The Nordic Welfare Model in the Waves of Post-WWII Transformations and Algorithms of Changing Social Policy

Abstract

After the expansive post-WWII period, the economic slowdown in the 1970s accompanied by problems connected with inequalities and increasing commitments in social policy, to a great extent because of population ageing, began to put pressure on the Nordic welfare states. The progress in techno-science and changed values in the new welfare culture, derived from the cultural turn and paradigm shift in social sciences and also influenced by the economic and social transformations, paved the way for rapid digital transformation and big data analytics. These changes provided possibilities to take another look at experiences of changed economic and social developments to face the new trends, risks, and needs to provide welfare and security by means of new social arrangements, such as for example redesign of the eldercare. The new digital and algorithmic culture, with new opportunities for utilization of the vast amount of information has been of great help in planning and decision-making, for example, in social investments. The economic recovery, together with good governance, guides transformative social policy by use of artificial intelligence in algorithmic solutions and robotism.

Key words: Social spending, digital and algorithmic culture, artificial intelligence, algorithms, good governance, transformative social policy.

Introduction

The foundations of the Nordic welfare states were laid during the first decades of the "Golden Age", 1945-1973, a period of economic expansion and prosperity. Sweden became the leading Nordic welfare state and a strong representative of the Nordic model, also applicable for the other Nordic countries, Denmark, Finland, Iceland and Norway. The strong economic growth in Sweden after WWII until the middle of the 1970s increased the economic frames for a broad scope of public social policy, based on the old social democracy ideals of "People's Home", stressing that in a good home there is equality, consideration, cooperation, and helpfulness (Gould 2001, p. 28). According to the Nordic welfare model or the social-democratic welfare model, social policy emphasizes solidarity expressed in universal coverage and equal treatment of all citizens. Through generous transfers to individuals and

families, and publicly provided services financed by high taxes, the Nordic welfare systems became different from the other welfare state systems like those in the US and the conservative-corporatist systems, in for example Germany and France. The expansion of the public sector, especially the public social service and welfare sectors, has in comparison with other welfare systems, been strong in the Nordic countries (OECD 2017, p. 3).

The global crises and stagnant economic growth since the 1970s, accompanied by problems of increased inequalities and poverty, have, in connection with national structural changes, even begun to cause pressure on the Nordic welfare states (Stephens 1996, p. 55; Pierson 2001a, p. 410). The long tradition of Nordic welfare research, from the first Swedish Level of Living Survey (1968) and the research on the level of need satisfaction, to the following studies on changing social equality in the Nordic countries, has broadened the view of welfare, and also paved the way for new thinking about values in social policy (Kvist et al. 2012**,** pp. 2-3). Attention has particularly been paid to the command over resources such as health, education, housing, security of life, culture and to political resources for fulfilment of one's own potential, based on early British thinking (Titmuss 1974, p. 29) and also drawn from John Rawls on social justice and Amartya Sen on capability and functioning, and ethics (Sen 1993, p. 30). The Finnish sociologist Erik Allardt shifted the focus from the resource approach to the level of need satisfaction, including relationships and social ties to family and kin, people in the neighborhood and institutions (Kvist et al. 2012, p. 2). The Nordic welfare research tradition is connected to the ideas of trust and social capital and their connections with good governance or quality of government, which is important for guidelines in social policy (Rothstein 2013, p. 19; Kvist et al. 2012, p. 2-3; Putnam 1993, p. 167).

The demographic changes and the increasing social expenditure have made it necessary to take another look at policy actions. The high quality of population statistics in the Nordic countries and the available projections have always been the most important basis for planning and decision making. In the post-WWII period, the digital age or information age also began to shift and further modernize the society into an economy based on communication technology, automation and computation. The advancing digital transformation, also opens up new opportunities for strategic planning in today's and future social policy. Under internal and external pressures, the Nordic countries have been finding it necessary to review their past experiences and face new trends, risks, and needs in order to make changes in

