European Journal of Workplace Innovation

Special Double Issue: European Approaches to Sustainable Work

Volume 6, Issues 1-2, March 2021

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The European Journal ofWorkplace Innovation (EJWI) is an open-access, net-based, peer reviewed and English-language journal. The Journal invites research-based empirical, theoretical or synoptic articles focusing on innovation and workplace development.

The aim of the journal is:

- To develop insights into workplace innovation
- Provide case studies from Europe as well as comparative studies from other continents
- Develop and present new theories in the field of workplace innovation
- To increase international publication within the field
- To become an important publication channel for workplace innovation researches as well as the international research community.

Table of contents

Issue 2

Preface

Editorial

Richard Ennals
Editor in Chief

Sweden has a strong tradition of research in Working Life, which has been seen as central to the successful Swedish Model of consensus, social equity, respect for work, and ongoing economic and social development. Generations of researchers and partner organisations have been accustomed to a stable policy framework extending over several decades.

When Sweden joined the European Union in 1995, priority was given to introducing perceived benefits of the Swedish tradition into policies and programmes of the EU. Sweden held the rotating Presidency of the EU in the first six months of 2001 and saw this as the focus for a major initiative, "Work Life 2000: Quality in Work", which was financed by the Swedish government and co-ordinated by the Swedish National Institute for Working Life. Swedish researchers led 64 specialist research workshops, with invited international participants. They were laying the foundations for an EU Presidency Conference in Malmö In January 2001. Each workshop led to publications by the lead researchers, by journalists, and by rapporteurs, who focused on the dialogues at the workshops. I was the rapporteur for most of the workshops. I edited a series of three Yearbooks (Ennals, 1999, 2000, 2001) which provided insights into the rich and diverse field of Working Life Research.

Following their election in 2006, the new Swedish Liberal and Conservative government and the Swedish Parliament (Riksdagen) closed the National Institute for Working Life on 30th June 2007, thus removing the focus for ongoing research and policy development. The research community has continued to be active and productive, as is demonstrated in this Special Double Issue of the European Journal of Workplace Innovation, which draws on Swedish and EU initiatives and institutions.

The majority of the articles in this Special Double Issue are by members of the Swedish Working Life Research community. There are also a number of articles by authors from other European contexts, some of whom work at EU or transnational organisations (Eurofound, EU-OSHA and PEROSH). The background of the work is also a Vinnova-financed network on promoting sustainable work in Horizon 2020 and Horizon Europe. In July 2018 a new agency was launched by the government to disseminate knowledge on work environment research, and also to evaluate national policies for better working life, the Swedish Agency for Work Environment Expertise.

The Special Double Issue looks ahead to new policies and programmes, building on traditional values and research. From experience of "Work Life 2000: Quality in Work", together with many projects and programmes with diverse organisations, I suggest that there are some fundamental questions to be considered:

- Is there a unified view of knowledge about Working Life?
- What are the links between research, policy development, and practice?
- How are Swedish initiatives now linked with the wider EU context?

The Special Double Issue brings together veterans in the field and younger researchers. It provides an important reference point for Working Life Research in Sweden and the EU, with implications for Sweden, the EU and the wider world.

The EJWI editorial team are grateful to the team of Swedish guest editors for their efforts. It is notable that most of the papers come from Swedish researchers, who work increasingly in the context of the EU. The final editorial and production process is coordinated by Norwegians in the Department of Working Life and Innovation at the University of Agder, where I am an adjunct professor. My own home country, the UK, left the EU in January 2000.

I find it tragic that in many countries, including the UK, public health and the economy are now being devastated by the Covid pandemic, with over 100,000 deaths from Covid in the UK. We have entered the deepest recession for over 300 years. In a future Special Issue of EJWI, we plan to address the resulting issues for work. This Special Double Issue, with papers largely written before the pandemic, stands as a memorial to principles of Sustainable Work, which are now under extreme pressure.

Reference

Ennals R. (ed.) *Work Life 2000: Yearbooks 1, 2, 3.* London, Springer 1999, 2000, 2001.

