from globalization, although there have been adverse effects in parts of the Nordic labour markets. In the 1970–80s, large numbers of Nordic jobs in the production of shipyards, shoes and textiles were offshored. The restructuring of international production and delivery chains has, in recent decades, implied salient relocation of manual jobs in, for example, manufacturing, banking, finance and shipping, along with growth in knowledge-intensive white-collar jobs at home. Overall, however, the Nordic models have generally shown remarkable resilience and adjustment capacity in the face of globalization and volatile internationalized markets (Sapir 2005; Barth and Moene 2013; Dølvik *et al.* 2017).

A central element of the Nordic capacity to weather instability during times of international upheaval has traditionally been their macro-economic policy regimes, where sound public finances have enabled countercyclical stabilization policies and let

tax and transfer stabilizers cushion the swings (Andersen and Holden 2010). Further, the welfare states have played a central role in re-channelling demand towards labour by using revenues from prosperous industries on jobs in public services and transfers to low-income groups with high consumption propensity. While globalization has accentuated the importance of preserving such capacity, it can constrain that capacity in several ways: for instance, through increased tax competition and enhanced opportunities for "regime shopping", as well as through weakening of monetary policy tools and of the employment multiplier effects of fiscal stimulus. The impact of such constraints are especially felt in countries that have ceded autonomy in monetary policies and must rely solely on fiscal and wage policies in handling economic shocks.

In the interconnected, transnational production and markets of the 21th century, the governance capacity of national institutions has become increasingly contingent on international rules. Many of the changes currently affecting working life are hard to influence by national policies alone, and the collective action problems entailed in resolving them are daunting; just think of the quandaries associated with regulating international migration, low-wage competition, CO_2 emissions, financial transactions, and taxation of global mega-corporations.

The only forum for working life norm-setting on a global scale is the UN's International Labour Organization (ILO), where governments, employers and trade unions meet to oversee the ILO conventions of fundamental rights at work, to exert pressure on governments to ratify and respect these rights, and to influence policy-makers to promote employment and decent work. Although the ILO conventions represent an important source of international labour law, ILO's immense scope, consensual decision-making, and limited enforcement capacity means that the most salient role of ILO in our region is probably as agenda-setter and forum for policy deliberation. The ILO Global Commission on the Future of Work is a case in point.

In Europe, the EU is the only transnational institution with the capacity to enact working life rules that are binding for member states, companies and citizens. Since the 1980s, the member states have gradually delegated regulative power to the EU institutions in areas such as environmental policies, competition law, social security coordination and stipulating product standards. As to worker's rights, the EU mandate is modest, but enactment of a range of directives has secured a floor of minimum labour and social rights under the pan-European labour market. This means that working life policies in the Nordic countries have become part of a two-tiered regulatory system, where the intersections between the national and European tiers from time to time become subject to conflict.[6] As far as digitalization of work is concerned, the EU level is attaining increased importance. The European Commission's Digital Single Market strategy, EU regulation securing digital users' ownership of their personal data (GDPR) and recent interventions to make Google and Apple pay tens of billions USD in taxes to Ireland – along with its plans to launch a new 3% tax on the revenues of the tech giants

[6] Salient illustrations are the 2007 Laval and Viking verdicts where the ECJ ruled that the single market's four freedoms curtailed how far national trade unions could go in launching (nationally lawful) industrial action against foreign companies (Evju and Novitz 2014; Dølvik and Visser 2009).

and other online services – underscore the need for supranational institutions advancing the collective good in instances where nation-state authorities lack means and power. Legal decisions also impact national policies directly, such as the recent European Court of Justice (ECJ) case where Spanish trade unions sued Uber for breaching Spanish taxi regulations (Case C-434/15) and the ECJ ruled that Uber was obliged to follow national transportation legislation.[7]

Compared to developments in the 1990s and early 2000s, when China, Russia, India and other emerging economies rapidly gained global market shares, the pace of economic globalization may now seem to lose momentum. The rising power of these economies – aided by their adoption of advanced technologies – is challenging the Western leadership both in global value chains and politics, making the international system increasingly multipolar. Whether the most salient effect for Western and Nordic businesses will be tougher competition higher up in the value chains or expanding markets for their exports remains to be seen (Freeman 2013; Dølvik 2013), but will depend on their ability to provide the innovative products in demand by those driving the digital and green transitions.

While the preceding phase of globalization was enhanced by the political liberalization of global trade and investment regimes, the recent backlashes against global and European economic integration have demonstrated that a further deepening of globalization is neither inevitable nor irreversible. For the Nordic economies, which are highly dependent on free and predictable international economic exchange, a reversal to protectionism and international trade conflicts would clearly be harmful. It is doubtful, however, that such a political backlash will reverse the market-driven dynamics of globalization (Milanovic 2018).

The rapid reduction in communication and transport costs has not only coupled markets for goods and services around the globe, but has led to accelerating dissemination of technology and exchange of (big) data, information, and knowledge-based tasks on a global scale. A growing number of services can be provided online without regard to geographical constraints, enabling both accelerated innovation and increased international competition. Combined with the ongoing digitalization of production and the leap in higher education in developing countries, these dynamics may add momentum to the already ongoing changes in global value chains – away from patterns where production was increasingly concentrated in developing countries while knowledge-based activities remained in Western countries. Thus, a possible scenario is that we will see further twists of globalization in knowledge-intensive production and online service sectors, whereas the offshoring of traditionally labour-intensive production may slow. In some areas, re-shoring to high-cost Western countries by means of advances in robotics, automation, additive manufacturing etc. is even foreseen. At the same time, the rise of oligopolist digital mega-corporations may alter the relations of trade and power in unforeseen ways.

[7] https://curia.europa.eu/jcms/upload/docs/application/pdf/2017-12/cp170136en.pdf

2.4 Technological change

The rapid and seemingly accelerating technological progress in areas such as computing, robotics, artificial intelligence and biotechnology – argued by many to be propelling a fourth industrial revolution (World Economic Forum 2016; Brynjolfsson and McAfee 2014; Schwab 2017) – is increasingly framing debates on the future of work. While technological progress has been a permanent engine of change in labour markets throughout recent history, the expanding possibilities of digital technology may enable rationalization, automation and reorganization on an unprecedented scale. Increased interconnectedness and computerization of cognitive as well as manual routine tasks, along with digital platforms matching tasks and labour in new ways, is set to shape the future of work. This development is driven by an exponential increase in computing power coupled with ever improving algorithms, networks and big data, often referred to under the umbrella concept of "digitalization".

For working life, the most significant development may be digital tools enabling an expanding number of routine tasks – including seemingly complex cognitive tasks, as long as they can be codified – to be automated or augmented, using computers. In addition to revolutionizing the speed of communication and access to information, computing technology is set to impact productivity and work organization in most industries and services. The most dramatic forecasts have warned that large parts of the workforce may be replaced by computerization and herald a technological transformation of similar or greater proportions than that seen during the industrial revolution of the 19th century (Frey and Osborne 2017; Brynjolfsson and McAfee 2014; 2017). While such predictions are contested and historical experience suggests that technological advancements tend to create more jobs than they destroy, there is a growing consensus that inequality and skill gaps are likely to widen as technology alters the demand for labour and skills. Whether digitalization will lead to polarization or an overall upgrading of the occupational structure depends also on institutional factors and political responses, especially regarding education and reskilling.

If successful, emerging digital technologies could contribute significantly to better services, work environments, quality of work and productivity growth. Not limited to robots and rationalization of manufacturing, productivity gains are foreseen in most sectors of the economy and could prove disruptive to industries as diverse as agriculture, transport, media, health care, finance and many public services. Advances in robotics and additive manufacturing (3D printing) may enable some re-shoring of manufacturing to Western countries, though it seems unlikely to bring back substantive numbers of manual jobs in manufacturing.

Digitalization also promises greater flexibility in staffing and work organization, notably through digital platforms matching local labour supply and demand, and online crowd-work matching tasks and workers regardless of geographical constraints. This allows jobs to be de-bundled into smaller tasks, potentially creating flexibility for workers wanting to freelance or top up their incomes, while providing companies with easier access to external labour "on

demand". Digital platform work and non-standard employment simultaneously challenge current regulation of employment and work environments in ways that can be disruptive in parts of the labour markets.

2.5 The megatrends interact and institutions still matter

The global megatrends identified above – technology, demography, globalization and climate change – will undoubtedly influence the trajectories of labour markets and the future of work worldwide. The megatrends are nevertheless largely a continuation of familiar dynamics, and the changes they bring about will not necessarily be of unprecedented nature or scale. Whereas populations are ageing slowly but surely, globalization seems increasingly contested and, to some extent reversible, subject to geopolitical conditions. Nevertheless, the megatrends identified here will interact with, and possibly reinforce, the challenges that Nordic working lives are already struggling with after the past decades of financial unrest, population movements, technological renewal and ongoing restructuring.

Globalization, ageing, and deindustrialization of employment are all long-term historical trends. In contrast, drivers of the digital transformation and the shift to a greener economy may set in motion more disruptive transformations of the content, organization and governance of work. In particular, emerging technologies with the potential to fundamentally – and rapidly – change labour markets and the ways we work may present qualitatively new challenges to the organization of work and the Nordic models. As technological change is a central premise of current debates surrounding the future of work debate, and underpins the main research questions of this project, the following chapter details the driving forces of the ongoing technological shifts and their potential impact on work and employment.

To understand how work and societies will be affected by these megatrends, we need to take into account not only that they interact, but also how they affect and are shaped by differing institutional settings. In Chapter 4 and 5, we thus look at how these megatrends may influence the Nordic models. The Nordic countries seem well positioned to tackle upcoming challenges associated with these trends, though ageing, migration, global warming and changing trade patterns may exert pressures on the Nordic models. The emerging digital technologies may reinforce some problematic trends – such as difficulties with integrating migrants in the labour market and growing inequality – while being key to tackling others, such as caring for the elderly and curbing emissions to limit climate change.

3. The impact of emerging technologies on employment and work

The impact of new digital technologies on employment, production processes, work organization, employment and labour markets is expected to be far-reaching. New technological possibilities and combinations of them can bring paradigmatic change in products and the entire process related to its production (Arthur 2009). This will have consequences for the working conditions of individual workers and for employment at the workplace level, and in turn for structures that regulate the relationship between employers and workers. New technology is thus expected to bring profound changes concerning the types of jobs that will be needed, as well as where, how, and by whom these jobs will be done. This has sparked concern about the risk of growing job insecurity, inequality and potential job losses.

This chapter first describes the nature and promise of key emerging technologies, illustrating why they have instigated debate about the future of work. Second, we turn to the potential consequences for labour market structure, wages, inequality and work organization.

3.1 Driving forces and emerging technologies

Increasing computing power, interconnectedness and data access is driving the development of technologies positioned to change the future of work. Currently emerging technologies (see box 2.1) enabled or augmented by this development include machine learning and artificial intelligence, smart robotics, the Internet of things (IoT), additive manufacturing, autonomous vehicles, big data, blockchain and related fintech and augmented or virtual reality. Advanced biotechnology also benefits from such inventions.

A driving force behind these developments is the rapid evolution of computers, specifically the exponential increase in computing power expressed in Moore's law – that is, that the number of transistors in a dense integrated circuit doubles about every two years. Though some experts expect a slower pace in the years ahead, this observation has proved to be roughly accurate for five decades, as various innovations and breakthroughs have advanced integrated circuit technology by more than seven orders of magnitude. This has enabled processing speeds to increase and the price of computing power to fall correspondingly, vastly expanding the use cases and efficiency of computers (Brock and Moore 2006). The software needed to harness this power is also becoming increasingly

sophisticated, resource intensive and crucial for a competitive advantage. Marc Andreessen's much-quoted statement that "software is eating the world"[8] seems more self-evident than ever and extends far beyond Google, Uber and Airbnb.

Increased interconnectedness in the form of improved telecommunication, the Internet and various wireless technologies (such as 5G, WLAN, Bluetooth, NFC and RFID) is enabling networks of unprecedented speed and scale. Aside from providing revolutionary channels of communication and entertainment, this also expands the possible applications, efficiency and power of computers through technologies such as cloud computing, cyber-physical systems and the Internet of things. The ability to analyse rapidly expanding amounts of (big) data is becoming increasingly important to business models across industries. It is also crucial in the development of new technologies, from advancing artificial intelligence through deep learning and natural language processing, to improving predictive maintenance or optimizing DNA analysis.

Introduction of technologies expected to bring about transformations in production and the world of work are often referred to under the concept of digitalization and/or the heading of Industry 4.0. Of particular significance is artificial intelligence (AI), which some predict will have a much larger impact in the coming decades than digitalization and IT have had over the past two decades (Makridakis 2017). Advanced robots, networked machines and machine learning will be combined to generate new products and new ways of producing goods and services. This includes computer software able to understand, translate and use natural languages, robots able to see and perform an array of intelligent functions, self-driving vehicles and a host of other capabilities. An overview of emerging technologies considered to be game-changing, and frequently referred to in the literature on the future of work (cf. Balliester and Elsheikhi 2018; Eurofound 2018a; WEF 2018; Teknologirådet 2018), is presented in Table 3.1.

Table 3.1: Digitalization for dummies – a lay reader's brief explanation of main digitalization concepts

Enabling technology	Key aspects
Artificial intelligence (AI) and machine learning	Artificial intelligence refers to an area of computer science that enables a device to perceive its environment and take actions that maximize its chance of successfully achieving set goals. Capabilities generally classified as AI include successfully understanding human speech, competing at the highest level in strategic game systems (e.g. chess, Go, poker), autonomously operating cars, and intelligent routing in content delivery networks and simulations. Advances in machine learning, particularly deep learning using neural networks and natural language processing, is increasingly enabling computers to learn from experience, adjust to new inputs and perform human-like tasks. AI is expected by many observers to be the most transformative technology in existence, partly because it can substitute human labour by automating routine tasks – both cognitive and manual. In the long run, AI will be able to substitute, supplement and/or amplify practically all mental tasks (Makridakis 2017; Teknologirådet 2018).
Smart robotics	Robots using sensors, high-level and dynamic programming, and AI/machine learning can perform "smarter" tasks that require more flexibility and accuracy than those of traditional robots. Smart industrial robots may for example be able to handle and move delicate products, adopt to unpredictable environments and collaborate with humans. Advanced industrial robots are equipped with functionality with less-structured applications, such as sensors detecting potential collisions, and halting or performing a programmed motion with very limited lag.

[8] Andreessen, Marc. "Why Software is Eating the World". *The Wall Street Journal*, 20 August 2011.