decision-making in social policies. This work, earlier obtained by human beings from changed economic and social developments, and findings from especially welfare research, has been taken over by automation and computation. In the new digital and algorithmic culture, a crowd of facts and ideas are sorted and classified into intelligible estimates that govern actors in the way they look at new policies when the circumstances have changed dramatically (Gere 2008; Striphas 2015; Beer 2017). The governments have also become aware of the importance of technological innovation especially in the ICT sector for improvement of production and service capacity (Gylfason et al. 2010, p. 30; Holmström et al. 2014, pp. 6-7; OECD 2017a). The advanced technology and algorithmic solutions began to give the governments new and powerful possibilities to monitor fiscal and other trends and to develop strategies for a sustainable development in line with social policy goals. The scarcity of economic resources has restrained social investments to ensure a healthy and productive labor force in the future. The new digital and algorithmic culture, together with the economic growth, which is estimated to improve in the coming years, has given the Nordic welfare model new opportunities to manage all commitments in social policy and to plan for social investments.

Transformations generate fiscal stress

The post-WWII period of economic growth and prosperity came to an end after the oil crisis of 1973, triggered by the Arab–Israeli War and the Iranian Revolution. The economic slowdown and the increasing commitments and social spending in social policy, have put pressure on the Nordic welfare systems. The economic slowdown, poverty, income and health inequalities, and lack of opportunities for education and employment are dividing our societies and undermining our economies and democracies (OECD 2008; Piketty 2014, pp. 23, 25; Atkinson 2015, pp. 63-64, 81; Stiglitz 2015, pp. 88, 178). Unpredictable risks such as wars, catastrophes and terrorism are plaguing the world today. The increasing streams of refugees are also giving rise to social and economic concerns. In the early 1980s, the new global situation was perceived as a major economic crisis and policy efforts were launched to curb rising expenditure. The increasing social expenditure, population changes, especially the ever-increasing older population, and the requirement for good health and professional skills of the labor force and unemployment, were observed as pressure not only on the governments and the authorities, but also on the productive population.

Expanding commitments in social policy – increasing social expenditure

In1980, the increasing social expenditure began to put marked pressure on the Nordic welfare states. The social expenditure increased to 30% of GDP in Sweden, and almost close to that level in Denmark. In Finland and Norway, the expenditure was 21% of GDP (Table 1). The social expenditure has always been lower in Iceland than in the other Nordic countries. During the first decade (1975-1985) after the end of the Golden Age and the beginning of the new changing post-industrial era, Nordic social policy was sustained, despite the beginning shifts in political views, and crises were manageable. Some impairments in the level of living were visible in an increase in the number of people on means-tested social assistance during the first years of the 1980s (Marklund 1988, pp. 26, 30, 43, 53).

Table 1 here

Under the extraordinary circumstances in 1991-1994, the social expenditure increased in all Nordic countries, e.g. in Sweden to 32.4% of GDP in 1995, and even in Finland to 30.6% (Table 1). The policy has been that the demands are increasing but financing becomes problematic (Andersen 2004; Andersen et al. 2007, p. 83). Sweden showed an example by changing existing social policy programs, e.g. expansion of waiting days for unemployment and sickness benefits, a freeze on adjustments in child allowances, and a rise in the retirement age. The changing circumstances and the high tax burden also made it necessary for the other Nordic countries to adjust welfare programs according to established goals and to adapt to changing demands, values and norms (Stephens 1996, pp. 43, 55; Pierson 2001a, p. 425). The Nordic countries were hit harder during the financial crisis 2008-2009 than, for example, the OECD countries on average, with the exception of Norway. Nowadays the Nordic welfare states spend a considerable part of GDP on social protection within social policy, in 2015 around 32% in Denmark and Finland (Table 1). The average is 28.7% of GDP for the 28 European Union countries (Eurostat 2017).