European approaches to sustainable work: introductory remarks

Kenneth Abrahamsson
Maria Albin
Elisabeth Lagerlöf
Chris Mathieu

Globalisation, digitalisation, international competition, new demographic and technological transformations have fundamental impacts on working conditions, working hours and the location of work. The development towards work without boundaries, a platform economy and labour market polarisation have significant repercussions for employment relations, social protection, and the role of social partners. Temporary jobs and precarious working conditions are increasing in the service sector, while high-performance jobs become more common in the advanced manufacturing sector. More knowledge is needed on how to accomplish secure and adaptable employment, health and safety at work, proper work life balance, a good social dialogue and effective participation of workers. New workplace innovations for job quality, productivity and growth become increasingly necessary on the road to future work. Equality, social protection, and improvement of living conditions are major visions both in the ILO's 2019 centenary mission, and in the UN Sustainable Development Goals to be attained by 2030.

The theme for this double issue of *European Journal of Workplace Innovation* is to highlight European approaches to sustainable work, digitalisation and job-related transitions looking at next policy steps in the implementation of the European Pillar of Social Rights. A starting point for this research initiative was a Swedish project, headed by Maria Albin, of the Karolinska Institute, and financed by the Swedish Innovation Agency, Vinnova, to strengthen research on sustainable work in the European Framework Programme Horizon 2020, and later Horizon Europe.

During this project journey initiated in 2013, we have broadened the connotation of sustainable work, to reflect on European workplaces as such and their capacity to meet future challenges. In 2019 the policy discussion and research on the future of work was extremely intense. The ILO, OECD, the EU Commission as well as many policy producing institutions were actively involved in framing futures of work in times of digitalisation, climate change and just transition.

In 2020, many future ideas have collapsed as an effect of the Covid-19 pandemic with its fundamental and its far-reaching Europe-wide shock impacting the economy, labour market

and working life, public and occupational health, family and living conditions, following on various organisational, social and mental lockdowns. The policy process has not, however, been caught in a revolving door, with sustainable work out and Covid-19 in. On the contrary, the need for an in-depth discussion of sustainable work in Europe and the global context, is even stronger in this new situation.

Much of the content found in this double issue was initially presented at a multidisciplinary conference in October 2018 convened by the Vinnova-financed platform on Sustainable Work in EU Horizon 2020, and held at the Ingvar Kamprad Design Centre, Lund University. The purpose of the conference was twofold. Firstly, it comprised reports of the platform project as such, and relevant policy initiatives and meetings that had been organized from 2013 to 2018. A second aim was to provide an overview of ongoing activities in Nordic countries, the EU and ILO, concerning development towards a sustainable working life, in order to make an impact on the next European Framework Research Programme, Horizon Europe, as well as the then still existing Horizon 2020. A total of around one hundred people participated in the conference, representing all the Nordic Work Environment Institutes, the PEROSH Network for European Institutes, EU OSHA and Eurofound, as well as several leading researchers in various areas (www.sustainablework2020.se).

One of the key-speakers was Allan Larsson, former adviser to Jean-Claude Juncker on the European Pillar of Social Rights and involved in the ILO work on Future of Work. His presentation highlighted the development of various welfare and labour market models and economic development from WW2 to current times. One of the challenges discussed at the conference was how individuals and employees can claim their rights in the new gig or platform economy. How do you negotiate with a platform or algorithm? How can we change direction to meet the widespread social and political discontent, strengthen the social contract, and start a new social recovery?

Another field of interest covered at the conference was job longevity, health and labour law regulation, challenges at work in times of digitisation, new perspectives on ergonomics and exposure research. Attention was also paid to the social dialogue, the quality of work and sustainable workplaces. The Nordic countries have a strong tradition in occupational health and safety research, as well as in research on sustainable work systems. The strategic importance of sustainable work, as a resource for health, innovation, and growth, is emphasised in the European innovation strategy, and by the social partners. Therefore, workplace innovation and workers' health and wellbeing need to be a more visible and coherent theme in the EU's research programme Horizon Europe.