Enabling technology	Key aspects
Big data	"Big data" is the study and application of data sets that are so big, complex and often unstructured that traditional data-processing application software is inadequate. It usually refers to the use of predictive analytics, user behaviour analytics, or certain other advanced methods to extract value from data. Such data is generated both by human users online and increasingly by sensors and cyber-physical systems. Effectively leveraging such data requires advanced analytical tools and computing power. Labour-saving use cases include improvements in customer profiling, supply planning and product quality, as well as predictive manufacturing with near-zero downtime. Predictive analysis and user profiling is also key to many digital platforms companies, such as Uber.
Internet of things (IoT)	Enabled by the reduced cost and energy requirements of connected sensors and the development of 5G networks, the Internet of things describes networks of physical devices embedded with electronics, software, sensors, actuators and connectivity that enable them to connect and exchange data. IoT is a central part of Industry 4.0, which will make use of sensors e.g. in the manufacturing industry to create cyber-physical systems in which information collected from the sensors is fed, through the Internet, to computers to gather data about the production process and to analyse these data with unprecedented granularity. In advanced cyber-physical systems, a whole factory can be digitally mapped and enabled using such sensors. Not limited to manufacturing, IoT systems can, for example, be applied to agricultural processes, with sophisticated sensors embedded in fields, waterways and irrigation systems that connect with machine-learning systems set to maximize production in an environmentally friendly manner, requiring little human labour (Eurofound 2018b; Clark 2017; Fraser and Charlebois 2016).
Autonomous vehicles	Combining a variety of sensory data to perceive their surroundings, including radar, laser light, GPS, odometry and computer vision, autonomous vehicles are capable of sensing their environment and navigating without human input. Potential benefits include increased mobility, safety, traffic efficiency and reduced freight costs, and enabling services such as automated home deliveries and integration with public transportation through systems offering mobility as a service (MaaS). The introduction of autonomous driving systems is likely to overlap with the transition to battery electric vehicles. Autonomous cars are currently at prototype and testing stages, with test fleets available to regular customers in some locations. A number of major tech and automotive companies aim to introduce fully autonomous cars to market between 2020 and 2025, and full societal penetration has been forecast for as early as 2026 (Estevadeordal *et al.* 2017). In closed environments such as warehouses, autonomous trucks and carrier robots are currently operational. Delivery and passenger drones are currently in prototype and testing stages, as are autonomous ships. Autonomous vehicles are likely to impact labour markets primarily by substituting large numbers of drivers and operators.
Additive manufacturing	Additive manufacturing, often referred to as 3D printing, is a technique using the super-imposition of successive layers to build a product. Products can thus be digitally modelled before being physically generated. The "revolution is … the ability to turn data into things and things into data" (Gershenfeld 2012). Additive manufacturing enables unparalleled opportunities for prototyping, new shapes and geometries, and short production series, and can significantly add to the precision and flexibility of manufacturing. It also offers promise in moving production closer to end users, especially as cost comes down. Additive manufacturing is currently used primarily in high-tech and high-cost scenarios such as prosthetics manufacturing and in automotive and aerospace industries. The potential of the global additive manufacturing industry has been estimated to as much as €423 billion (Manyika *et al.* 2013) but has not yet matured much beyond the prototyping and testing stages (Eurofound 2018a: 6). While the hype around additive manufacturing is receding, the technology is advancing and cost-effective industrial scale metal printers are being developed with the intention of mass production around 2020.[9]
Fintech & blockchain	Blockchain and related distributed ledger technologies are currently undergirds of crypto-currencies, but have a variety of potential uses. A blockchain is a distributed register to store static records and dynamic transaction data without central coordination, using a consensus-based mechanism to monitor the validity of transactions. This technology might have a far-reaching impact on the world of work since it is cheap, secure, and data-based (Finextra 2016). Some commentators argue that blockchain algorithms will markedly restructure the financial sector and replace traditional jobs in areas such as accountancy, banking, translation and legal assistance (McKinsey & Company 2016).

[9] One player in this development is printer giant HP, planning to deliver its sub-USD 400,000 Metal Jet commercial 3D printers to customers in 2020.

Enabling technology	Key aspects
Biotechnology	Modern biotechnology is based on recent scientific insights into the specific mechanisms of biological processes within living organisms (for instance, through systems genomics and metabolomics research). These are used to design processes in industry using yeasts, bacteria, fungi and enzymes to produce biomaterials and biofuels, as well as to increase yield and resistance in agriculture. Advances in genome-editing techniques such as CRISPR and the increasing standardization of bioengineering components and techniques is posited to increase the pace of development and the range of real-world applications in the coming years (National Academy of Sciences 2017).

3.2 Labour market consequences: Disruptive break or continuous change?

Technological advances enable new ways of producing and delivering goods and services. To what extent such shifts in productive forces will destroy and create jobs, transform skill demands, work environments, and the relations of production and employment is a more open question. This section presents some of the main strands and arguments in the debate on how new digital technologies will impact the number of jobs, occupational structure, company and market structures, and forms of employment.

3.2.1 Job loss and job creation

Much attention has centred on the extent to which existing jobs are threatened by new technologies, and how this will affect the number of jobs. Claims that large segments of the workforce are susceptible to being replaced by computers have been widely cited, although recent research has criticized and nuanced such predictions. The methodology and the assumed speed of innovation and restructuring in particular have been questioned, and the potential for job creation and productivity growth has been further elaborated. While the prospect of technology-driven unemployment is highly contested, there seems to be an emerging consensus that changing skill requirements and adjustment pressure resulting from technological shifts could create tumultuous restructuring processes.

Concerns about machines that replace employees and cause alienation and deskilling have been recurrent among economists and social scientists (Braverman 1974; Gorz 1984; Rifkin 1995). With such concerns intensifying over the last decade or so, it is pertinent to recall that paradigmatic technological shifts have come in ebbs and flows since before the first industrial revolution in the 18th century. Dire predictions have always been more dramatic than the following real world consequences. In essence, the past centuries of technological progress have not made human labour obsolete: on the contrary, while technology has eliminated many jobs (and entire occupations), more jobs in other areas have been regularly created due to productivity-driven increases in purchasing power for consumers and businesses. As innovation spurs new products and allows workers and firms to produce more with the same input, wages go up, prices go down, and demand increases, in turn generating more jobs –

some in new occupations, but often more in existing ones. Based on this insight, Atkinson and Wu (2017) argue not only that fears of technologically-driven unemployment are overblown, but that occupational churn and the share of jobs lost to technology in recent years is actually at a historic low. In a similar vein, it has been argued that innovation has already peaked (Gordon 2012). Notably, however, many observers claim that this time will be different, citing the abovementioned technologies and their disrupting effects on the complementarity between production volume and the input of human labour – thus diminishing the labour share of generated incomes.

In particular, artificial intelligence (AI) and automation challenge routine jobs (Marcolin *et al.* 2016). Not only will manual routine tasks continue to be automated, but jobs consisting of cognitive tasks that until recently were considered non-automatable are now at risk. As Brynjolfsson and McAfee (2014) suggest in their seminal book, the technological change we are experiencing in this "second machine age" is not only displacing some specific types of jobs, but will likely lead to a massive transformation of the labour market. Occupations involving mainly routine tasks are deemed most at risk.

A much-cited estimate based on the characteristic tasks of each occupation, suggested that 47% of jobs in the United States are at risk of being substituted by computers or algorithms within the next 10 to 20 years (Frey and Osborne 2017, first published 2013). This methodology has also been applied on Nordic labour market data with comparable results (Pajarinen *et al.* 2015). A McKinsey estimate purports that globally, current technology could automate 45% of the activities people are paid to perform and that about 60% of all occupations could see 30% or more of their constituent activities automated of work tasks (Chui *et al.* 2015). The automation of transportation alone, enabled by autonomous vehicles, could cause as much as 13% of the economically active global population to lose their jobs, according to Estevadeordal *et al.* (2017).

Critics of such alarming forecasts have argued that, besides the fact that assessments of whether a given task is automatable tend to be non-transparent and uncertain, whole occupations are unlikely to be substituted as there is great variability in the tasks within each occupation. Automation can also be costly and may not happen quickly, despite being technically feasible (Autor and Handel 2013; Bye and Næsheim 2016; Acemoglu and Restrepo 2016; Borland and Coelli 2017). Importantly, job losses are likely to be lower than the estimated potential as technical, economic, and social factors can act as barriers to adoption. Additionally, the occupation-focused methodology pioneered by Frey and Osborne (2017) disregards the fact that workers holding jobs in the same occupation often do not perform the same tasks because their work is organized differently – some requiring more face-to-face interaction or autonomy, for example. Thus, we should not expect that entire occupations will disappear, though many tasks will be automated.

A more nuanced approach to analysing the number of jobs at risk is to study the task content of individual jobs instead of the average task content of all jobs in each occupation. This results in much lower figures for the share of jobs potentially at risk of automation. A study commissioned by the OECD – which largely applies the method used by Frey and Osborne (2017), but uses workers' reports of the tasks involved in their job from the OECD's Survey of Adult Skills (PIAAC) – estimates that, on average, just

9% of jobs are at a high risk of being automated (Arntz *et al.* 2016). McKinsey & Company similarly estimates that automation could replace 45% of activities currently undertaken by humans, but only 5% of full jobs could be totally substituted by technology (Chui *et al.* 2015). In a later study, McKinsey & Company (Bughin *et al.* 2017) suggests that net employment effects in "digital forerunner" countries in Northern Europe will be minimal or even positive.

Relatively few studies estimate potential job growth driven by new technology (see Balliester and Elsheikhi 2018). Net employment effects are notoriously hard to predict, as one must not only account for technology-driven job creation in terms of new tasks and occupations, but also second-order effects driven by productivity gains that propel growth in aggregate demand through reinvestment and/or wages. Furthermore, unlocking the potential for job growth may require new markets to be developed and regulated, particularly in the green economy, care and personal services sectors or an augmented public sector (ILO 2017a). McKinsey Global Institute, analysing various scenarios on the net impact of automation on future labour demand, estimates that there will be enough work to maintain full employment in the long term (Manyika *et al.* 2017). A more medium-term oriented study by the World Economic Forum (2018) forecasts that by 2025, machines will perform more work tasks than humans, compared to the 71% being performed by humans today, but purports that the net employment effects will be positive. According to the study, 133 million new roles could be created by "… [t]he rapid evolution of machines and algorithms in the workplace" between 2018 and 2022, far outnumbering the 75 million jobs that might be displaced.

Productivity effects are hard to measure and similarly difficult to estimate – recall Solow's (1987) infamous statement about the paradox that "you can see the computer age everywhere but in the productivity statistics"– but some recent analyses suggest that digitalization has the potential to double yearly economic growth by 2035 (Daugherty and Purdy 2016) or by 0.8 to 1.4% annually (Manyika *et al.* 2017). Despite overall stagnant European productivity growth in the past decade and often disappointing productivity effects resulting from concrete digitalization projects, there is evidence indicating that the productivity effect of digitalization is, to some extent, materializing. According to estimates by the EU Commission, as much as 30% of EU GDP growth 2001–2011 was due to digitalization (Van Welsum *et al.* 2014).

In sum, there seems to be broad agreement that job destruction will accelerate due to digitalization, but the overall net effects are more difficult to establish. Concerns of lasting technology-driven unemployment are contested and often outright dismissed. Nevertheless, political action seems warranted to prevent the "lock-in" effects of short-term structural unemployment and polarization of labour markets, as well as to provide the skills and investment needed to extract the full economic potential of the emerging technologies.

Skills and occupational structure: Upgrading, polarization or degradation?

Irrespective of net employment effects, technological shifts and the product innovations that follow alter the types of jobs available, as well as their content and skill requirements. As computers and related technologies grow more powerful, companies have less need for certain kinds of workers and demand more competencies that are complementary to the technology. The effects of such changes can already be observed in past and current patterns of occupational change. During the 1980s, researchers in the US started to label the changes they observed in the occupational structure as Skilled-Biased Technological Change (SBTC). They promoted a rather hopeful message, claiming that technological change results in the growth of high-skilled and well-paid jobs at the expense of low-skilled and low-paid jobs (Berman, Bound and Machin 1998; Katz and Murphy 1992). The SBTC hypothesis asserts that new technology, especially in manufacturing, decreased the demand for lower-skilled employees by substituting them with labour-saving new technology. For highly-skilled employees, the new technology instead enhanced productivity, increasing the output of their work. The result is what could be described as an upgrading of the structure of jobs and occupations in the labour market.

More recent research, however, paints a more complex picture. For instance, influential US researchers have argued that the occupational structure is subject to increasing polarization. Polarization here refers to a growth of the number of jobs both at the high skill/wage and low skill/wage ends of the occupational distribution, relative to a decrease or stagnation of the number of jobs in the middle of the distribution. In the US, this pattern was observed from the 1990s. Autor *et al.* (2003; 2006) show that from 1990 to 2000, along with growth in high paid jobs, growth was seen in the lowest paid jobs as well. In the past decade, polarization of labour markets has also been shown in most European countries (Goos *et al.* 2010; Eurofound 2017).

The main explanation given is that digital technology enhances the productivity of workers mainly performing non-routine cognitive jobs while taking over routine jobs, both cognitive and manual – such as bookkeeping, clerical work and routine production work. Jobs consisting of manual non-routine tasks – mostly low-wage service jobs – remain more or less untouched. This effect is labelled Routine-Biased Technological Change (RBTC). According to this hypothesis, new technologies will complement non-routine jobs involving high-level skills, while replacing routine jobs involving middle-level skills. The substitution of routine jobs is assumed to decrease both wages and the relative number of workers in these jobs, as middle-income jobs dwindle.

Polarization has been shown to be related to and likely caused by technological change. Whereas digitalization is presumed to increase the number of jobs at the upper end more or less directly through enabling higher productivity, growth of jobs at the lower end can be partly regarded as a second-order effect of technological progress, as the growth created drives demand for goods and labour-intensive services (Autor *et al.* 2003; Autor *et al.* 2006; Dwyer 2013). Growth in the service sector and particularly in personal service and care work has been connected with polarization (Dwyer 2013; Åberg 2015), and attributed partly to increased purchasing power among high-income groups that drive demand for personal services (Mazzolari and Ragusa 2013). Low-

skilled service jobs are usually labour intensive, spatially bound and involve unpredictable work patterns and direct customer contact, which make them difficult to rationalize by means of digital technology. Goos and Manning (2007) thus employ Baumol's (1967) cost disease thesis as an additional explanation of the growth of low-paid service jobs, asserting that employment will decline in sectors where technology is rapidly increasing productivity, for example in manufacturing, while remaining steady in low-tech sectors where productivity growth is low, such as in low-wage service jobs.

As an accompaniment to changes in the occupational structure, the digital technological shifts are likely to propel increased structural mismatches in the labour market along the dimensions of both skills and geography (Restrepo 2015; Polachek *et al.* 2017). In a scenario of polarization, the big question is whether some of those becoming redundant in medium-skilled jobs can acquire new skills and climb into the non-routine skilled segments, and how many will have to start competing for non-routine jobs in the low-skill segments with abundant supply of labour. Geographical mismatches are more likely to occur in the segments for high-skilled digital work, where demand is rising, supply seems to be lagging behind and mobility barriers may inhibit adjustment. Such dynamics can make structural unemployment more entrenched and long lasting, and hurt job creation prospects (ILO 2013). Facilitation of reskilling and transitions to new occupations or locations will thus be crucial for adapting to the new technological and economic opportunities. Such efforts are challenging, as there is often a gap between slow-moving education systems and the shifting demands of employers. Skill gaps are already pronounced in several technical domains, such as science, technology, engineering and mathematics, but demand is also expected to rise for communication, teamwork and other soft skills as a consequence of the ongoing technological shifts (ILO 2017b; Russel Group 2017).

3.2.2 Changes in company and market structures

As new technology propels product innovation and changes in the production and delivery of goods and services, new markets, business models and types of companies emerge, and existent markets tend to change. Robotization and automation may also enable re-shoring of manufacturing production from developing countries to advanced economies, benefitting from proximity to consumer markets and innovation hubs (Cohen *et al.* 2016; De Backet *et al.* 2016). Increased use of computers and robotics, together with new production techniques demanding advanced skills, reduce the labour-cost advantages of producing in developing countries. A possible consequence is that the primary and manufacturing sectors in advanced economies may retain or improve their global competitiveness despite high labour costs – as seen, for instance, in the Swedish mining industry and Norwegian shipyards. As automation substitutes routine work tasks, the prospective employment effects of re-shoring in the advanced economies are nevertheless likely to be limited.

A novel phenomenon arising with the digital technologies is the rise of global mega corporations, driven by increasing returns to scale. The "big five" tech companies – Google, Apple, Facebook, Amazon and Microsoft – already control much of global

computing activity and have seen a meteoric rise in valuation, partly without a corresponding rise in the number of employees. The combination of big data, networks, and the importance of computing power and software with decreasing marginal costs seems to be particularly conducive to the formation and exertion of monopoly power (Rifkin 2014; Rogoff 2018). The interconnectedness of the digital economy also creates network effects, where the value of a product or service increases in accordance with the number of users. Social media is perhaps the clearest example of network effects being the cornerstone of the business model. As network effects only become significant after a critical mass of adoption has been achieved, they create significant barriers to entry for new actors in the markets – and underpin the "winner takes all" logic inherent in these kinds of markets.