In the Nordic countries the public expenditure on old age is a substantial component (mainly early retirement and old age pensions, institutional care and housing services, home care and support for informal care), varying in 2015 between 35% (Norway) and 42% (Sweden), although lower in Iceland (26%), of the total social expenditure. The combined expenditure for old age and sickness is more than

50% of the total social expenditure, in Sweden in fact two-thirds (Nososco 2016, p. 252). The length of time that people remain active in the labour market, greatly affects social spending on sickness and disability. Besides demographic changes, with major implications for social policy, certain other characteristics of the population such as, for example health and unemployment, and welfare state developments contribute to the maintenance of benefits and services at the already achieved level. The activities of trade unions and federations of employers in labor market policies, as well as in other social policies, women's labor force participation, and also voters as recipients of benefits and services and as employed in the welfare sector, are connected to the post-industrial transformations implying an increase of employment in the welfare sector, support to maintain commitments in social policy at the achieved level, and with increasing social spending as a power-resource approach (Pierson 2001a, pp. 412, 440; Korpi 2003, p. 590). The share of social spending for families and children of the total social spending has not changed appreciably since 2000, and is now about 11-12% of the total social spending (Nososcco 2016, p. 252). The challenges for future family policies, and also for the power resources of actors in social policy, are linked to social investments in education and protection for promoting inclusion and ensuring the labor force (Morel et al. 2016, pp. 2, 8, 11; Hemerijick 2016, pp. 47-49).

Demographic changes

Great demographic transformations have taken place in the Nordic countries. The general pattern is that the proportion of the elderly is increasing, the proportion of children is decreasing, as is the working population**.** By 2050, the proportion of the population aged 65 and over in the Nordic countries is predicted to be between 20% and 25% of the total populations (Nordic Statistics 2017, p. 34).The demographic shifts have an impact on the possibilities to maintain sufficient high employment for economic growth and to act for development and progress in social policy. The Nordic countries have, with the exception of Finland, succeeded in maintaining higher and quite stable employment (Holmström et al. 2014, p. 6; Nordic Statistics 2017, p. 26). In February 2018, Finland had an employment rate of about 70% among persons aged 15-64 years, which is still lower than in the other Nordic countries (OSF 2018). The goal of the Finnish government is to reach 72% in the coming years. The reason for the lower employment rate in Finland is connected with early retirement. Since the 1950s, Finnish men, especially middle-aged men have been found to be in poor health, affecting their functional ability in working life (Bäckman & Dallmer 2000, p. 25). The decreasing trend in male employment begins about six years earlier in Finland, at the age of 54, than in the other Nordic

countries (Nososco 2016, p. 33). The demographic changes have greatly affected the dependency ratios, calculated as the share of the population aged 65 years and over in relation to the population of working age 15-64 years. The dependency ratios will continue to increase remarkably in the Nordic counties until 2030. Although changes in the eldercare in favor of care at home have taken place and the new technology can support the care of the elderly even in their own homes, the increase in the populations aged 85 years and over implies that there should also be advanced and regularly supervised institutional and hospital care according to the estimated need. For those older people not in need of professional care, but in need of social or minor health care, long-term home care can be given by informal caregivers like spouses, children or other family members, supported financially by the government (Riedel and Kraus 2011, p. 28). An effective and well-functioning eldercare also requires an increased partnership between home, service institutions and hospital for the organization and utilization of different forms of care.

The demographic shifts are of crucial importance in the planning of social protection and productive social policy now and in the digital future, emphasizing more strongly than earlier efforts towards a social investment welfare state, where especially the children and the population of working age are focused on (Hemerijck 2016, p. 49). Other investments, such as impact investing, can potentially provide new ways to allocate private capital to address challenges facing the mixed system of provision of services, and thus generate both a social and an environmental impact (social return) alongside a financial return (O'Donohoe at al. 2010, p. 14). Social arrangements, capabilities and social opportunities are also important from the perspective of life satisfaction and happiness in a well-functioning society (Layard 2005, pp. 111-113; Sen 2010, p. 269). The actors in social policy and decision-makers nowadays can exploit the knowledge that has been generated by the pervasion of digital technology, and the rapid progress in technoscience, and especially in information and communication technology (ICT).