Sustainable work and sustainable work systems have been used as a policy concept and buzzword in working life and research during the last two decades. Sustainable work aims at illuminating and supporting a process to cope with present and future challenges at the workplace: it is not a product nor an end goal. A sustainable workplace reflects the reconciliation between health, the development of work environment for the employees, and a productive and value-creating mission for the enterprise or production organisation.

The purpose of this two-volume issue is to place sustainable work in context. The first issue focuses on the future of work and the transformation of the European workplace from a policy perspective, while the second issue shares reflections, models, and results from various research positions. The first contribution by Allan Larsson, former Director General of DG Employment and adviser to Jean-Claude Juncker, and Kenneth Abrahamsson, adjunct professor, Luleå University of Technology, has a challenge-oriented perspective looking at the innovation-driven digital transformation, and the policy-driven climate transition in the context of pandemic-driven restructuring of important sectors of our economies and societies. The next article by Kenneth Abrahamsson illuminates and describes various understandings and aspects of the concept of sustainable work. The shifting character of the European workplace will also have repercussions for the concept of sustainable work as such, and its relation to workplace innovations, job quality, precarious work, and climate change. Sustainable work is also a response to climate change and the greening of European enterprises, production systems and workplaces.

Which policy priorities, programme initiatives and calls are needed to highlight sustainable work as a core issue in Horizon Europe? Through reflecting on the Swedish Platform for Sustainable Work in Horizon 2020, Maria Albin, Professor of occupational- and environmental medicine at the Karolinska institute, and Elisabeth Lagerlöf, senior consultant, describe formal and non-formal ways to strengthen sustainable work as a central theme in European research. This is a joint challenge for policy, the research community, as well as European agencies and networks such as EU-OSHA, Eurofound and PEROSH.

The first issuee also comprises three contributions from European actors. Franz Eiffe, PhD and research officer at Eurofound, gives an overview of Eurofound's Reference Framework and the Context of Sustainable work. His article focuses on sustainable work in a life-course perspective. William Cockburn, head of the prevention and research unit at EU OSHA, the European Agency for Safety and Health at Work, presents an institutional perspective and highlights policies, priorities, and ways of work on OSH in the future. The work of the European network for national work environment institutes, PEROSH is presented by Mary Paulien Bongers, chairperson, Mary Trainor, chair of the scientific steering group, and Jan Michiel Meeuwsen, PEROSH's Manager of International Affairs. Finally, Lennart Levi, Professor Emeritus in psychosocial medicine, Karolinska Institute, and one of the pioneers in Swedish occupational health research, presents a global survival perspective on Stressors at Work and Elsewhere by focussing the challenges of Agenda 2030 for the world of work.

The second issue comprises challenge-driven research for a sustainable working life. Job longevity is a core aspect of sustainable work in a life-course perspective. By looking at institutional contexts and figures, Bjørn Einar Halvorsen, former director general, and senior adviser, from Norway discusses and analyses the high and rising rate of senior employment in the Nordic countries. Job longevity and the mobilisation of the workforce into the third age can also be seen from an equality and gender perspective. As been shown by Maria Albin, professor, and Theo Bodin, associate professor, Institute of environmental medicine,

Karolinska Institute and Eskil Wadensjö, Professor in labour economics, Institute for social research, University of Stockholm, the social gradients in health and working conditions in combination with gaps in the supportive welfare systems result in job longevity being in part a problematic and unequal process.

Two articles touch issues of innovations, new technology, and quality of work. The first article, on the relationship between job quality, innovation, and employment, authored by Chris Mathieu, Principal Investigator, and Susanne Boethius, Project Manager of the Horizon 2020 project *QuInnE* - Quality of Jobs and Innovation Generated Employment Outcomes (both at Department of Sociology, Lund University) presents the major findings of that project on the reciprocal relations between job quality and innovation. The pros and cons of sustainable work, digitisation and new production systems is the focus of the contribution from Lena Abrahamsson, Chair Professor in human work science, and Jan Johansson, Professor in industrial work environment, both at Luleå University of Technology.