The big five tech companies, their upcoming Asian counterparts, and other emerging winners in the global digital economy pose novel challenges to existing tax and welfare regimes, and to the governance of competition. Apparently, the big tech firms routinely seek to acquire start-ups, patents and technology – not always just to stay ahead of the competition, but also to eliminate it. This has raised concerns that those firms can – or have – become so dominant, so profitable and so encompassing that it has become very difficult for start-ups to challenge them, thereby stifling innovation (Rogoff 2018). As they grow more dominant in their own market niches and expand into additional sectors of the economy, these companies often succeed in paying zero or marginal national taxes to the countries they operate in. This raises very real questions about the distributional effects of new digital technologies and associated changes to organizational structures and markets – i.e. about who will benefit from the value added of the productivity increases promised by new technology, and whether the profits will be reinvested in the national economies these companies operate so that demand and job growth will follow.

3.2.3 Job quality, flexibility and (in)security

Digitalization is changing the way people work in existing jobs, and is facilitating outsourcing as well as new and non-standard forms of employment. In both existing and new jobs, digital tools and processes can alter work organization, job content, task execution, and important aspects of job quality with implications for working time schedules, health and safety, learning opportunities and job security. Along with the predicted polarization of work, job quality is likely to improve for those in high-skilled/paid jobs involving analytical, interactive and problem-solving tasks (de Groen *et al.* 2017). Workers becoming redundant from routine jobs, however, face the risk of having to take less-skilled work with poorer job quality at the same time as increased competition for jobs in such segments may lead to deteriorating wages and working conditions.

In growing parts of the labour market, however, the increased speed and efficiency of work flowing from increased use of information and communication technologies (ICT) can reduce strainful, repetitive tasks and give employees more autonomy, flexibility, and available time for non-routine, cognitive tasks (Curtarelli *et al.* 2014). More autonomy and flexible working environments – temporally and spatially – may

also facilitate better work–life balance, while increased stress levels may arise from unlimited connectedness and blurred boundaries between work and private life. In many parts of working life, digital technologies and robotics can relieve workers of hazardous environments and harmfully monotonous tasks, but also introduce new risks associated with physical inactivity at work, the transparency of algorithms, human-machine interfaces and work-related stress, particularly resulting from increased worker monitoring. Psychosocial and organizational factors will thus become increasingly more important with ICT-driven changes (EU OSHA 2015; 2018).

A trend towards more non-standard forms of employment – such as temporary employment, short-term work, agency work and dependent self-employment – has been observed in many developed countries over the past decades (ILO 2016; Eurofound 2017). In some instances, this has given rise to a growing secondary labour market characterized by greater job insecurity and poorer employment conditions, often referred to as dualization (Emmenegger *et al.* 2012). Partly influenced by changing employer staffing strategies, and partly by political processes of deregulation, labour market dualization can be exacerbated by digital technologies. This can arise from faster restructuring, more flexible production and new possibilities for outsourcing through online work and matching of tasks, customers and workers via digital platforms. Non-standard forms of employment are associated with less training and higher incidence of inferior job quality, occupational health and safety, and employment security (Boden *et al.* 2016; EU-OSHA 2015; Quinlan 2016; Reinert 2016).

Work mediated by digital platforms is the most innovative of the new forms of employment that have emerged in the past decade. To date, platform work is still relatively marginal, especially in the Nordic countries (Dølvik and Jesnes 2018). The potential for growth is nevertheless substantial. While promising reduced transaction costs and greater flexibility to firms, consumers and potentially to workers, digital platforms also present challenges related to working conditions and social protection. If platform work gains momentum, it may engender disruptive change in parts of the labour market. By denying employer responsibility and using algorithms and data to match demanders and suppliers of short-term work (gigs), digital platforms may challenge the existing legal and institutional framework built around the relation between workers and employers.

For digital platforms, especially those mediating online labour, algorithmic control and management is central to the operation. Algorithmic management techniques can potentially offer workers a high degree of flexibility, autonomy and task variety. However, these mechanisms of control have also been shown to be associated with low pay, asocial working environments and higher incidence of irregular hours, overwork, sleep deprivation and exhaustion (Wood *et al.* 2018). Depending on the regulative responses of governments and social partners, the future path of platform work and its impact on job quality is very much up to the platforms' ability to develop business concepts that not only cater to the expectations of customers but also to those of the workforce and the wider society. It is indeed possible to envisage trajectories of change where platform work is increasingly incorporated into the existing institutions of labour market regulation (Sundararajan

2016; Söderqvist 2017), as for instance illustrated by the framework collective agreement recently signed by a Danish platform and trade unions.[10] Yet, alternative trajectories where platforms act as engines for further fragmentation of work, transfer of risk to workers, and inferior work environments appear equally plausible (Dølvik and Jesnes 2018). Such a scenario would challenge existing systems of rights and duties in the European and Nordic models of employment relations, work environment protection and social security.

[10] The cleaning platform Hilfr signed a framework agreement with the union 3F, which entered into force in august 2018 and guarantees sick pay, holiday allowance and pension contribution for those working through the platform. In a Danish context, this is the first example of work platforms trying to fit into the Danish labour market model. Several resembling agreements exist in Sweden.

4. The Nordic model: Past and present

The aim of this project is not only to provide knowledge about how the changing future of work may affect Nordic working lives, but also to study how the Nordic model as such can be affected by, and influence, the transition towards the future of work. As is well known, the Western countries have been marked by a variety of labour and welfare models, where the Nordic model has been viewed as distinct from the liberal labour markets residual welfare states of the Anglo-Saxon countries and the more state-regulated labour markets and occupation-based welfare systems of the continental European countries (Esping-Andersen 1990; Gallie 2007). According to the "varieties of capitalism" literature (Hall and Soskice 2001; Amable 2003), the different roles of markets, state, and institutional coordination in such models are associated with different sources of competitiveness and types of innovative capacity. While the liberal market economies tend to be ahead in path-breaking technological innovation, the coordinated economies are often regarded as stronger in production processes innovation, industrial skills, and emulation of new technologies. A central issue of this project, especially in Pillar 2 on digitalization and robotization of traditional work, is whether and how the Nordic models still fit with such general typologies and hypotheses.

In the first part of this Chapter (4.1), we therefore review the Nordic model's background and main distinctions, especially regarding working life governance and restructuring. To establish a frame of reference for assessing future change, the second part (4.2) takes stock of recent developments in Nordic working lives, as far as employment, demography (ageing and migration), labour relations, and inequality is concerned. The chapter ends with a few introductory reflections about whether the joint impact of the megatrends sketched above and these developments is likely to result in the continuation or break-up of the Nordic model.

4.1 The Nordic model: Background and main traits

Historically, the Nordic models of capitalism, with wage labour as the dominant form of work, emerged from the upheavals of industrialization, nation building, and democratization on the eve of the 20th century (Andersen *et al.* 2014; Dølvik 2013; Kangas and Palme 2005). The technological breakthroughs in the 19th century, including hydropower, railroads, telecommunication and the combustion engine, spurred production of manufactured goods and contributed to the sweeping industrial transformation of the Nordic economies. A by-product was the rise of new opposing classes that attained pivotal roles in shaping the evolving Nordic models. After a long

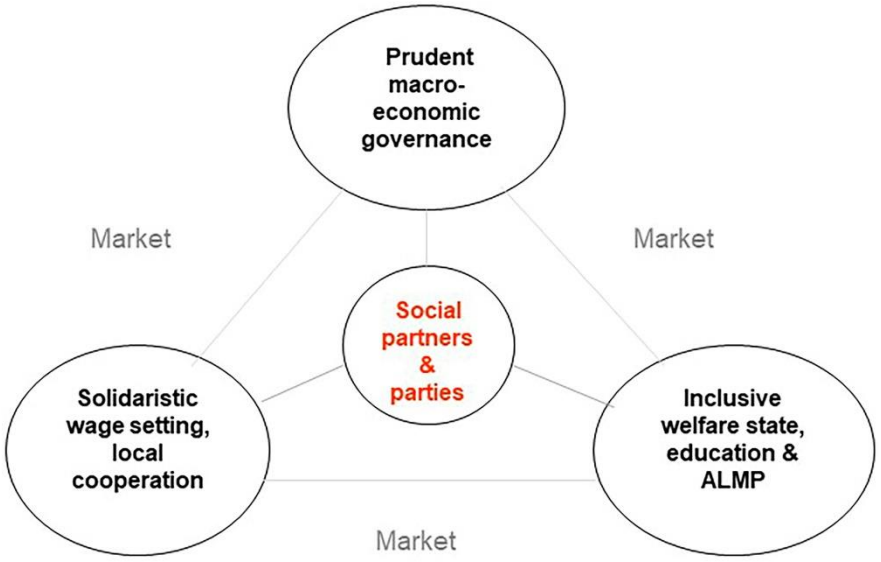
phase of class struggle between the organizations of industrial employers and the ascending labour movement, the mass unemployment and conflicts under the Great Depression led to broad class-compromises in the 1930s – and in somewhat different forms in Finland and Iceland after the second world war (Kangas and Saloniemi 2014; Ólafsson and Ólafsdottir 2014). The "conflict partnerships" that eventually evolved between organized labour and capital – in interplay with strong, unitary states – contributed to the institutionalization of the central tenets of the Nordic model. This paved the way for the development of power balances and mechanisms for coordinating wage setting, economic, and social policies that proved conducive to combining economic growth and social justice during the industrial post-war era (Dølvik *et al.* 2015).

Anchored in prudent economic policies, the post-war Nordic models were distinguished by their tax-funded, universal welfare states, and encompassing employer and labour organizations. The latter coordinated multilevel bargaining systems with strong company tiers, forceful dispute settlement mechanisms, and strict peace duties between bargaining rounds. Fiscal policies aimed to secure balanced budgets in the medium term. In the 1950–60s, cyclical stabilization policies were underpinned by politically controlled credit policies, capital controls, and low interest rates intended to boost investment and growth (Mjøset 1986). In the 1980s, credit markets were liberalized and independent central banks attained more responsibility for securing low inflation and stabilizing the economies. Geared to propel growth in manufacturing exports and provide sufficient domestic demand to maintain full employment, the Nordic economic policy regimes also entailed important supply-side elements. Schumpeterian mechanisms of "creative destruction" emerging from the combination of market competition and solidaristic wage policies spurred economic restructuring, productivity and high investment rates, while education and active labour market policies sought to enhance the supply and mobility of labour and skills (Dølvik 2013; Vartiainen 2014).

Throughout the 1960–70s, vast public investment in education, welfare services, and labour market training contributed to rising participation rates especially among women, and the share of the workforce with higher education continued to double throughout the 1980s (Dolton *et al.* 2009). In vocational education and training (VET), Denmark stood out with its comprehensive apprentice system, whereas the VET systems in the other Nordic countries were mainly school-based – though in Norway, there was a mixture of both (Hagen Tønder and Nyen 2016).

The interaction between the main pillars of the triangular Nordic model – (1) responsible macro-economic policies; (2) coordinated, multi-tiered collective bargaining and labour relations; and (3) universal welfare states geared towards work and social investment – are illustrated below. Based on the interaction between markets, institutions and politics, a key factor is that the main actors are able to secure coordination and coherence between the basic policy areas and pillars (Dølvik *et al.* 2015).

Figure 4.1: The traditional Nordic model in small, open economies



«Productive justice» - equality, risk sharing, social investment
«Conflict partnership» - trust, coordination, power balance
→ **«Politics with markets»**

4.1.1 Politics with markets

As perhaps expressed most pronouncedly in the Swedish Rehn-Meidner strategy (LO 1951), the interplay between product market competition, egalitarian wage setting, and the welfare state was seen as a major driver of industrial modernization and innovation. From early on, Nordic trade unions embraced technological change as a necessary means to improving earnings and working conditions. Competition and compressed wage structures pushed unprofitable firms out of business and reallocated labour and capital investment into the most productive firms and sectors (Erixon 2011). Income security provided by the welfare state and mobility-enhancing labour market policies assured company unions that workers would gain from rationalization and productivity-oriented cooperation at the workplace level – a typical Nordic example of "politics with markets" (Jørgensen *et al.* 2009; Pontusson 2011). The welfare state was thus seen as a productive arrangement, and was tailored to the wage-earner role – before, during and after the work–life career. By bringing huge flows of women into the labour market and increasing the supply of skills and human capital, the strong expansion of education, public services and childcare in the 1960s–70s made the Nordic countries forerunners in gender equality and the transition towards a post-industrial society (Iversen and Wren 1999). Public employment, which still accounts for almost 1/3 of all Scandinavian jobs and roughly 2/3 of all female jobs, also contributed to securing

a wage floor under competition, as long as the labour markets were basically national/Nordic. Together with the high "social wage",[11] these factors did, for quite some time, effectively close off the expansion of low-paid service jobs seen in many other countries (Dølvik 2001). Of additional political importance is the overlapping interests of producers and users of welfare services that have provided a strong support base for the public foundations of the Nordic welfare states (Martin and Thelen 2007).

4.1.2 Varieties of Nordic capitalism

Despite these common institutional traits, the Nordic economies have developed quite different industrial structures, sectoral specializations, and energy sources (Mjøset 2011; Dølvik *et al.* 2017). *Denmark* has long been known for its agricultural sector, craft industries and shipping, but has over the past decades been distinguished by its advanced food-industrial complex, pharmaceutical industry, windmill energy, energy-saving products, and numerous "high tech" niche products. *Sweden* was traditionally associated with its large manufacturing production of iron and steel, paper, transport vehicles and machinery, but has in recent decades become a major producer of pharmaceuticals and ICT-related goods, software and services. *Finland* used to depend on its paper and pulp, forestry machines, chemical and metal industries, but has – facilitated by its comprehensive R&D/innovation regime (Fagerberg and Fosaas 2014) – become an international player in electronics and other advanced high-skill industries. *Iceland* has been distinguished by its export of fish, hydropower-based aluminium products and, recently, its surging tourism. Similarly, exports from *Norway* were long built on natural resources, manufacturing relying on cheap hydropower, and shipping, but has recently also become a leading supplier of maritime services, aquacultural products, and fossil energy based on its advanced, international offshore industry.

Diversity is also found in energy sources, offering different avenues towards the UN objective that our economies shall be carbon neutral by 2050. Carbon-based electricity production is limited in the Nordic countries. Although Denmark is still dependent on the import of carbon-based electricity from the continent when wind is low, its production of wind power is rising fast. Iceland and Norway mainly draw on hydropower, while Sweden is a leader in bio-energy production. In Finland and Sweden, nuclear energy also plays a role.

Given the diverse industry structures, the Scandinavian production regimes are likely to find different paths into the digitalized future of work. A common feature of the Nordic growth trajectories, however, is that their strong dependence on exports has been combined with high levels of domestic consumption facilitated by high employment, dual-earner households, egalitarian income distributions, and sizeable public services sectors. The latter elements have distinguished the Nordic countries

[11] The "reservation wage" concept refers to the fact that the level of income security provided by unemployment benefits and other social benefits indirectly defines a lower wage threshold that job-seekers entitled to benefits are inclined to accept when offered a job (Barth, Moene and Wallerstein 2003). This calculation can be different for labour migrants coming from sending countries with much lower welfare benefits/reservation wages, because accepting a job in the Nordic countries also secures equal access to more generous welfare benefits (NOU 2011: 7).

from other export-reliant, coordinated economies (e.g. Germany) that display high saving rates and repressed domestic demand, and from more liberal market economies (e.g. the UK and US) that are driven by credit-based domestic private consumption – so-called "privatized Keynesianism" (Crouch 2011). In recent years, however, domestic demand fuelled by credit-based private consumption has become a more salient driver of Nordic growth (Baccaro and Pontusson 2016; OECD 2018), increasing the vulnerability to international financial instability.