Algorithms of transformative social policy

Economic slowdown, risks and uncertainties are obstacles to the ability of social policy to realize goals to promote social arrangements through policy actions based on preferred values and goals in the welfare culture (van Oorschot et al. 2008; Mohan 2015, p. 125; 2018, p. 94; see also Bäckman 2016). There is, therefore, a need for transformative policy actions toward a new development, aiming at

economic stability, justice and ecological sustainability, as well as increased trust in the ability of the governments and the political actors to handle the affairs. Growing dissatisfaction, social hope and visions of a new development, and new thinking about values and goals of social policy in a welfare culture call for policy actions on a broad front based on relevant information that can increasingly be produced by advanced technology. Changes can be carried out according to the formula (D x V x F > R), where the dissatisfaction with the current situation (D) and the vision of what is possible (V), and the first steps towards reaching this vision (F) are greater than the resistance (R) to change. Kowalsky (2015, p. xviii), has referred to this as engendering hope and optimism as a way toward a new social development, through a comprehensive reform agenda.

Algorithms of change

As a result economic crises, demographic changes and new thinking on values, capacity building or social investment, not only for social protection but also for a productive social policy, beginning with protection in early age to ensure the health and working ability of the population, have become new directions in social policy (Morel et al 2016, p. 2-6; Hemerijck 2016, p. 46, 49). The focus is on development of opportunities for children to participate in early childhood care and education, and the efficient use of human capital through other supportive welfare arrangements, i.e. through day care, supporting women's and lone parents' employment. The new thinking about capacity building through social protection and productive social policy has its roots in the Swedish social-democratic ideas of social policy, particularly advocated by Alva and Gunnar Myrdal in the promotion of family policy in the 1930s**.**

The path-breaking discussions and change in social policy favouring social investments appear some years before and around the Millennium in the social policy agendas of the European Commission, the OECD and in the book "Why We Need a New Welfare State", addressing the need for a new look at the welfare state and its social investments (Esping-Andersen et al. 2002). Morel et al. in their "Towards A Social Investment Welfare State" (4th ed. 2016), on the basis of findings from a project about the future of social investment from 1999, examine the social investment perspective as a new welfare paradigm; policies for development and progress aim at "preparing" rather than "repairing" (Morel et al. 2016, pp.1- 2, 11-12; Hemerijck 2016, pp. 46-47). The ideas of the "new era of perspectives on social investment", with a life course perspective, leading on Rawlsian

intergenerational justice, represents a new view of welfare provision, also in a long-term social policy for promoting social arrangements through policies based on existing values and goals in the welfare culture (van Oorschot et al. 2008; Bäckman 2016). Economic stability, solidarity, social justice, ecological sustainability and trust in governments are important goals for development and progress. As a part of long-term environment policy, forest management is important for the quality of life and health of populations. Nordic studies show that forests with old, high trees, offering natural space, peace etc., contribute to human health and well-being as environments for recreation and rehabilitation (Nordström et al. 2015). The economic and social transformations have increased the importance of the welfare state and its new paradigm for social investments. The social policy agendas of the European Union, discussed, for example, in the reports from the European Council 2010 and the European Commission 2017, emphasizing growth, improvement of productivity and reducing risk of poverty and social exclusion but also environmental development, have influenced economic and social policy strategies in the Nordic countries (Kuitto 2016).

The revolutionizing technology and communication, together with government intervention (good governance), has opened up new opportunities to get intelligible findings, based on an infinite number of important changes in politics and culture, facts about economic and social development for transformative social and welfare policy in a wide sense also for environmental protection and promotion of ecological sustainability (Mohan 2015, pp. 33-34, 40; Stiglitz 2014, p. 16-19: Striphas 2015; Beer 2017). Already fifty years ago Lofti Zadeh introduced the concept of the fuzzy algorithm, which though fuzzy rather than precise, was considered to be of use in a wide variety of problems relating to information processing, control, artificial intelligence and, more generally, decision processes involving incomplete or uncertain data (Zadeh 1968). Data and algorithms are crucial in the government's shift towards data-driven policy-making in the digital and algorithmic culture. Government by algorithm refers to the governments' increasing reliance on data and algorithms (Naudts 2017). There is, however, also a pressing need to question the impact algorithms may have on both individual and societal values, such as autonomy, identity, equality and democracy. Algorithms govern not only policy-making and decision-making for the achievement of social policy goals, that promote welfare, social security and social satisfaction through social arrangements, but also the dark side of data-driven decision-making for social good such as, for example, violations of privacy (Pasquale 2015, pp. 9, 184). The new welfare culture, emphasizing new values, and norms for goals

and decision-making in social policy, has further encouraged us to derive advantages from technological advances.