Finally, two texts relate to the importance of the social dialogue on the national, Nordic, and European levels. Firstly, stakeholder collaboration, inspired by the Nordic model for sustainable work and competitiveness during an industrial startup, is studied in a new high-growth entrepreneurial firm by Ulrika Harlin, LicEng MSc, and Katrin Skagert, PhD, both researchers at RISE, Research Institutes of Sweden, Martina Berglund, PhD, Assistant professor at the Department of Management and Engineering at Linköping University, and Mattias Elg, Professor of Quality Technology and Management, centre director at HELIX Competence Centre at Linköping University. Secondly, Anders Kjellberg, Professor of Sociology, Lund University, looks at the shifting role of trade unions in the social dialogue by using models, institutional settings, and statistics to track developments both in a Swedish and European perspective. So, what is the next step for research on sustainable work in Europe? In some concluding remarks, the editorial group reflects on policies, institutional factors and research needed in the effort to foresee and form the Future of Work in Europe in the context of Agenda 2030 and the new research challenges and missions articulated in Horizon Europe.

About the authors

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Chris Mathieu, Department of Sociology, Lund University was PI and project coordinator on the Horizon 2020 project QuInnE. He currently works in the Horizon 2020 projects Beyond 4.0 and DiHECO. Mathieu is currently co-editing The Oxford Handbook of Job Quality (OUP).

How can Europe tackle the three employment challenges: the digital, the climate and the pandemic transition?

Allan Larsson
Kenneth Abrahamsson

Abstract

Never before in modern times has Working Europe been faced with such a fundamental and far-reaching transition pressure. We are at the beginning of two powerful transition processes, the innovation-driven digital transformation, and the policy-driven climate transition. On the top of these processes, we are now facing a pandemic-driven restructuring of important sectors of our economies. Are our labour market regimes and policies fit for these challenges? Are we finally witnessing "the end of work" and an extended period of being "Left Behind"? Or can we build up capacities to deal with these three fundamental challenges? In this paper the authors discuss these issues based on the most recent labour market research and statistics, and present some preliminary conclusions on the new forms of transition mechanism, and the scaling-up of European and national labour market transition policies as part of the Next Generation EU recovery strategy. It is not easy to predict the content, quality and volume of skill development needs caused by the triple challenge of climate change, digitalisation, and Covid-19. We suggest, however, that the EU Commission should develop a transition capacity indicator corresponding to at least one fifth of the labour force and to recommend new springboards and bridges to work for the next years to come. We are convinced that this is the most productive and profitable investment Europe can make.

Keywords: Digitalisation, climate change, green deal, Covid-19, just transition, skill gap

The twin challenges of digitalisation and climate transition

The increasingly significant element in the 2020s is that the transformation of society, enterprises, and workplaces will be driven by two strong forces: the energy- and climate transition to low carbon-energy and renewable energy, and the ongoing digital transformation in its many new forms such as AI, IoT, 5G and Big Data. Electricity 4.0 is a

necessary precondition for Industry 4.0, and illuminates the emerging symbioses between the challenges of digitalisation and climate transition. By using the concept of Electricity 4.0, we want to highlight the need and importance of new zero-carbon energy systems in a future perspective. It is a twin concept to Industry 4.0, which is more familiar and has been used for some years. Together, they are core actors in the transformation on European workplaces and societies. The Swedish Climate Policy Council underlines the need for new and heavy infrastructure investments. *In conclusion, the obstacles to the industrial sector's transition involve the need for new technologies and innovation for replacing energy and materials based on the use of fossil fuels in various industrial processes*.[1] Taken together, they will have major repercussions on production systems, work organisation as well as job shift and transition. Climate transition is not only a grand challenge for Research & Innovation (R&I) and the European Innovation system. It also comprises the demand for new skills and educational investment on a scale far beyond present investment.