4.1.3 The Nordic micro-model: Still a lever for renewal and adjustment?

A distinction of Nordic labour relations is their multi-level structure with strong local tiers of management–labour relations (Kjellberg 1992; 1998). International observers of the Nordic models tend to highlight the centralized peak organizations and collective bargaining systems, often overlooking the important roles of organized labour relations at company and workplace levels (Due *et al.* 1994). Operating within a system of centrally regulated peace duties, criteria and procedures, they enable local "labour voice" through codetermination, employee participation, and negotiations at company and workplace levels. Because the main issues related to the distribution of value added between capital and labour have been resolved centrally, local parties can concentrate on issues of common interest, such as enhancing productivity, skill formation, and safeguarding jobs (Ilsøe 2010; Nergaard *et al.* 2009); this is in contrast to what happens in fully decentralized systems. By creating a basis for trust and ongoing cooperation in the workplace, this has (to a varying extent) contributed to the evolution of a Nordic "style of management" based on broader employee involvement, smaller social distances, and fewer hierarchical tiers than in most other countries (Schramm-Nilsen *et al.* 2004).[12]

The company tier in the Nordic models has contributed to a stronger local, democratic anchoring of labour relations than e.g. in the continental countries, where company issues are left to bipartite works councils and trade unions have no official role at workplace levels. Facilitated also by the tradition that employee protection legislation can be derogated from by collective agreements, most pronouncedly in Sweden, these traits of the Nordic models have given ground to considerable "negotiated flexibility" (Andersen and Ibsen 2015). Further, in accordance with shifting circumstances, they can choose to resolve different issues at different levels and shift between decentralized and centralized processes as they see fit. Today, there is thus considerable variation as to which issues are resolved centrally, industry-wise and locally between the Nordic countries. Denmark, where virtually all actual determination of wages and working time in the private sector is delegated to the company level – with the adjustments in the centrally defined minimum wage as a reference – is clearly the most decentralized. Finland has long been the most centralized, with tripartite

[12] In the 1960–70s, these features were taken further through experiments with "self-governing teams" and enhanced worker autonomy, as practised at several Volvo plants and elaborated in the socio-technical school (Sandberg and Movitz 2013). A more conspicuous version was witnessed in the call from SAS head Janne Carlzon to "tear down the pyramids" (Carlssen 1985).

income policies and less-developed company bargaining. In 2016, however, the "Competitiveness Pact for Finland" entailed a move towards sector-based coordination with increased scope for company level bargaining, like the other Nordic countries did in the 1980–1990s (Dølvik and Marginson 2018). A key question for the years to come, however, is whether these micro-foundations of the Nordic models remain strong enough to handle the increased pace and scope of change expected to mark the transition into the hopefully green, digital future of work.

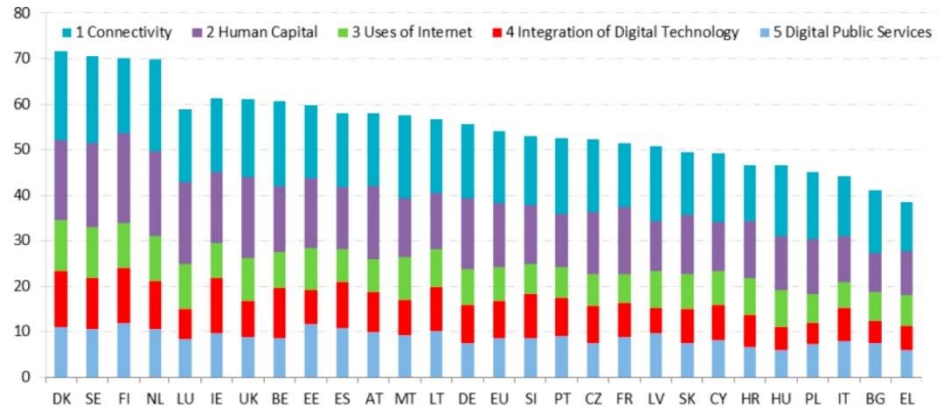
4.1.4 Nordic policy approaches to restructuring

The Nordic economies' capacity for restructuring and flexible adjustment (Katzenstein 1985) is, according to the Swedish Labour Minister, Ylva Johansson (14 May 2018), rooted in the interaction between three main pillars: (1) the strong partnership relations at both local and central levels; (2) a range of support schemes available for companies and employees facing restructuring, downsizing or sudden market fall-outs,[13] and (3) the provision of income security and high levels of education in the workforce underwritten by the welfare states (Johansson 2018). Citing that the share of Nordic workforces involved in workplace restructuring and learning new things is the highest in Europe (Hurley *et al.* 2017), Johansson argues that this "flexicurity" approach to restructuring creates trust and encourages people to test out new opportunities and solutions. In other words, "A good safety net is good for entrepreneurship. If a project doesn't succeed, you don't go broke".[14]

Of further note is the fact that the Nordic economies tend to top international rankings with regards to the adoption of new technologies, Internet access, ICT literacy, and innovation, including renewal of production and work processes through "employee-driven innovations" (see Fagerberg and Fosaas 2014; Kristensen and Lilja 2011). The Nordic region is already one of the most digitized parts of the world, with high digital penetration rates in society, digital government initiatives and high Next Generation Access (NGA) network coverage in the vast majority of the Nordic regions (Nordic Council of Ministers 2018). As indicated in Figure 4.2 and 4.3 below, this means that the Nordic countries appear better prepared for the transition to a digital and greener economy than most other countries.

[13] These include various public benefits, schemes for training and ALMP, temporary lay-offs/short-term work, and other forms of public involvement at local, branch/industry, and central levels. Sweden has, through social partner agreement, also developed "job security councils" (Trygghetsrådene) funded by the employers, helping people subject to downsizing find new jobs. In Stockholm in 2017, 83% of the users found new jobs, 2/3 with the same or better pay (NYT 27.12.2017).
[14] Carl Melin, policy director at Futurion to the New York Times: "The Robots Are Coming and Sweden is Fine", 14. May 2018.

Figure 4.2: Digital Economy and Society Index (DESI) 2018



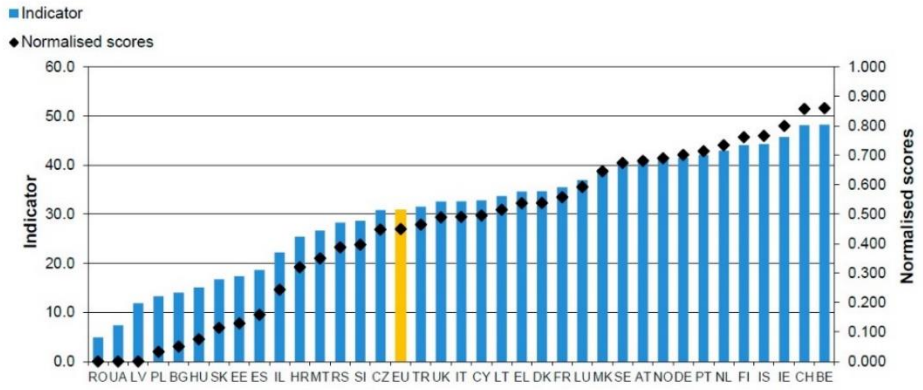
Note: NO is located between NL and LU.

Source: European Commission, Digital Scoreboard.[15]

Regardless of support schemes, the main drive towards innovative company adjustment emerges from the pressures that company actors face from product market competition and regulatory requirements. Besides high labour costs and strong competition in liberal product markets, the strict regulations of product, labour, and environmental standards in the Nordic countries (Porter 1990; Reve 2001) have added to the push towards higher product and process quality – thereby serving as "beneficial constraints" (Streeck 1992). For Nordic companies, demanding customers, high-skilled workforces, and well-organized counterparts have probably functioned in a similar way. The Nordic business sector's capacity for adjustment has thus been facilitated by institutional frameworks that have proven conducive to industrial change. Relatively well-developed physical and social infrastructure – due to public investment in transport, communication, digitalized public services, and arrangements for combining family and professional careers – has also contributed to business environments that enable enterprises and workforces to engage in demanding changes at work. A question for the years ahead, however, is whether these policy tools and frameworks are up to the tasks when the green economy and the heralded fourth industrial revolution are gaining momentum.

[15] Available at https://ec.europa.eu/digital-single-market/en/desi. Figure from "Digital Economy and Society Index (DESI) 2018 Country Report Norway" (European Comission 2018). Norway is not included in the online version.

Figure 4.3: SMEs with product or process innovations



Note: Performance for 2014 or most recent year available. Statistical outliner: Romania.

Source: European Commission (2018) Fact Sheet 2018 European Innovation Scoreboard.

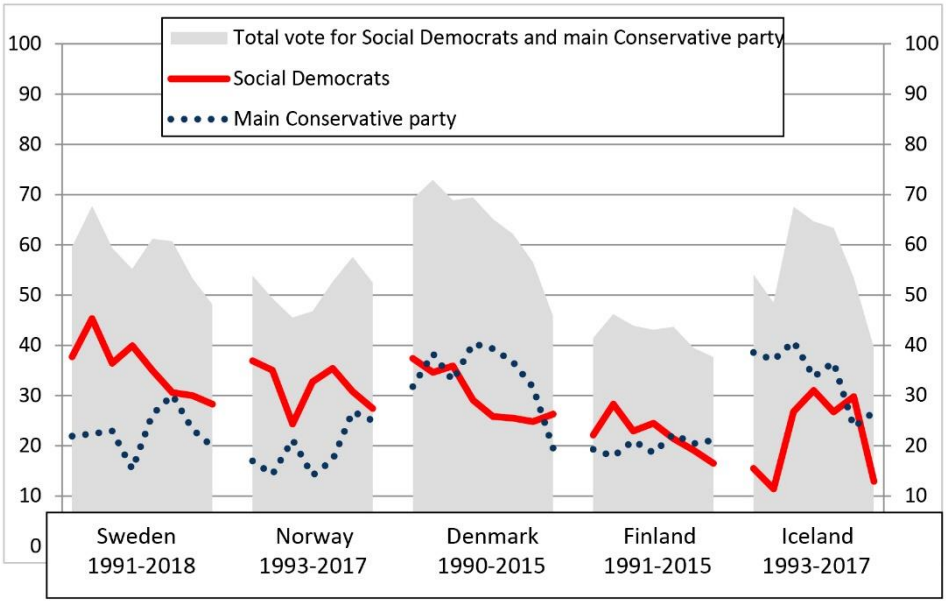
4.1.5 Diverse and changing political frameworks

In national models where the interaction between markets, institutions, and politics has been premised on broad policy coordination, predictable political leadership of the state has been considered an important success criterion. From the early days of the Nordic model, international observers frequently referred to the central role of Social Democracy as a precondition for the model's stability (Childs 1936; Esping-Andersen 1990). After the Social Democratic hegemony begun to crumble in the 1970s, however, it turned out that the Nordic models could work under different political leaderships.

In fact, Nordic politics have always been marked by national varieties. While Sweden was distinguished for long periods in the 20th century by Social Democratic majority governments and salient elements of class polarization, Denmark has had a long tradition of minority coalition governments and compromises across the Left–Right divide. The long Labour Party dominance in Norway also built on broad coalitions with primary sector forces. In contrast to these three, Finland and Iceland have been marked by predominant Centrist parties with roots in the primary sectors, weaker Social Democracies, significant Left parties, and highly variable coalitions.

Since the 1980s, Nordic politics have become more volatile. Though Social Democratic parties have held governing power for long periods, their electoral support has declined (Figure 4.4).

Figure 4.4: Electoral fragmentation – change in the main Conservative and Social Democratic "catch-all" parties' share of the vote in elections of parliament. Percent. 1990–2018



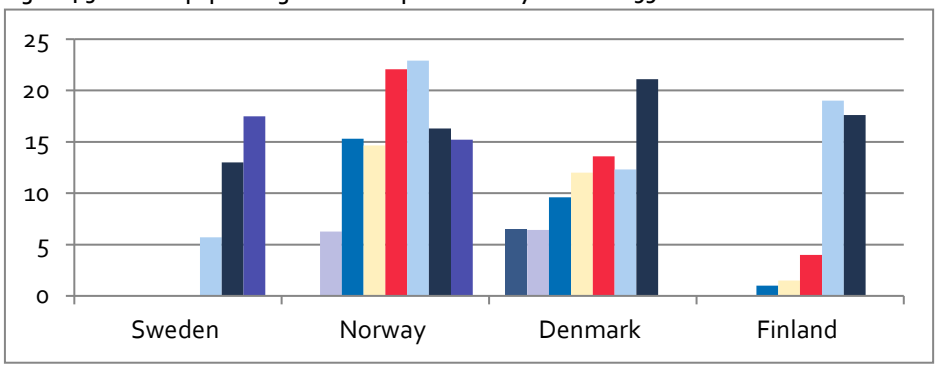
Source: NSD European Election Database;[16] Dølvik *et al.* (2015). For Denmark, the Liberal Party and Conservative People's Party are combined.

When entering the 1990s, Denmark, Finland, and Norway were ruled by Conservative-led coalition governments, followed by Sweden in 1991, and Iceland in the mid-1990s. The Social Democrats came back in office in the 1990s, except in Iceland, where the pendulum swung towards the centre-right coalitions again in the first decade of the new century. Recent years have seen a combination of strengthened competition for the median voter, i.e. moves towards the centre, along with tendencies of electoral polarization and fragmentation of the party political landscapes. Often viewed as a reaction among disenchanted groups to the kind of megatrends cited above – notably immigration, globalization, and EU integration – the support for populist parties on the right[17] have risen (Figure 4.5). In combination these developments have contributed to less predictable patterns and processes of coalition-building. The aftermath of the 2018 election in Sweden is a case in point.

[16] The data applied in this analysis are based on material from the European Election Database. The data are collected from original sources, prepared and made available by Norwegian Social Science Data Services (NSD). NSD is not responsible for the analyses/interpretations of the data presented here.

[17] In the literature, these parties are often coined as welfare-chauvinist parties with anti-EU and xenophobic traits, as they seem to support a generous welfare state for "native" citizens but want restrictions on immigration and immigrant rights (Kangas and Saloniemi 2014; Brochmann and Dølvik 2018).

Figure 4.5: Vote for populist right in Nordic parliamentary elections 1990–2018. Percent



Source: NSD European Election Database.[16]

Diversity has also marked the Nordic countries' international affiliations. Denmark was long the only Scandinavian member of the EC/EU (from 1972), but in 1995 was joined by Finland and Sweden. Norway and Iceland refrained, but joined the single market through the EEA agreement in 1994, excepting agriculture, fisheries, trade policies and political representation in decision-making. Nonetheless, all five countries have largely faced the same international economic opportunities and constraints. An important exception is monetary policies, where Sweden, Norway, and Iceland have run flexible exchange rate regimes since the 1990s. Finland became a member of the eurozone from the beginning, in 1999, and adopted the Euro as the national currency in early 2002, while the Danes have kept the Krona pegged to euro (and before that the ECU). With no independent tools left in monetary policies, Finland and Denmark may thus face greater pressures to undertake internal devaluations – that is, cuts in budgets and/or wages – in instances of economic shocks (De Grauwe 2013; Eichengreen 2012), whereas the other Nordic countries run the risk that exchange rate fluctuations, arising from volatile financial markets, will complicate economic policies.

4.2 Nordic working lives faced with global "megatrends" and domestic change

The global "megatrends", including digitalization, are as earlier mentioned not entirely new. They have in fact been underway for quite some time. In spite of that, since the turn of the century, the Nordic model has regained the role model status it had in the 1970–80s (the Swedish variant in particular), serving as a reference case in international debates about whether equality and efficiency are reconcilable (Sachs 2004; Sapir 2005; OECD 2012). After significant controversies about the viability of the Nordic model in the early 1990s, the ensuing recoveries and solid Nordic performance in the early 2000s have also contributed to broaden political support for and identification with the model (Dølvik *et al.* 2015). The recession after the 2008 financial crunch

affected the Nordic economies differently,[18] but by 2018 all the Nordic economies seem back on track, with declining unemployment and growth in GDP and employment. Except for high public debt ratios in Finland (exceeding EU thresholds), public finances are comparatively solid. With such an outlook, one might presume that the Nordic economies are well equipped for the challenges ahead, but the resilience of the Nordic working life model depends on the solidity of its domestic foundations.

In this chapter, we therefore review some of the main developments in the Nordic labour markets in recent years, and point out how they, in interaction with the global megatrends, may affect the Nordic models' adaptiveness in the years to come.