Artificial intelligence and effectiveness in social policy

The availability of extensive information is connected to questions about the effectiveness in social policy, i.e. "how to get the right things done" with the population's trust in public institutions ("the voice of the citizens"), and also to the question of how to ensure a sufficient supply of skilled labor force in the ICT sector (van Oorschot et al. 2008, pp. 5, 11; Atkinson 2015, pp. 121-122). The international organizations (e.g. United Nations, European Commission) have, through their recommendations, in many ways encouraged member states to pave the way for an effective use of the revolutionizing technological possibilities (see e.g. European Commission 2013a; Eurostat 2017a). Good governance or quality of government, free from corruption and related phenomena, is a prerequisite for effective policy-making, for the achievement of goals and progress in social policy (Rothstein 2013, pp. 22-26; Bäckman 2015, p. 40). William Baumol in his research from the 1960s paid attention to the imbalanced growth between the manufacturing and service sector in times of technological and employment change. The rising costs associated with labor-intensive service industries like the welfare sector (e.g. child care, eldercare, health), where the relative costs of services rise over time causing fiscal stress, has come to be called the "cost disease" or "Baumol's disease" (Baumol 2012, pp. xvii, 19-20). Many welfare activities require human contacts and the values attached to public welfare services become important, encouraging social investments in human capital (Pierson 2001, p. 84; Atkinson 2015, pp. 121-122). Well-planned investments in human capital and a well-educated labor force, facilitate adjustment to changing circumstances by making it easier to upgrade skills through additional life-long training (Gylfason et al. 2010, pp. 30, 215). In the age of the current digital revolution, one of the important roles of governments is to encourage both research and development and upgrading of additional skills through training in the use of the new advanced technology (Atkinson 2015, p. 118-123). Information technology and digitalization are sources of progress. Digitalization, automation and robotics, nowadays affect nearly all working tasks, and offers opportunities to raise labor productivity. A well-educated labor force can more easily adapt to changing circumstances and upgrade its skill through additional training when needed. Encouragement for research and development and investments in basic research to promote the generation of new

knowledge and to improve opportunities to utilize this knowledge should be given high priority (Gylfason et al. 2010, p. 254; Holmström et al. 2014, pp. 7, 10, 29-30).

Among the different types of algorithms, the greedy algorithm can nowadays also be used as a selection algorithm to prioritize options in different phases within a search for information from both sides of the discussion of a problem to reach the optimum at each phase in the hope of finding a final optimum solution (Cormen et al. 2009, p. 414). In Finland, the Finnish Innovation Fund SITRA, an independent public foundation operating directly under the supervision of the Finnish Parliament, has arranged a competition on the subject of what Finland can do for the future. One of the winners of SITRA's million euro "Ratkaisu 100" (Solution 100), in the fall 2017 when Finland celebrated its 100 years of independence, was a project showing how the public sector and enterprises can form ideas of competence or lack of it in their planning for the future (SITRA 2017). Researchers have long searched for Artificial General Intelligence (AGI). By means of advanced and revolutionizing technology it has been possible to construct thinking and speaking robots. Sophia, the baby with advanced thoughts from 2016 and Erica, the Japanese android who was declared the most realistic female human robot of 2016, are examples of such robots. Sophia, modeled after actress Audrey Hepburn, has like Erica a human-like appearance and behavior. Both are capable of speech and holding a conversation with humans, thanks to a combination of speech-generation algorithms, facial-recognition technology and infrared sensors that allow them to track faces across a room. They would be suitable for service functions in healthcare, customer service, therapy and education (Goertzel 2016; Nevett 2017: Hanson Robotics 2018).

According to a survey carried out for the European Commission (2013) concerning ICT education in schools, high levels of virtual learning provision exist in the Nordic countries (2013, pp. 33, 48). The study of and practice in computer-based training, online learning, and in the use of mobile technologies, vary, however, in different European countries. In January 2018 the European Commission launched new measures to boost key competences and digital skills for better use of digital technology in teaching and learning, improving education through better data analysis and foresight, and developing the digital competences and skills needed for living and working in an age of digital transformation (European Commission 2018).