4.2.1 Employment and demography: Changing populations and stagnant workforces

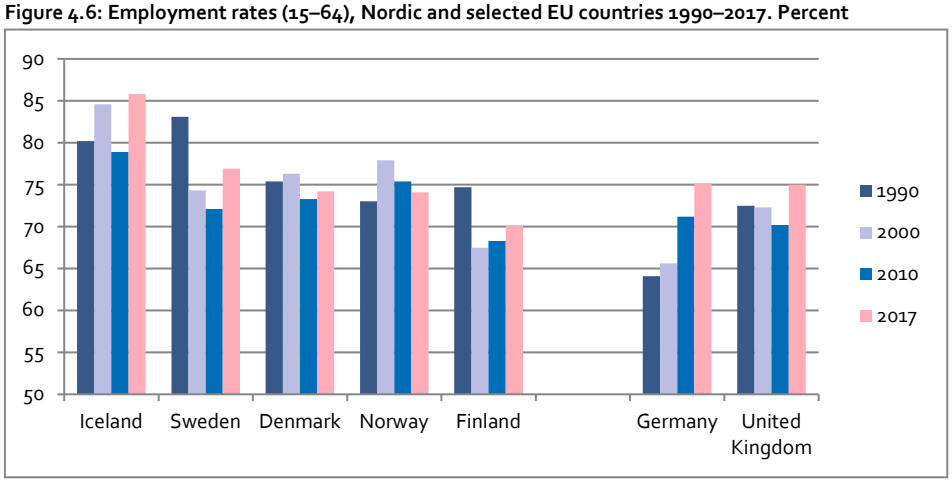
The financial crises in the early 1990s and in 2008 have contributed to divergent developments in Nordic employment rates. The Nordic countries have also diverged with regards to the development of immigration, population ageing and dependency ratios.

Flattening employment rates

Iceland has always boasted employment rates far ahead of the other Nordic countries. After its lasting labour market slump following the crisis in the 1990s, Finland met a new setback under the euro crisis, but the employment rate has now climbed over 70% – though with a shrinking denominator. Sweden, too, saw severe employment decline in the 1990s crisis, but has recently bounced back after a protracted job recovery since the 1990s. In the new century, employment rates for the 15–64 age bracket in Denmark, Norway and Sweden have fluctuated around roughly similar levels – 72–77% – but recently Sweden has exceeded its 1990 peak, whereas Denmark and Norway have seen stagnation since 2008.

[18] Iceland recovered fast from the crash of its financial adventures. Sweden and Norway rode the recession smoothly, while Finland ran into a double-dip due to the slump in global paper/pulp markets, the Nokia collapse, and the ensuing euro crisis. Denmark, too, experienced a protracted downturn after the crunch of its homemade bank and building bubble, which unleashed austerity and debt deleveraging. Norway eventually faced recession after the oil price dived in 2014.

Figure 4.6: Employment rates (15–64), Nordic and selected EU countries 1990–2017. Percent



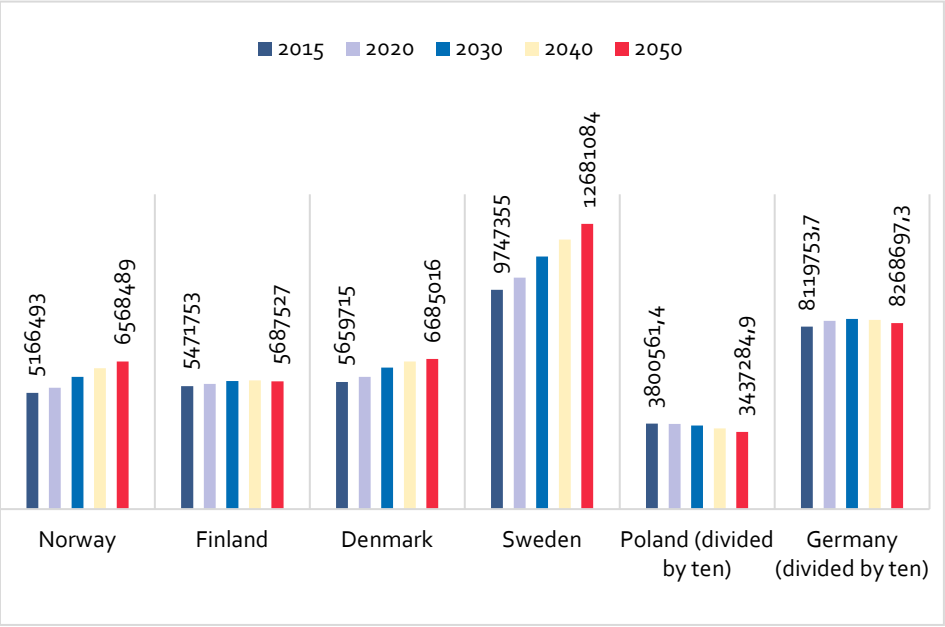
Source: OECD.stat.

Given variations in the shares of short-term and part-time employment, average annual working time varies markedly between Finland, Sweden (and Iceland), at the high end, and Denmark and Norway at the lower end (Appendix Figure A1). This is mirrored in the full-time equivalent employment rates (Appendix Figure A2), where Iceland is way ahead of the others, among both males and females, and is followed by Sweden. Danish and Norwegian males in particular experienced declining rates in the 2000s, implying that in full-time equivalents, the total employment rates (both sexes, ages 15–3364) in Norway and Finland are now similar, whereas Denmark has fallen somewhat behind since 2007.

Ageing populations

Due largely to the work- and family-friendly welfare states, Nordic fertility rates have been high compared to European countries (Normann and Nørgaard 2018). The shares of elderly in the Nordic populations – and thus the old-age dependency ratios – have therefore been comparatively low.

Figure 4.7: Projections of changes in population 2015–2050, selected Nordic and European countries



Note: Iceland is not included in Eurostat's analyses, but Iceland's population will rise steadily – circa 18% (50,000) from 2012 to 2030 (Fløtten *et al.* 2013, from Nordic Statistics).

Source: Eurostat projections 2018.

As shown in Figure 4.7, the Nordic population as a whole is expected to grow considerably – rising by more than 5 million (ca 20%) between 2016–2050. More than half of this growth will occur in Sweden, where the population will rise strongly – by roughly 3 million (30%) between 2015 and 2050 – whereas the Finnish population will hardly grow at all. Norway and Denmark will also see significant population growth at circa 1.4 million (27%) and 1.0 million (18%) respectively.[19] These discrepancies reflect differences in the populations' current age structure, which is partly related to the different sizes of the immigrant populations, which are younger everywhere.

The *elderly population* (65+) will grow markedly in all Nordic countries but at different paces. The lowest projected level in 2070 is seen in Sweden, where the share of elderly persons in the population increases from 25 to 35% between 2015 and 2070 (European Commission 2018). The highest share of the elderly will occur in Finland (rising from 26% to 41%), while the projected levels in Denmark and Norway lie in the middle. Strikingly, the share of the very old (80+), who have higher care needs, will more than double in all Nordic countries, from 4–5% in 2015 to 10–12% in 2070. Iceland is not included in the long-term projections cited above, but will have the lowest Nordic

[19] Although we have limited the time horizon of the project to the next 15–20 years, the demographic projections are so reliable that it is helpful to apply a longer time span; looking 30–40 years ahead brings us to around 2050 and the trends do not change in the meantime.

share of the elderly and the highest share of those of working-age in the coming 20–30 years (Fløtten *et al.* 2013).

Owing to population ageing, the Nordic supply of labour will see significant stagnation in the coming decades. Differences in the present age profiles and future population growth will cause divergence in the evolution of national *labour supply*. In Sweden, labour supply (20- to 64-year-olds)[20] is projected to increase by 7–8% between 2015 and 2030 and a further 17–18% between 2030 and 2070 – altogether below 0.5% per year, contrasted with a significant decrease in the entire period in Finland. Projected growth in labour supply in Denmark and Norway is comparable with that in Sweden from 2015 to 2030, but Denmark will see a modest decline and Norway a modest increase from 2030 to 2070 (Eurostat 2018).

As a result of these changes, the *demographic old-age dependency ratio*[21] will increase strongly in the Nordic region from around 30% in 2015 towards 50% in 2070. Then there will be roughly *two working-age persons per elderly* compared with *more than three* today. The burden on the working-age population in terms of catering to the elderly will increase most pronouncedly in Finland where the demographic old-age dependency ratio rises from 33% to 52% from 2015–2070, and least in Sweden (from 32% to 43%) (European Commission 2018). When also taking into account the variations in age profiles and participation rates within the national working-age populations, the divergence in the *economic* old-age dependency rates is amplified further, projected to reach 66% in Finland in 2070 and 54.5% in Sweden, with Denmark and Norway in the middle.

Growing immigrant populations

In demographic terms, Sweden will benefit from the age profile of its much larger immigrant population, which is a major source of future growth in the Swedish working-age population. Given the immigrant population's growing share of the working-age population in all Nordic countries in the coming decades – and their markedly lower employment rates compared to the native population – successful policies for labour market integration will become increasingly important for the sustainability of the Nordic welfare states. Given also that the international migratory pressures are unlikely to recede, stronger progress in work integration requires immigration policies ensuring that the inflows are attuned to the absorption capacity of the Nordic labour markets (NOU 2017: 2; Brochmann and Dølvik 2018).[22] Hence, an important task for Nordic governments in the future will be to contribute to the development of better-coordinated European immigration policies suited to these conditions.

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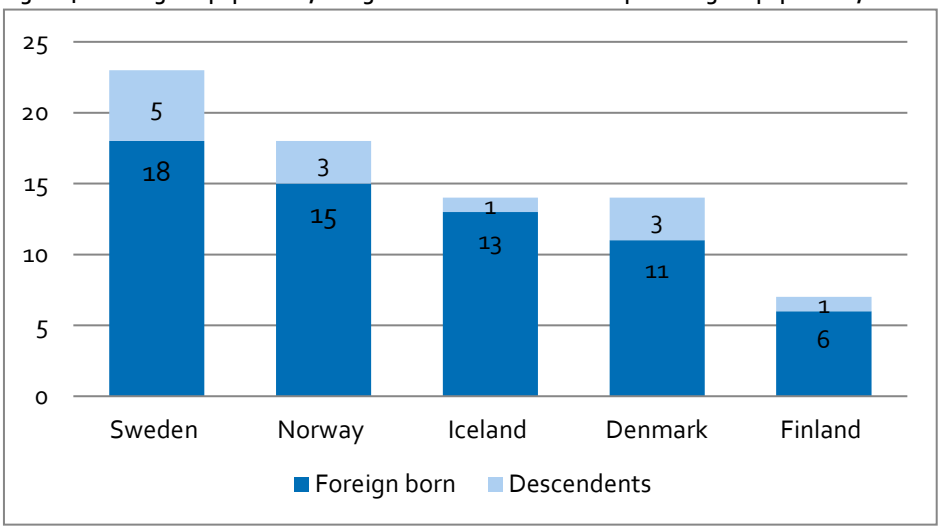
[20] Labour supply is calculated on the basis of projections of current labour market participation rates of different age groups, adjusted for estimated effects of reforms in retirement ages and pension systems in recent years (European Commission 2018).

[21] The size of the elderly population (65+) relative to the size of the working-age population (15–64).

[22] The demographic projections cited above are (conservatively) based on annual net immigration in the range of 0.5%/50,000 in Sweden up until 2030, 0.4%/ 26–27,000 in Norway and Denmark, and 0.2%/14,000 in Finland. Between 2030 and 2060, the net inflows are supposed to decline towards the range of 0.1–0.3% per year (European Commission 2018).

Figure 4.8: Immigrant population, foreign-born and descendants as percentage of population, 2016



Source: Normann and Nørgaard 2018, based on national sources.

Considerable efforts and investments have been undertaken to promote labour market integration of immigrants, but the results regarding inclusion of immigrants from third countries (outside Europe and North America) have been mixed – especially among women (NOU 2017: 2; Djuve 2017). Average employment rates among third-country immigrants from Asia and Africa are largely 25–30 percentage points lower than those of comparable native groups (Djuve and Grødum 2014; NOU 2017: 2). Encouraging, however, is that their descendants (the so-called "second generation") appear to perform much better in terms of educational achievement and employment – and, according to recent Norwegian data, even better than comparable native groups (NOU 2017: 2; Hermansen 2016). Nonetheless, as the stock of first generation immigrants in the foreseeable future will by far outnumber their offspring, further efforts and investment in promoting inclusion in work will remain a key issue in the coming decades. Indeed, the need for efforts to enhance labour market inclusion is no less for the sizable shares of native youth dropping out of school and work – the NEETs – and the too-many young people dependent on social benefits.

Welfare state sustainability

Although the impact on public budgets of a scenario with unchanged employment rates among third-country immigrants can appear modest,[23] it is worth acknowledging that these costs come on top of the projected growth in expenditure on pensions, health services and care for the rapidly growing very old population. New digital welfare technologies may alleviate some of these pressures – easing care tasks and enabling prolonged careers – but for Nordic governments, efforts to facilitate participation in work, prolonged careers and increased employment rates among the elderly, immigrants and women in particular will remain a crucial task. In this view, all Nordic countries have made reforms in their pension systems over the past decades, aimed to spur higher retirement ages – apparently with positive effects. The share of people staying longer in work is increasing. The 5–8 percentage point rise in employment rates in the 65+ population since 2000 also reflects that those in their 60s today on average enjoy better health, more education, and – due to technological change – less physically burdensome work.

Nevertheless, in order to maintain the sustainability of the welfare states, Nordic governments are likely to face tough choices when it comes to policy priorities, reforms, and the re-allocation of public resources in the decades to come. In spite of potential gains from digitalization, the demands on public coffers associated with preparation for the digital and green shifts – through reskilling, life-long-training, and infrastructure investment – will probably not ease these strains. Still, as indicated by the rising employment rates among the senior population, there are considerable untapped sources of labour, not least among women. In addition, the sizable Nordic variations in average annual working time – roughly 15% higher in Sweden and Finland than in Denmark and Norway (OECD Statistics 2018) – suggest that measures enabling longer working hours and careers among female part-timers can make a notable difference.

4.2.2 Changing boundaries: Erosion of the model from below?

Several of the global megatrends have already made their mark on Nordic working lives. Following the Eastward enlargements of the EU since 2004, the rising influx of labour migrants and workers posted by foreign subcontractors has altered the terms of competition and opened new channels for hiring labour outside the reach of traditional employment regulation in several industries. The challenge of low-wage competition has triggered high-profile judicial and political strife regarding the interfaces between national and European law. In the Laval, Viking, Olkiluoto, and STX/yard cases (see Evju and Novitz 2014), national labour law and organized actor practices in the Nordic countries were subject to trial in the EU and EFTA courts.

[23] For instance, calculations made for a government-appointed commission in Norway indicated that immigration would contribute to an increase in public funding needs in the range of 2.4–3.5% of GDP 2016-2060 (Holmøy *et al.* 2017; NOU 2017: 2). As this partly reflects the fact that the returns on the oil fund due to immigration must be divided among a larger population in Norway, projections from other Nordic countries indicate somewhat lower figures (Malchow-Møller and Skaksen 2009; Sanandaji, 2016).

In order to halt the rise in wage dumping, circumvention of rules, and work–life criminality, Nordic governments and social partners have chosen different approaches. While Finland and Iceland introduced statutory generalization of minimum terms in collective agreements in the 1970–80s, which Norway has also done more recently – Denmark and Sweden have relied on their tradition of trade unions striking collective agreements with foreign firms, by means of industrial action if necessary. In all instances, however, this has implied the establishment of new tiers of wage regulation following the 2004 EU enlargement, where foreign and especially posted workers are often remunerated at lower levels than comparable native workers, whose conditions have thus come under pressure (Arnholtz *et al.* 2018; Lillie *et al.* 2014).[24] Ageing and economic progress in Eastern Europe may lead to reduced labour emigration from these countries and may, in combination with arising labour shortages in Germany and other continental countries, lead to intensified competition for labour in the EU/EEA single market. This implies that the Nordic countries might also experience increased outward migration. Still, geographical proximity and persisting discrepancies in wages and living conditions between the "new" and "old" EU/EEA states give reason to assume that the flows of Eastern labour to the Nordic countries will not disappear, but the volume is likely to recede. If a stagnant domestic supply of labour leads to tighter labour markets, the market conditions for countering low-wage competition can thus be expected to improve.