Are the Nordic welfare states equipped for the digital future?

The global economy is recovering and forecasts estimate that the global GDP growth will increase around 3.5 – 3.7% in 2018. In comparison with the fastest growing economies, India and China, the Nordic countries belong to the group of the slower growing economies; forecasts show a growth of about 2%, but probably not over 3% for the coming years (World Bank 2017, pp.4-5). The economic growth boosts investments, improves employment and productivity, all of which are necessary for progress. Social investments in children and young people as transformative social policy to ensure the health and working ability of the population of productive age, have to be planned to fit demographic and economic changes (Kangas & Rostgaard (2007); Meagher and Szebehely 2012, p. 89; Kuisma and Nygård 2015). An effective use of information technology and digitalization is a prerequisite for future policy-making for the achievement of goals and progress (Holmström et al. 2014, pp. 7, 28; Stiglitz 2014; Atkinson 2015, pp. 115, 303). The availability of a skilled labor force is a perquisite for a well-functioning economy in times of changing technology. Sustainable development and progress require a continuous capacity to build social protection and a productive social policy to ensure a skilled labor force to maintain the productivity made possible by technological change in the future.

The progressive Nordic countries

The Nordic countries have succeeded in continuously improving their public service sector in the new digital era, providing their citizens with efficient public services. Due to the development of information and communications technology (ICT) and the expansion of education in this field, there is an increase in the number of employed ICT specialists as a percentage of total employment in the EU countries. In 2016, this share was significantly higher in the Nordic countries (Table 2). Measured by the Digital Economy and Society Index (DESI) 2017, which sums up relevant indicators on Europe's digital performance, the Nordic countries have the most advanced digital economies in the European Union (Table 2). The UK is ranked 7th and Germany 11th. Romania has the lowest scores on the DESI, e.g. level of human capital (basic and advanced skills), digital technology (business digitization and e-commerce), digital public services (services provided by the government), and broadband connections and use of the internet (citizen's use of content, communication and online transactions). The Nordic countries are also progressive in the further developing of their public services in the digital era.

Sweden, for example, in 2011 launched the Digital Agenda, "ICT for Everyone – A Digital Agenda for Sweden", as proposed guiding principles and goals for the ICT policy. It involves every area of social and economic life, such as, for example, internet usage, human capital, public e-services, development and progress, in order to benefit from the development opportunities of ICT (GOS 2011, p. 13).

Table 2 here

Although Sweden is ranked behind Denmark, Finland and Norway in the DESI with an index value of 0.67, it is still far above the EU28 average. Sweden has been at or near the top of international digitalization rankings for years, and leads the way in the areas of investment and use of human capital, internet usage and e-government (Buhr et al. 2017, p. 14). Individuals using the Internet to interact with public authorities (eGovernment Users) is higher in the Nordic countries than, for example, in the UK and Germany. This is to some extent associated with the income distribution, which is more equal in the Nordic countries and gives the households and individuals better opportunities to purchase modern technical equipment for use of the internet and communication than in many other countries. The economic circumstances among immigrants are challenging the Nordic welfare model (Fritzell et al. 2012, p. 176). In Sweden, with a high number of refugees, the "mobilearn", a digital solution to spread information directly to smart telephones, also recommended by the European Commission, has been implemented by authorities to give facts about available services, employment etc. (European Commission 2016).

Progress in advanced digital technology and communication, and the advance of artificial intelligence (AI) will continue to affect every aspect of our lives as citizens and consumers. The above-mentioned thinking and speaking Sophia robot is a good example of the direction in which technological innovation and artificial intelligence (AI) is going (see e.g. Atkinson 2015, p. 115). Although the accelerating digital transformation provides new opportunities for development and progress, the question can be raised whether there are enough ethical rules to guide the rapid development and increased use of advanced technology and communication in such a way as to prevent the formation of "dark side" problems (Cath et al. 2018). The same question about ethical values and social justice must also be raised in connection with the implementation of transformative social policy (Bäckman 2007, p. 15). It is important that the governments ensure

that goal-setting for performance improvement is of value even in the future. A well-functioning society, pursuing long-term success and progress, requires social cohesion, confidence in public institutions and generalized trust, all of which have been shown to be high in the Nordic countries (Grönlund and Setälä 2012; Stiglitz 2013, pp. 151-153). The government is the primary institution through which people, politicians, administrators and planners collectively act to solve problems and make decisions about social policy goals. Capacity, competence and intentions, i.e. the quality of government or good governance; 1) level of corruption, 2) bureaucratic effectiveness, 3) rule of law, i.e. equality before the law, and 4) strength of democratic electoral institutions, i.e. establishing a representative democracy (Rothstein 2013, pp. 19, 22-26), have been found to be high in the Nordic countries (Charron 2013, pp. 56, 59; see also Bäckman 2015, pp. 41-44). The Quality of Government correlates very strongly with a country's degree of economic development and is in many ways connected with good out-comes related to human well-being, a central goal of social policy, for example, low income inequality, low child mortality, high level of social capital, happiness and life satisfaction.

The futuristic view

The welfare research and especially that concerning the Nordic welfare states and their welfare performance, has, through analyses and observations, for a long time provided useful data for the development of social policy, and nowadays also advice on the best course of actions through utilization of the advanced technology and algorithms. The future-proofing, originally used to describe the condition of historic buildings, which stipulates that goals and guidelines will continue to be of value in the distant future, rather than projections of current trends. Future-proofing can also be used in welfare state policies for goal-setting of performance improvement including foreseeable challenges, managing and mitigating risks, building resilience and reducing future vulnerabilities, thereby ensuring a better and sustainable future (Boston 2014, pp. 3, 7-10). The economic slowdowns and related risks, have further confirmed the need to have a futuristic view of development and progress both in research (Bäckman and Sharma 1998; Gylfason et al. 2010; Stiglitz 2014; 2017) and in recommendations, based on e.g. the European foresight project Digital Futures, which is a journey into 2050 visions and policy challenges (European Commission 2013a).

Research and development expenditure in the Nordic countries is internationally at a high level, especially Sweden, where the R & D expenditure was 3.25% of GDP in 2016, has reached top international level (Eurostat 2017b). The Nordic countries have also the most advanced digital economies in the European Union (Table 2). It is, however, important to maintain a high level of education and research to ensure investment in human capital and a well-educated labor force for sustainable development based on new technological solutions as, for example, artificial intelligence. A policy solution to unite leading universities and research institutions for effective use of resources was made in September 2017 in Finland. The new economics research and education center is formed in order to attract top-level experts for facilitating decision making in society. Based on experienced from the Massachusetts Institute of Technology (MIT) in the United States, the new center could play an important role in artificial intelligence research (see Press conference 2017). In their social policies governments are required to find and use not only the most appropriate alternative of an algorithmic solution to a problem, but also to evaluate the effectiveness of implemented decisions. The effectiveness of the implementation of social policies has to be evaluated in relation to outcomes or "getting the right things done", paying attention to social justice and other values of the new welfare culture, such as life satisfaction.

Discussion and conclusions

Many episodes and events, such as stagnation in the global economy and national economic and social development trends, have put pressure on the Nordic welfare model. Welfare cuts have been made especially during recessions and some impairments in the level of living during those periods have been observed, resulting in an increase in the number of people on means-tested social assistance. The new welfare culture, derived from the cultural turn and paradigm shift in social sciences, emphasizing new values and norms in social policy, and also greatly because of economic and demographic changes has impacted on policies for the redesign of welfare arrangements. Because of marketization and privatization, redesign of services has taken place, for example, in the eldercare, where care in one's own home has been prioritized. Social investments for social protection (human capital development) and productive social policy (use of human capital) have also been both social and economic strategies, based on policy innovations and practices for sustainable development. Social investments in children and young people as transformative and especially productive social policy to ensure the health and working ability of the population of productive age, have been strongly advocated.