Declining unionization and bargaining coverage

The external pressures on the Nordic labour market regimes have accentuated longer-term tendencies of decline in trade union organization. On average, union density in the Nordic countries[25] has fallen by 11 percentage points since 1995: the most in Finland and Sweden (16 points) and the least in Norway and Denmark (6–7 points) (Nergaard 2018). With the exception of Norway, the decline was accelerated by political changes in national unemployment insurance funds (the Ghent systems; A-kasser) before and after the turn of the century. Since 2010, the downward slope has thus flattened. The largest drops have occurred among blue-collar employees and in private services, while union density is stable or rising among employees with higher education in the public sector. Even in well-organized Denmark, the fall in unionization has spurred erosion of the workplace tier of labour relations in several industries, especially in private services (Toulborg *et al.* 2016).[26]

Yet, since employer rates of organization have been stable or rising, collective agreement coverage in the private sector has remained quite stable, at high levels in

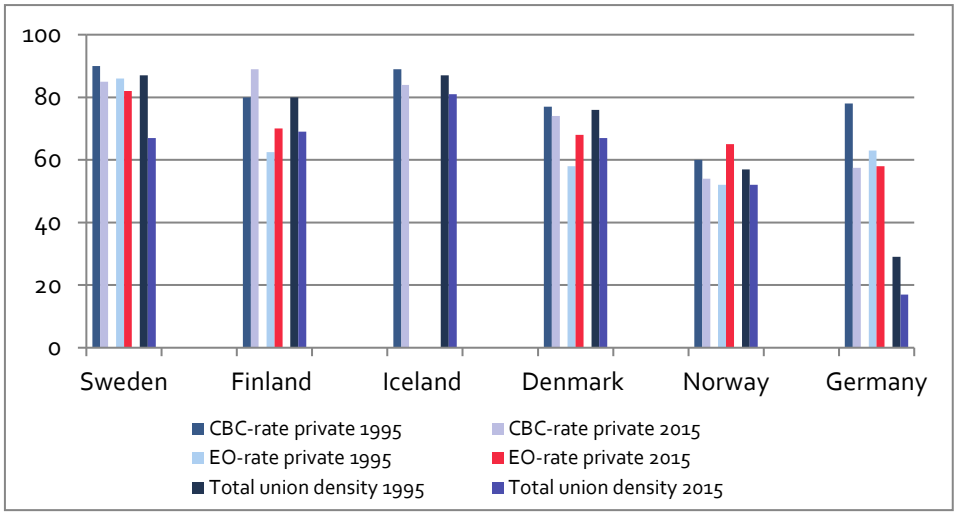
[24] In Norway, such segmentation has been amplified in several sectors by the hiring of temporary agency workers from Eastern Europe, where – until recently – no wage regulations applied in the Norwegian case; this is in contrast to Sweden where agency workers are covered by collective agreements and are entitled to pay between assignments (Alsos and Evans 2018).

[25] Iceland is exempted here due to patchy data and the small denominator.

[26] Such tendencies have been more accentuated in Norway, where unionization in sectors such as retail, hotel, restaurants and accommodation, and transport is well below 20%, and only a minority of firms have a shop steward or collective agreement (Barth and Nergaard 2015).

Finland (85%), Sweden (84%), Denmark (74%), and likely Iceland,[27] while the level is markedly lower in Norway (49%) (Nergaard 2018). A certain decline has been visible in all countries, however. As shown in numerous studies, collective agreement coverage varies with firm size and is much higher in manufacturing and public sectors than in the growing private services sector – this also applies to unionization. Union density is also markedly lower among employees with shorter tenure and residency, little education, a younger age, and atypical or temporary positions, the incidence of which is high in parts of the private services sector (Andersen *et al.* 2014; Nergaard *et al.* 2016). If the predicted growth in work through digital platforms materializes, it may reinforce the tendencies towards fragmentation and externalization of employment. The development of non-standard and independent work is the subject of the analyses in Pillar III of the NFoW project, and the development of platform work is addressed in Pillar IV (see overview in Chapter 6).

Figure 4.9: Trade union density (total), employer organization rate, and collective agreement coverage in private sector, 1995–2015*



Note: *Some of the bars are based on figures from the years closest to 1995 and 2015.

Source: J. Visser, ICTWSS database 5.1, 2016.

Segmentation and changing dividing lines

Third-country immigrants and labour migrants tend to be overrepresented in industries and workplaces where atypical contracts are widespread and the organization rates are low. The declining union presence in the workplace has thus coincided in parts of working life with rising shares of immigrant workers and other vulnerable groups with scant power resources. In effect, on the workplace level, the tendency of erosion in the organizational foundations of the Nordic model has been most pronounced in areas of the labour market where non-standard work has been spreading, the competition for

[27] Comparable figures are not available from reliable data sources.

jobs has hardened, and the concentration of disempowered, fluid labour, often of foreign origin, is strongest.

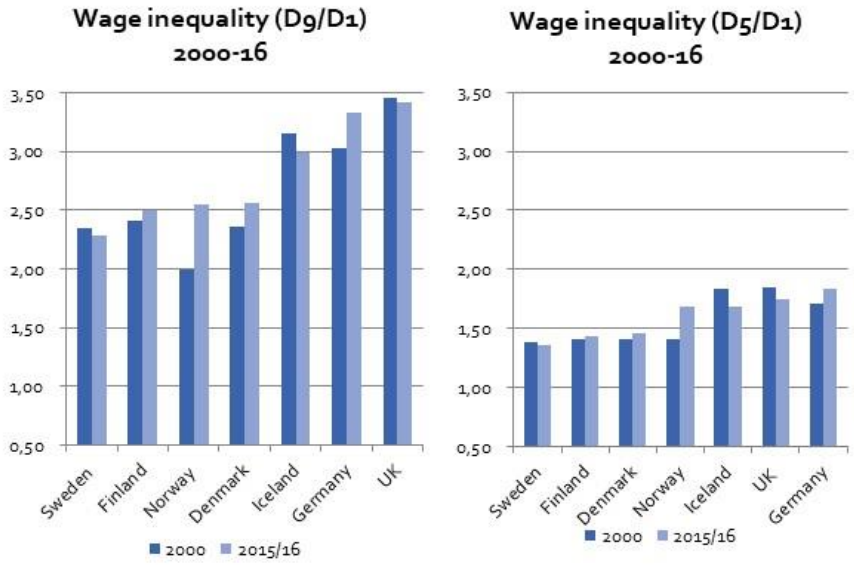
Such dynamics towards more segmented or dualized labour markets, where important divisions tend to follow ethnic and educational lines, may – if not counteracted – result in a development where the Nordic model is increasingly preserved for resourceful, well-integrated groups while those most in need of protection tend to fall on the outside. If, as many expect, the digital shift leads to declining employment in the middle of the job ladder (polarization) and more outsourcing, atypical contracts, free-lancing and platform work, intensified competition for jobs and pay in the lower rungs is likely to exacerbate these tendencies.

Growing inequalities

The changes highlighted in this chapter have come along with increased wage inequality in three of the five Nordic countries, mostly in the private sector. The exceptions here are Sweden, where high collective agreement coverage and solid job growth in the past decade have kept wage dispersion in check, and Iceland, where the formerly highest Nordic wage gaps diminished in the wake of the financial collapse (see Figure 4.10). In Finland, where coverage is also high and extension of agreements is routinely used, wage dispersion has only risen modestly – despite rising unemployment, restructuring, and declining labour demand during the crisis – and much less than in Denmark and Norway. In the latter two countries, collective agreement coverage is lower and the influx of migrant labour has been higher. In Norway especially, where less than two out of every five employees in the private sector are organized and the inflow of labour immigration has been highest, the growth in wage inequality has been among the strongest in Europe – even in the lower half of the wage distribution (Dølvik and Marginson 2018).[28]

[28] While earnings inequality measured by the D9/D1-ratio increased from 2000 to 2015 by between 4 and 10 percentage points in Finland, Denmark and Germany, respectively, and decreased in Sweden, the increase in Norway was 27.5 percentage points (OECD.stat).

Figure 4.10: Development of wage inequality 2000–2016, Decile 9/decile1 and decile 5/decile1



Source: OECD.stat.

The distributive effects of the transition towards the future of work – and possible measures to prevent rising disparities – is a crosscutting issue that all of the pillars of the NFoW project will be attentive to. If the technologically-driven polarization of work predicted in many studies materializes, a possible scenario is that, unless they get access to adequate re-training, many redundant workers in the "squeezed middle" will have to compete for jobs in the low-skilled segments, where the supply of labour is already abundant. As this is likely to unleash downward pressures on pay and conditions in the lower ends of the labour market, while increased demand for skills in the high end will drive up wages, there is an obvious risk for widening wage gaps. If ageing and other pressures on the transfer and tax system simultaneously lead to further retrenchment in the welfare benefit system, the dynamics towards increased income inequality will be magnified. Yet, warning us that the increased use of artificial intelligence and robotics in working life will contribute to "greater wage inequality, greater income and wealth inequality and probably more unemployment and a more divided society", the Nobel Prize laureate Joseph Stiglitz also reminds us that "none of this is inevitable" if politicians change the rules of the game (Stiglitz, Guardian 12.9.2018).

4.2.3 Taking stock and looking forward: Continuity or break?

So, how well have the Nordic models weathered the global megatrends thus far, and what does this tell us about their ability to handle the changes at work in the future? It is no doubt that the past decades of financial unrest, high immigration flows, technological renewal, and restructuring have revealed cracks in the still well-regulated Nordic working life models. The past hallmarks of encompassing collective bargaining,

limited inequality, and vital workplace partnerships with the capacity for negotiated adaptation can no longer be taken for granted.

In this chapter, we have also noted that most Nordic countries have felt compelled to tighten social benefit systems, and that they have had mixed success in integrating the growing immigrant population into working life and curbing the rise in inequality. On a positive note, comprehensive pension reforms have contributed to rising participation rates among the 60+ generation.

In a comparative perspective, the trends towards segmentation or dualization of the labour market have clearly been stronger in other parts of Europe, where for instance the weighed union density in the EU as a whole is now down to 23%, and non-standard, casual work has proliferated. A salient example is Germany: after the reunification, which profoundly widened the labour market, Germany saw glaring gaps in wages and conditions opening up while unionization dropped well below 20%. Change can thus occur rapidly. A consequence, however, was that the governing coalition of Christian and Social Democrats initiated vigorous measures to turn the trend. In 2015, legal reforms allowing the extension of collectively agreed minimum wages in all sectors were launched, underpinned by the introduction of a statutory minimum wage meant to serve as a safety floor under collective bargaining (Müller *et al.* 2018).

There are no indications that the current external and internal pressures on the Nordic models will abate in the coming decades. The question for the NFoW project is thus how the *additional pressures* for change arising from digitalization and the other megatrends will interact with the already ongoing processes of change in Nordic working lives. Several of the megatrends can be viewed as a continuation, or amplification, of familiar dynamics – for instance, globalization and the associated deindustrialization of employment. In fact, the pace of technological renewal and job destruction (and creation) in the Nordic economies has long been high – as demonstrated by the sweeping restructuring in banking, manufacturing, and telecommunication that has occurred since the 1980s. However, some of the drivers behind the green and digital shifts clearly may set in motion more disruptive, path-breaking transformations in the content, organization and governance of work.

The Nordic governments have taken notable initiatives to prepare the Nordic societies for these changes. A range of commissions, committees, research programmes and task forces have been set up, and numerous white papers and reports have been published (see e.g. SOU 2015: 91; 2015: 65; 2016: 89; 2017: 24; NOU 2016: 3; Danish Government 2018; Ailisto *et al.* 2016). Further, the Nordic Council of Ministers has established an ad-hoc ministerial council (MR-Digital) for the period 2017–2020, assigned to develop joint Nordic–Baltic initiatives promoting cross-border digital services, digital innovation aimed at companies, and completion of the EU digital single market.[29] Aiming to make the Nordic–Baltic area the most digitally integrated region in Europe, the Nordic Prime Ministers recently announced an initiative to "lead the world in developing and rolling out the fifth generation wireless network (5G)."

[29] https://www.norden.org/no/information/om-det-nordiske-samarbeidet-om-digitalisering

The Nordic models' future capacity to handle familiar technological rationalization and restructuring will depend in part on the political and social actors' ability and will to shore up their ailing foundations. One resource in this respect is the Nordic workers' and trade unions' attitudes towards technological change, which seem to make them less concerned that it will undermine jobs and employment than their peers in most other European countries. In a recent Eurobarometer survey, Nordic countries were among those where the citizens had the most positive perceptions of digitalization's societal and daily life effects.[30] In a Finnish representative survey among 15–79-year-old citizens, 71% did not believe that technological unemployment will become a lasting problem (Anttila *et al.* 2018). In another survey of Finnish shop stewards, 72% held that the introduction of new technologies had not had any detrimental effect on employment (SAK 2018).

To take full advantage of this trust in technological progress, however, a reversal of the tendencies towards more disorganized labour relations is warranted. The prospects for smooth, fair handling of the digital and green shifts are definitely higher if the micro-tier of labour relations is kept intact and agile. In several sectors – such as retail, transport and logistics, where the immediate impact of digitalization is likely to be hard – that is not a straightforward task. Considerable support from the state and peak associations is warranted: for instance, in developing incentives and rules that foster interest in organizing and collective problem-solving among companies and (new categories of) employees. If such commitment is there, it is plausible to hypothesize that the Nordic model will be better equipped to handle the continuous, non-disruptive changes arising from globalization and climate change than most comparable models.

When it comes to the more path-breaking technological changes associated for example with the application of artificial intelligence, the impact on Nordic working lives is far more difficult to assess. The potential for innovative application in new products, services and forms of production is indeed immense (Brynjolfsson *et al.* 2018; Teknologirådet 2018), but the timespan, extent and ways in which they will penetrate our working lives are uncertain. The dissemination of such path-breaking innovations in ordinary companies depends on the feasibility and economic viability of buying and using them, which vary profoundly among the majority of small and medium-sized firms that prevail in Nordic working lives. A recent survey showed that 33% of affiliated firms in the main employer confederation (NHO) in Norway had implemented some form of digitalization or automation of processes or work tasks by 2016, mainly related to information sharing; 12% had made use of robots, drones or robotics, and 20% of so-called big data (NHO Kompetansebarometer 2017). The vast majority, in other words, had not implemented any digitalization measures beyond plain information sharing. In the same vein, a survey conducted by the Confederation of Finnish Industries (EK) shows that as much as 40% of their member companies do not think that digitalization is important for them and that digitalization is not among their key strategic objectives. Only 10% regard themselves as digitalization frontrunners in their industries (Alasoini

[30] https://ec.europa.eu/digital-single-market/en/news/attitudes-towards-impact-digitisation-and-automation-daily-life

2018). Among Finnish SMEs, only 2–3% make use of new, more disruptive digital opportunities (such as big data, the industrial Internet or the platform economy) and very few have plans of doing so in the near future (Pk-yritysbarometri syksy 2017, in Alasoini 2018).

As emphasized earlier, the dissemination and impact of novel technologies on working life are contingent on a range of legal-institutional, competence-related, and market-reliant factors where developments are extremely hard to predict. It took a long while from when the steam engine was invented until it was taken into commercial use, and the same applied to the US military's development of the Internet's predecessors in the early 1960s.[31] More recently, six to seven years after Uber was hailed as an innovation that would instantly revolutionize taxi businesses around the globe, its main business concept (Uber-Pop) remains illegal in four out of five Nordic countries (and absent in Iceland), and Uber has been obliged by the ECJ to comply with national transport regulation all over Europe.