The maintaining of the core values in social policy, based on old social democratic traditions, has been strong, and the Nordic welfare model has shown itself to be resilient enough to adapt to changing circumstances. The ability to continually adapt to new challenges in the future is a prerequisite for preserving the Nordic welfare model and its core values, and for moving toward innovations and progress. Since the deepest post-WWII recession in 2009, the global economy has recovered, and according to forecasts, the economic growth is estimated to be in the range of 1.5-2.0 % in the Nordic countries in the coming years (World Bank 2017, pp. 4-5). The Nordic countries as small open economies benefit from global growth, clearing the way for their governments to manage the commitments in social policy provided they can keep up with the digital developments. Unprecedented shifts in the global economy are, however, possible because of political tensions and wars, catastrophes etc. in different parts of the world, as well as changes within the countries such as population ageing, are factors which impact on the national economies and can also cause unprecedented budgetary stress.

Good governance or the quality of government, free from corruption and related phenomena, which is at a high level in the Nordic countries, has facilitated the use of advanced technology for adaption to changed circumstances and for meeting new challenges. Economic and social changes have especially given rise to the need to for a futuristic view of development and progress based on findings from welfare research and algorithmic solutions. Instead of projections of current trends, fuzzy logic and scenarios without exact mathematical models, can be used in the solution of resource allocation and priority problems. The future-proofing, originally used in seeking resilience in the historic building environment, in a wider sense targets the performance improvement of welfare arrangements. Although the Nordic countries are ranked top concerning digital performance in Europe, and are progressive in the further development of their public services in the digital era, it is important to maintain the high level of education and research that the Nordic countries have already achieved. Long-term social policy is required to ensure investment in human capital and a well-educated labor force for sustainable development. Relevant information and prognoses for decisions, produced by advanced technology and communication in a digital age and algorithmic culture, is nowadays already available for a sustainable social policy and will be so and even utilized in the future. A crucial problem in the goal-setting for policy actions is how to provide choices and to maintain service effectiveness, i.e. “to get the right things done”. An estimation of needs and services, and the ethical and social justice values embedded

in goal- and priority-settings are important, as are also the evaluation of implemented decisions. The use of advanced technology and communication and the rise of artificial intelligence will lead to dramatic changes in the future. The collective debate on critical public issues will draw on wider evidence because scientific observations and insights will be open to analysis by all. As a result, governments will be able to shape policies more dynamically and in a more participative way. People will have a voice in policy and decisions regarding public assets, projects, laws and regulations. Policy options could be tested beforehand in the virtual space before collaborative decisions are reached and implemented. The question is, whether there are enough ethical rules to guide the rapid development and increased use of advanced technology and communication to prevent the formation of "dark side" problems. The use of advanced technology in policies oriented towards further development must above all be given high priority in decision-making because today's decisions will have long-term consequences.

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Tables

Table 1. Social expenditure as a percentage of GDP in the Nordic countries 1980 – 2015.

	Denmark	Finland	Iceland	Norway	Sweden
1980[a)]	28.8	21.2	..	21.1	30.2
1995	31.4	30.6	18.9	26.0	32.4
2010	32.4	29.3	23.2	25.2	28.6
2015	32.3	31.6	22.8	27.9	29.6

Source: Eurostat 2017; OSF 2017, Appendix Table 7.

[a)] The definition of social expenditure expanded since 1974, figures for 1980 according to the classification by the Nordic Medico-Statistical Committee (NOMESCO), see Official Statistics of Finland, OSF 1982, Table 54.

Table 2. Employed ICT specialists as a percentage of total employment 2005 and 2017, and Digital Economy and Society Index (DESI) 2017 in the Nordic countries and some other countries.

	Employed ICT specialists		Digital Economy and Society Index
	2005	2017	2017
Denmark	2,8	4,4	0,71
Finland	5,1	6,8	0,68
Iceland	3,0	4,2	. .
Norway	2,9	4,6	0,69
Sweden	5,6	6,6	0,67
UK	4,7	5,1	0,60
Germany	2,2	3,8	0,56
Hungary	4,0	3,6	0,46
Romania	1,1	2,1	0,33
EU-28	2,6	3,7	0,52

Source: Eurostat 2017a; European Commission 2017