This points to the salience of legal regulation and institutions in shaping the use of new digital technologies in the commercial production of goods and services. The organization of platform work, where "algorithms serve as boss", prompts a series of legal questions pertaining to the contractual status of those doing, mediating and purchasing the work. What are their rights and duties regarding price setting, taxation, social charges, remuneration, termination of contract, and worker and welfare rights (Prassl and Risak 2016; Hotvedt 2018)? Thus far, the expected acceleration of freelance platform work has failed to materialize in the Nordic countries (Dølvik and Jesnes 2018; Illsøe *et al.* 2017; SOU 2017: 24; Statistics Finland 2018); a reminder that the growth of novel industries is contingent on market forces on both the supply and demand side – even in so-called two-sided markets (Alsos *et al.* 2018). As long as unemployment is low and most Nordic people seem to prefer permanent wage-earner jobs, the attractiveness of business and work relationships premised on lower remuneration and higher risks has proven limited. The main exception is among groups struggling on the margin of the labour market or seeking extra work to top up income. As the Nordic models are tailored to the needs of both sides of the wage-earner relationship, new agents operating outside those frameworks are entering terrain where the economic and legal risks on both sides are unknown – seldom a good basis for rapid market expansion.

To sum up, Nordic working lives are in no way unfamiliar with several of the drivers and megatrends expected to shape the future of work. So far, they have been fairly successful in coping with these pressures for change, but in some areas worrisome cracks have occurred. Although the future of work is not a function of technological determinism, there is reason to assume that the combined impact of the leap in digital technology, climate change, and the continuation of the other megatrends will subject the Nordic models to a real test of their adjustment capacity and cohesion. In the next chapter, we will single out some of the areas where we expect the need for renewal will be most strongly felt.

[31] https://en.wikipedia.org/wiki/ARPANET

5. The Nordic model in transition towards the future of work

How will the Nordic model fare in a digitalized, greener future of work? Will the model serve as an obstacle or a comparative advantage in reaping the benefits of the coming transformations? In which ways will the trends of change conflict with central tenets of the model, and in which areas will renewal or repair of existing cornerstones be required?

These are central issues in the NFoW project. At this initial stage, it would indeed be premature to anticipate findings and conclusions that might emerge. The main aim of this report is to develop questions and perspectives through which this huge theme can be constructively approached by the main actors and stakeholders of the Nordic models. The impact of the main drivers and megatrends described in Chapters 2 and 3 will be filtered by institutions and mediated by the economic, social and political choices taken by the involved actors and organizations. Dynamics pulling in one direction often trigger countervailing forces, and, as always, completely unforeseen events are likely to push things in unexpected directions. In the future scenarios of the 1980s, the fall of the Berlin Wall or the surge of China in global trade never featured. Further, the processes and actors shaping the future of work are operating across very different societal domains – businesses, markets, politics, courts, science and so forth – and at a multitude of levels, from the factory floor to the peak echelons of supranational bodies. Not least, they are becoming more closely connected across boundaries and continents. Attempts to predict how things will play out and how they might affect different working life groups are therefore infested with uncertainty and a high likelihood to fail. Instead of searching for precise answers or scenarios for how the Nordic future of work may evolve, the most useful approach to the project is to paint with a broad brush and search for knowledge that is actor- and policy-relevant. The more the project's studies incite the actors to develop their own deliberations and "take" on how to meet the opportunities and threats that will arise, the better.

As indicated in the introduction, we have chosen a medium to long-term time perspective – 15–20 years, i.e. 4–5 electoral rounds – to ensure that the issues addressed are close enough to make current politicians and actors realize that they ought to start preparing now if they want to influence the course of change. In the mid-2030s, a large share of the current workforce, working life leaders, and politicians will still be working, and the UN 2 degree objective will be long gone unless bold action is taken in the coming decade.

5.1 New challenges arising

In view of the background and trends described in this report, we will outline below some of the challenges that we envisage will become central in the societal debates regarding how Nordic working lives can be affected by, and made fit for, the changing future of work. As this is a work in progress, consider these as tentative guiding hypotheses for the subsequent studies that will be undertaken in the project:

- Given that Nordic working life actors have always embraced new technology and knowledge, it goes without saying – although it is beyond the scope of this project – that the strong Nordic record in fostering innovation, R&D, and investing in renewed technical, physical, environmental and social infrastructure must not only be maintained but stepped up considerably if we are to master the green, digital, and demographic shifts.
- Given the predicted polarization of labour markets and skill structures associated with further digitalization, along with the limited potential for automation of many non-routine, manual services jobs, huge renewal efforts are probably needed in the field of occupational skill formation, re-training, and further education to avoid growing skill mismatches, wage gaps, and exclusion in the lower end of the labour market. Given that the majority of the 2035–2040 workforce is already in employment, improved arrangements and capacity for in-work, lifelong training seems warranted in particular. As the educational systems are often poorly equipped to match this challenge, Icelandic and Danish examples demonstrating that social partners, supported by the state, can find new, inventive ways to resolve this pressing issue, may show a way ahead. The prospect of intensified cross-border competition for skilled labour in the single market, due to the shrinking, ageing European workforce, may further accentuate the importance of tackling these issues.
- Given that the Nordic labour and welfare regimes are built around the wage-earner relationship, the prospects of more non-standard work and fragmentation of employment relationships arising from digital outsourcing and platform work suggest that considerable efforts will be needed to better align the systems of social insurance, labour rights, and regulations with the needs of those falling outside the traditional Nordic arrangements. This is important to prevent new forms of marginalization and inequality – not least among the growing immigrant populations. Contrary to those citing digitalization as reason for giving up on the credo of "right to work for all" – instead proposing a flat "citizen income" for all – our guiding hypothesis is that technological change in general is reconcilable with creating new and more jobs in other areas. A precondition is, however, that proper arrangements for distribution of the value added provided by use of novel technology, including those enabling increasing returns to scale, are in place – at the company level, nationally, and transnationally. The latter points to the need for maintenance and renewal of the redistributive function of taxation systems.

- Given the potentially detrimental impact on the organizational cornerstones of the Nordic working life models expected from further outsourcing and fragmentation of work into mini-jobs or "gigs" in digitalized, transnational production systems, the organized actors are likely to face tough challenges in reversing the tendencies towards erosion of the Nordic model in several sectors. International experience suggests that such a turnaround requires support from the state in making organizing feasible and attractive for employers and employees alike. Alternatively, and contrary to the Nordic legacy, the state may assume a more prominent role in working life (re-)regulation. In view of the sweeping restructuring of companies and industries foreseen during the leap into a carbon-free, digitalized economy, a critical question is whether the micro-tiers of the Nordic model are still ready for the task. If not, how can the energy and trust needed to engage in demanding and potentially risky processes of innovative adjustment at the workplace be revitalized? Faced with the prospects of downsizing, job-losses, and movement into new areas or places of work, demand for new forms of public support for mobility and income security along the way will probably also arise.
- Given the severe labour market effects of the past decade's financial instability, the rise in household debt, and the changes in the EU economic governance regime in the wake of the euro crisis, it is pertinent from a future of work perspective to emphasize the central role the macro-economic policy pillar of the Nordic models has played in generating job opportunities and high employment, and preventing social exclusion. In view of the present constraints on monetary policy regimes, given the ample access to cheap money and low interest rates around the globe, the prospects of growing expenditure on elderly, infrastructure, integration, retraining and so forth will in all reckoning make maintenance of robust public finances and buffers for rainy days even more important in the coming decades. Aside from the growing need to prioritize between competing public purposes, reinforced tax competition among states, corporate tax-shopping, and more fluid tax bases propelled by digitalization will require political imagination to secure a sufficiently fair and broad tax base to underwrite fiscal policies that can meet the Nordic expectations of full employment and low inequality.
- Finally, given the Nordic economies' dependence on international trade and investment, a fundamental precondition for being able to maintain the Nordic model through the green and digital shifts is to preserve predictable multilateral regimes for international economic exchange. Nordic trade unionists often state that they are not afraid of new technology, only of old technology, but they have – like other stakeholders in the Nordic model – good reasons to be concerned about the recent outbursts of protectionism and isolationism witnessed in Brexit,

the White House, and elsewhere.[32] Used to benefitting from the world's largest single market as an extended home market, a fragmentation of the EU and a break-up of the global regimes regulating trade, measures against global warming, and product and labour standards would indeed represent a severe threat against the legacy of the Nordic model and the actors' engagement in promoting decent and sustainable working lives internationally.

This is only a tentative, non-exhaustive list of issues we believe Nordic policy-makers and social partners ought to be attentive to in their preparations for the future of work. Across the different areas of change foreseen in the future of work, however, there is one common denominator that has become salient already in the initial stage of the project: whereas the Nordic economies and working lives have been privileged by their strong and adaptive institutions, they are now apparently entering a phase where their ability to reap the benefits and master the challenges that are arising increasingly will depend on the actors' capacity to foster *institutional innovation*. Be it in the areas of life-long learning, protection for new categories of labour, inclusion of groups with poor or no primary schooling or preventing inequality and ensuring that all actors are contributing to the common good according to ability, the preparations needed to become fit for the future of work involve engagement in imaginative renewal and reconstruction of the work and welfare institutions that we once inherited from the pioneers of the Nordic model.

[32] See for instance the recent UN speech by US President Donald Trump, where he emphasized that "We reject the ideology of globalism, and we embrace the doctrine of patriotism" (Ward 2018).

6. Further agenda for the Nordic Future of Work project 2018–2020

This final section gives an overview of the main themes to be studied in the six remaining pillars of the project. The work in each pillar is done by a specialist team of Nordic researchers. A central aim is to facilitate public discussion and cross-fertilization between the various pillars through lectures, conferences, workshops, and the dissemination of discussion papers. After this initial report from Pillar I on the main drivers of change, Pillars II–IV will dig further into the dynamics and consequences of change in three specific areas:

- *II. Digitalization and robotization of traditional work* (coordinator Bertil Rolandsson, University of Gothenburg). This pillar analyses and compares changes in the occupational and wage structures in the Nordic countries, and undertakes qualitative studies of the impact of digitalization and robotization on the number and structure of jobs in the Nordic countries. Studies of changes in work organization, the need for skills, employment relations, and work environments are undertaken in a selection of Nordic manufacturing companies. Supplemented by focus group studies of the impact of technological change in a number of services industries, a central issue is how the restructuring prompted by the digital shift is handled by management, labour, and the social partners in these industries.
- *III. Self-employed, independent work, and new forms of externalized, flexible contracts* (coordinator Anna Ilsøe, FAOS/University of Copenhagen). Providing a comparative review of causes, incidence, and consequences of atypical work in the Nordic countries, this pillar will pay special attention to the emergence – often under the radar – of new forms of non-standard work. What are the drivers and consequences, and what kinds of methodological tools are needed to develop a better understanding of how and why such new forms of work are expected to flourish in the future?
- *IV. New labour market agents – platforms and crowds as mediators, managers, and undertakers of work* (coordinator, Kristin Jesnes, Fafo). This pillar will compare the evolution of platform work both at the aggregate national levels, and through case studies of prominent platform companies in the Nordic countries. Special attention is paid to the motives for and benefits and consequences of engaging in these kinds of activities among the workers, customers, platform owners, and the broader society. Besides the distribution of risks and gains, a central question is thus how government regulations and social partner initiatives may affect the development of such businesses and the situation of their users.

These three, interrelated pillars will, in view of the specific dynamics of change in each area, focus on the *consequences* for the content and nature of work, the labour market and possible policy responses. More specifically, how are the developments in these areas likely to impact on (a) employment, productivity, recruitment, labour market segmentation, and social and gender inequalities; (b) skill requirements and training systems; and (c) work organization, working environment, and employment relations? And to what extent do we see an upgrading, degradation or polarization of work?

In this view, the ensuing three pillars will focus on the needs and possible avenues for political-institutional response aimed at influencing the future of work in the Nordic countries:

- *V. Occupational health consequences and challenges to Nordic health and safety regimes* (coordinator Jan Olav Amundsen, STAMI, Oslo). The pillar consists of two main parts: 1) A literature study to summarize knowledge about the impact of digitalization and new technology on the psychosocial work environment and health (e.g. "stress" and "stress"-related health complaints), and 2) A Delphi study comprising the views of Nordic experts on what the main upcoming challenges are in this field, and how they should be faced.
- *VI. Labour law and regulations – needs, hurdles, and pathways for legal reform* (coordinators, Marianne Jenum Hotvedt, University of Oslo, and Kristin Alsos, Fafo, Oslo). Focusing on specific labour law implications within the central areas of change, this pillar has a twofold aim: first, to identify how change and developing trends affect and challenge the regulatory framework of labour law in the Nordic countries; and second, to suggest possible avenues for legal development and regulatory reform in a Nordic context.
- *VII. Final report: A Nordic path towards the future of work?* (coordinator Jon Erik Dølvik, Fafo, Oslo). Given the future changes at work and the likely gaps opening up in the Nordic models identified in the former studies, the aim of this pillar is to explore and discuss the conditions for institutional innovation and revitalization of the interplay between markets, organized interests, and the state in the Nordic model of labour market governance.

In order to stimulate Nordic debate, exchange of experiences, and knowledge development throughout the course of the project, the final reports from each pillar occurring in the TemaNord series will be preceded by a variety of conference presentations, workshops and discussion papers.

All outputs from the project and links to relevant information can be found at the project website: https://fafo.no/index.php/forskningstema/prosjekter/aktive-prosjekter/item/the-future-of-work-2.

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Sammendrag

Hvordan vil arbeidslivet i de nordiske landene endres i framtiden? Dette er det overordnede spørsmålet for prosjektet "The Future of Work: Opportunities and Challenges for the Nordic Models", finansiert av Nordisk Ministerråd. I denne innledende rapporten fra prosjektet beskrives de viktigste drivkreftene og trendene som forventes å forme framtidens arbeidsliv. Rapporten drøfter videre hovedtrekk ved de nordiske modellene og sentrale endringer i arbeidslivet, samt hvilke utfordringer framtidens arbeidsliv kan skape for de nordiske modellene.

Fortidige, nåtidige og framtidige endringsprosesser i arbeidslivet formes av en rekke faktorer. Debatten om framtidens arbeidsliv har likevel ofte et snevert fokus på teknologiske endringer, mens andre viktige faktorer som påvirker arbeidslivet ofte blir oversett. I litteraturen om framtidens arbeidsliv ser vi likevel en økende konsensus om de viktigste driverne – eller megatrendene – som ventes å forme framtidens arbeidsliv. I tråd med ILOs Global Commision on the Future of Work (ILO 2018) trekker vi i denne rapporten fram fire slike megatrender: Globalisering og endringer i teknologi, demografi og klima.

- *Demografiske endringer*, i hovedsak knyttet til aldring og migrasjon, vil i de kommende tiårene redusere arbeidsstyrkens størrelse relativt til antallet eldre og pleietrengende i befolkningen. I EU/EØS-området ventes befolkningen i yrkesaktiv alder å falle med ca. 45 millioner fra 2016 til 2080 (mest før 2050), mens antallet eldre (65+) vil øke med mer enn 50 millioner. Den største økningen vil komme blant de svært gamle (80+). Dette vil bidra til en dramatisk økning i forsørger/omsorgsbrøken, fra 29 prosent til 50 prosent (Eurostat 2018). Selv om de demografiske endringene er ventet å bli noe mildere i Norden, unntatt i Finland, kan arbeidskraftknapphet og hardere konkurranse om arbeidskraft i EUs indre marked ventes å begrense arbeidsmigrasjon til de nordiske landene. Samtidig forventes urbanisering å forsterke geografiske skiller i de nasjonale arbeidsmarkedene. Kombinert med rask vekst i befolkningen i yrkesaktiv alder i verden for øvrig – spesielt i Afrika – er det grunn til å regne med at både pull – og push-faktorer vil bidra til vedvarende innvandringspress i Europa.
- *Klimaendringer* og konsekvensene i form av tørke, flom og ekstremvær kan føre til humanitære kriser og utløse utvandringsbølger fra sårbare regioner. Nødvendige tiltak for å begrense global oppvarming vil bidra til press for rask omstilling i en rekke bransjer, bedrifter og lokalsamfunn – også i de nordiske landene. Overgang til fornybare energikilder og utslippsfri transport og produksjon vil medføre store endringer i virksomheter og produksjonskjeder. Tilpasningstiltak, inkludert relokalisering og gjenreising av infrastruktur, bygninger og produksjonsanlegg vil påvirke arbeidslivet og arbeidsplassene også for mange nordiske borgere. De

fleste anslag tyder på at det grønne skiftet vil bidra til en beskjeden netto-vekst snarere enn nedgang i sysselsettingen, men det vil likevel være en betydelig utfordring å sikre at berørte arbeidstakere får nødvendig støtte og omskolering for å mestre endringene i arbeids –og hverdagslivet.

- *Globalisering* av produksjon, handel, direkte investeringer og finans har, i likhet med europeisk integrasjon, vært en langsiktig trend som nærmest har blitt tatt for gitt. Brexit og utbrudd av proteksjonisme i ulike verdenshjørner indikerer likevel at en delvis reversering eller oppbremsing av globaliseringen ikke kan utelukkes. De små, åpne nordiske økonomiene er avhengige av forutsigbar internasjonal handel og kommunikasjon, og har samlet sett høstet store gevinster av globaliseringen. I en internasjonal økonomi med finansiell ustabilitet og økende gjeld, vil en svekkelse eller undergraving av de multilaterale internasjonale styringssystemene innebære økt økonomisk, regulatorisk og miljømessig usikkerhet, og medføre skadevirkninger for nordisk arbeidsliv. Digitalisering og stadig tettere sammenkoblede nettverk har gitt globaliseringen en ny dimensjon. Den digitale økonomien endrer samtidig konkurranse- og maktforhold, og vinneren-tar-alt dynamikken i det digitale markedet ser ut til å utfordre nasjonalstatene på en måte som vil kreve mer, ikke mindre, multilateralt samarbeid og regulering av den internasjonale økonomien.
- *Teknologisk endring*, inkludert stadig raskere datamaskiner, robotikk, kunstig intelligens og bioteknologi – sammenfattet i begrepet om en fjerde industriell revolusjon – utgjør i økende grad bakteppet for diskusjoner om framtidens arbeidsliv. Selv om teknologisk innovasjon ikke er et nytt fenomen, åpner digitaliseringen muligheter til rasjonalisering, automatisering og fragmentering av arbeidsoppgaver i et hittil ukjent omfang. Den eksponentielle veksten i regnekraft, kombinert med stadig bedre algoritmer, nettverk og stordata, har skapt grunnlag for framvekst av globale mega-selskaper som ved hjelp av fallende marginalkostnader kan oppnå monopol-liknende posisjoner og markedsmakt som gjør dem i stand til å omgå nasjonale reguleringer. Automatisering av både kognitive og manuelle oppgaver, og digitale plattformer som matcher arbeidsoppgaver og arbeidstakere på nye måter, kan føre til økt outsourcing, oppstykking av arbeid og polarisering av arbeidsmarkedet. De fleste jobber vil bli påvirket av teknologien, mange vil forandres fundamentalt, noen vil forsvinne og nye vil komme til. Det er derfor stor usikkerhet knyttet til de netto sysselsettingsvirkningene og hvor omfattende endringene vil bli. I lys av pågående teknologiendringer og det grønne skiftet er det uansett sannsynlig at vi går inn i en periode med intensivert restrukturering i arbeidslivet hvor behovet for omskolering, livslang lærling og mobilitet vil øke. Et kjernespørsmål er om de nordiske arbeidslivsmodellene fortsatt vil evne å håndtere omstillinger og innfasing av ny teknologi på en effektiv og inkluderende måte. Ettersom de nordiske landene figurerer høyt på internasjonale rangeringer av bruk av digital teknologi, innovasjon, humankapital, tillit og tro på teknologiske fremskritt, kan de virke bedre rustet til å takle det grønne og det digitale skiftet enn de fleste sammenlignbare land. Den digitale teknologien kan imidlertid utfordre

> hjørnesteiner i de nordiske arbeids- og velferds–modellene, som i stor grad er bygget rundt arbeidstakerforholdet og hvor små forskjeller, jevnbyrdige maktforhold og flate strukturer har vært ansett som komparative fortrinn. Dersom digital disrupsjon bidrar til økt polarisering i arbeidslivet og rutinejobber som krever middels kompetanse – hvor fagbevegelsen og avtalesystemet har stått sterkt – forsvinner, er det risiko for at de seinere års ulikhetsvekst blir forsterket, og at vi "går mot et samfunn med økte kløfter" (Stiglitz 2018).

I flere bidrag til debatten om framtidens arbeidsliv antas det at de potensielt ulikhetsskapende virkningene av digitalisering og kunstig intelligens vil bli forsterket av de øvrige megatrendene, slik at økende ulikhet utpekes som en selvstendig megatrend (se World Economic Forum 2018). I denne rapporten ser vi derimot økende ulikhet som et mulig endogent utfall snarere enn eksogent gitt, dvs at fordelingsvirkningene vil avhenge av de politiske og institusjonelle rammene framtidens arbeidsliv utvikler seg innenfor. I kontrast til forestillingen om at økt ulikhet er uunngåelig i en globalisert økonomi, har Barth og Moene (2012) vist at de mest globaliserte, åpne økonomiene gjerne har minst sosial ulikhet.

Arbeidslivsvirkningene av mega-trendene er således verken rettlinjete eller umulige å påvirke. Trendene kan trekke i ulike retninger, de kan bli svakere enn forventet eller til og med gå i revers. Hvilke muligheter og trusler de skaper for arbeidsplasser og arbeidsmiljø vil avhenge av markedsforhold, responsene fra sentrale aktører i økonomien og produksjonslivet, samt hvordan de underliggende trendene filtreres av institusjoner og politikk – i ulike bransjer, regioner, land og samfunnsmodeller. Utviklingen av framtidens arbeidsliv er dermed verken forutbestemt av teknologiske endringer eller andre globale megatrender. Utfallet av disse endringskreftene vil bli formet av politikk og institusjoner, og vil trolig utvikle seg langs ulike nasjonale spor og variere betydelig mellom bransjer og ulike grupper arbeidstakere.

Europeiske land har utviklet ulike arbeids- og velferdsmodeller, der den nordiske modellen anses som distinkt fra de liberale arbeidsmarkedene og begrensede velferdsstatene i angelsaksiske land og de mer statsregulerte arbeidsmarkedene og yrkesbaserte velferdssystemene i de kontinentale landene. For den nordiske triangel-modellen (se Chapter 4), basert på samspill mellom markeder, institusjoner og politikk, er det en forutsetning at aktørene er i stand til å sikre koordinering og sammenheng mellom de grunnleggende politikkområdene eller pilarene i modellen: (1) ansvarlig makroøkonomisk politikk, (2) partssamarbeid og sentralisert koordinering av lønnsdannelsen og; (3) universelle velferdsstater som legger til rette for høy yrkesdeltakelse bl.a. ved brede investeringer i kompetanse (Dølvik *et al.* 2015). Samspillet mellom markedskonkurranse, solidarisk lønnsdannelse, lokalt partssamarbeid og velferdsstatens inntektssikkerhet har blitt sett som en viktig driver av industriell restrukturering, innovasjon og mobilitet. Mens nordisk fagbevegelse har omfavnet ny teknologi, har konkurransen i liberale produktmarkeder gjort at kapital og arbeidskraft har strømmet til de mest produktive virksomhetene (Erixon 2011) og en aktiv arbeidsmarkedspolitikk har forsikret fagbevegelsen om gevinstene av

produktivitetsorientert samarbeid på arbeidsplassene – et typisk nordisk eksempel på "politics with markets" (Jørgensen *et al.* 2009).

Selv om Norden har vært kjent for sin fleksible omstillingskapasitet (Katzenstein 1985), har de siste tiårene med internasjonalisering av arbeidsmarkedene, endringer i teknologi og yrkesstruktur, høy innvandring og finanskriser vist at den nordiske robustheten og tilpasningsevnen ikke kan tas for gitt. Framtidige utfordringer vil komme i tillegg til og samvirke med uløste nåværende problemer bl.a. knyttet til stagnerende sysselsetting, integrering og marginalisering, fallende organisasjonsgrader, voksende husholdnings-gjeld og økt ulikhet. Uten å foregripe resultatene av de påfølgende studiene i prosjektet ser det ut til at følgende tre forutsetninger etter alt å dømme vil være kritiske for at de nordiske land skal lykkes i å takle overgangen til framtidens arbeidsliv:

- Gitt den forventede polariseringen av arbeidslivet og nedgangen i rutinejobber som følge av videre digitalisering, vil det trolig være behov for stor innsats innen yrkesopplæring og videreutdanning for å hindre økende lønns- og kompetansegap og utstøting fra arbeidslivet. Arbeidsstyrken i 2030-årene vil i hovedsak bestå av arbeidstakere som er i arbeid i dag. Bedre ordninger og kapasitet for livslang lærling synes derfor å bli særlig viktig. Ettersom dagens utdanningssystemer gjerne er dårlig rustet til å fylle denne oppgaven kan nye løsninger være nødvendig. Et eksempel på en mulig vei framover er at partene i arbeidslivet, med støtte fra staten, kan finne nye, oppfinnsomme måter å løse dette problemet på, som illustrert av nylige initiativ på Island og i Danmark.
- Gitt utsiktene til mer atypisk arbeid og fragmenterte tilknytningsformer som følge av digitale plattformer og nye forretningskonsepter, synes det påkrevd med tilpasninger i velferdsordninger og rettigheter for de som faller utenfor den nordiske lønnstakermodellen. Dette vil være viktig for å hindre nye former for marginalisering og ulikhet – ikke minst i den voksende innvandrerbefolkningen. En forutsetning vil imidlertid være at en finner gode systemer for å fordele verdiskapingen fra bruk av nye teknologier – inkludert de som gir økende skala-gevinster – på virksomhetsnivå, nasjonalt og transnasjonalt. Dette understreker behovet for vedlikehold og fornyelse av skattesystemenes omfordelende funksjon.
- Gitt omstruktureringene som må forventes i overgangen til framtidens grønne, digitaliserte økonomi, er et kritisk spørsmål hvorvidt organisasjonene i arbeidslivet og særlig det lokale partssamarbeidet fortsatt vil være i stand til å håndtere omstillingsutfordringene. Konfrontert med økende outsourcing og oppsplitting av arbeidsoppgaver til småjobber eller "gigs" i digitaliserte, transnasjonale produksjonssystemer, vil det neppe bli lett for partene å reversere forvitringen av den nordiske modellen som har begynt i flere sektorer. Internasjonal erfaring tyder på at en slik snuoperasjon krever støtte fra staten for å gjøre organisering tilgjengelig og attraktivt. Hvis tendensene til forvitring av det lokale parts–samarbeidet fortsetter, kan det bli vanskelig å ta vare på den tilliten

og viljen som trengs for å engasjere seg i krevende og potensielt risikable innovasjons- og forbedringsprosesser på arbeidsplassene.

Mens det nordiske arbeidslivet har vært privilegert med sterke og tilpasningsdyktige institusjoner, ser vi nå ut til å gå inn i en fase der evnen til å mestre de nye utfordringene i økende grad vil avhenge av aktørenes evne til institusjonell innovasjon. Enten det gjelder livslang læring, rettigheter for selvstendige og plattformarbeidere, inkludering av grupper med liten eller ingen formell utdanning, å motvirke økt ulikhet eller å sikre at alle økonomiske aktører bidrar til fellesskapet etter evne, så vil forberedelsene for framtidens arbeidsliv etter alt å dømme kreve nyskapende grep for å vitalisere arbeidslivsinstitusjonene i den nordiske modellen.

Appendices

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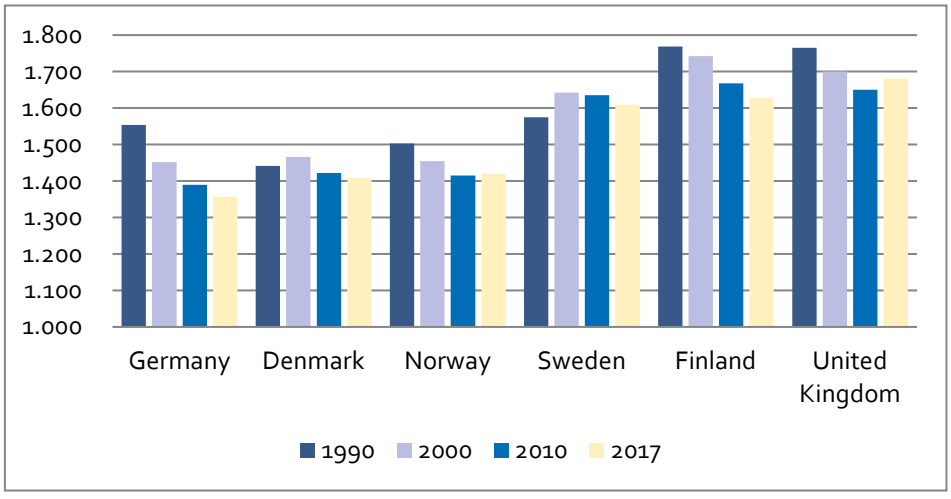
Appendix Figures

Figure A1: Average annual working time among employed

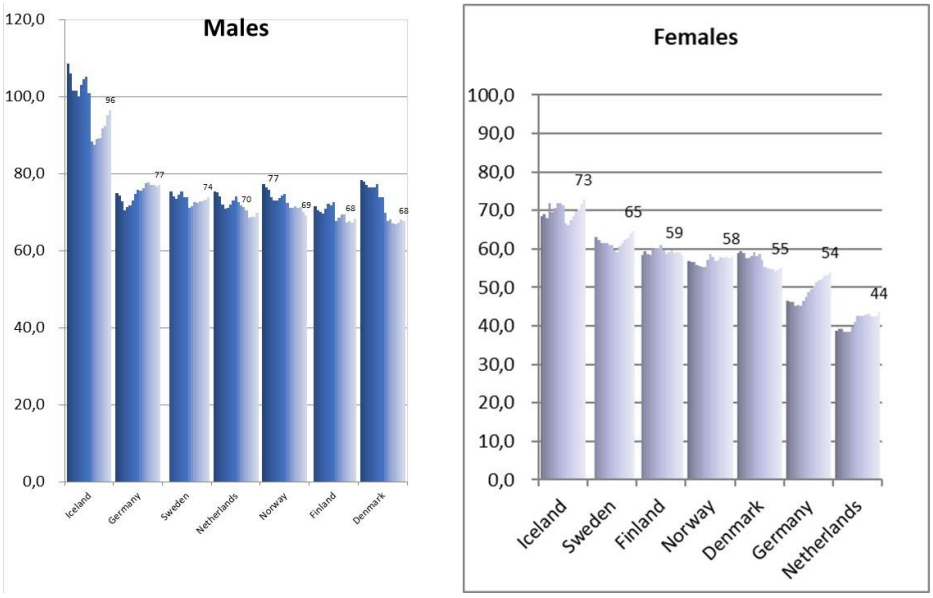
Figure A1: Average annual working hours per employed person. 1990–2017



Source: OECD.stat.

Figure A2: Employment rates in full-time equivalents

Figure A2: Employment rates in full-time equivalents 2000–2017



Source: OECD.stat.

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THE NORDIC FUTURE OF WORK – DRIVERS, INSTITUTIONS, AND POLITICS

How will work and working life in the Nordic countries change in the future? This is the question to be addressed in the project ***The Future of Work: Opportunities and Challenges for the Nordic Models***. This initial report describes the main drivers and trends expected to shape the future of work. It also reviews the main distinctions of the Nordic model and recent developments in Nordic working lives, pointing towards the kind of challenges the future of work may pose to the Nordic models. Too often, debates about the future narrowly focus on changes in technology. This report draws attention to the broader drivers and political-institutional frameworks influencing working life developments, aiming to spur debate about how the interaction of changes in demography, climate, globalization and digital technologies may influence Nordic working lives in the coming decades.

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