Today's skills will not match the jobs of tomorrow, and newly acquired skills may quickly become obsolete. The greening of our economies will create millions of jobs as we adopt sustainable practices and clean technologies, but other jobs will disappear, as countries scale back their carbon- and resource-intensive industries.[2]

The erratic pandemic shocking working and living conditions in Europe

On top of these twin challenges, the pandemic outbreak during 2020 has fundamentally changed the conditions of future work in many respects. The structural, economic, and social impact of Covid-19 on the labour market and working conditions has given the metaphor of *The Black Swan* a new, unexpected, and unhappy face. The first and second waves of the pandemic have in the short run significantly increased the levels of unemployment, and structural downsizing of specific sectors of the labour market, but also expanded in other sectors. Culture and entertainment and sports have more or less been locked down. Self-employed persons, consultants and SMEs are facing increasingly tougher times with falling demand for services, not to mention people being caught in precarious work and uncertain and low paid working conditions. The transport sector, tourism and international travelling have also faced new restraints.

Hospitals, care for the elderly, and health promotion is an expanding sector carrying both risks and challenges. The industrial sector is facing a falling demand for their products and is also suffering from transport and national barriers and disruptive value and production chains. New forms of remote and collaborative work have created both opportunities and risks in the European workplace. The shift from offices to home-offices (hoffices) implies a new form of occupational time and place balance: and not all homes are always good

[1] https://www.klimatpolitiskaradet.se/en/rapport-2020/. Report from the Swedish Climate Policy Council.
[2] Work for a brighter future. Global Commission on the future of work, ILO 2019

workplaces. The pandemic has led to an open and uncontrolled experiment in new forms of work, and a fundamental change in what we define as a modern workplace, with far reaching impacts on work organisation, leadership, workers co-determination, health and safety and forms of workplace learning. The current development of workplace transformations due to Covid-19 has opened our eyes to look at the new home-based workplace, with respect to leadership, social interaction at work, tensions between work and life, as well as ergonomic angles.

As been pointed out by McKinsey recently, there is a large overlap between jobs at risk due to Covid-19 in the short term, and jobs displaced by automation in the longer term.[3] The new panorama opens up dynamic transformations and learning processes of job destruction, job retention and job creation, as well as expansion of current jobs. And there is a growing risk that some groups, sectors, and regions might be lost in transition, which highlights the need for social protection in times of turbulent societal and industrial change.

Are we, finally, approaching "the end of work"?

Scenarios and projections of the future of work is a policy field in its "own. In 1995 the American futurist and policy thinker, Jeremy Rifkin presented his book *The End of Work. The Decline of the Global Labor Force and the Dawn in the Post Market Area.* Rifkin's ideas and contributions have been subject to criticism and discussion over the years. It also strengthens the scientific interest in the concepts of jobless growth and technological disruptions. Over the years, employment rates and number of full-time employees have shifted. Back in the mid-1990s there were deep concerns over growth and employment. In the public debate, there were two explanations for the weak performance of EU Member States: trade and technology.

Today, 25 years later, we know more about the interaction between tech-trade and employment. From 1995 to 2018, we have lived through a period of disruptive digital developments, a strong growth in global trade and investment, and a financial crisis. Despite this, there are 35 million more people employed in EU28 today compared to 1995[4] - the highest employment rate ever in the EU (before the pandemic). This is the net result: it includes a loss of more than 5 million jobs during and after the financial and currency crises, from a peak in 2008 to a bottom in 2013, before the economic recovery. 15 million of these additional 35 million jobs have been created during 2013 to 2018.It is, however, difficult today to predict the job loss, employment slack and new jobs generated for the next years to come.

The same applies when we look at global development: according to the ILO, employment has increased by almost one billion jobs over 25 years, between 1991 and 2016, from 2,2 to 3,2 billion[5]. In a short-term perspective, the impact of Covid-19 comprises not only job

[3] McKinsey (June 2020) The Future of Work in Europe. https://www.mckinsey.com/featured-insights/future-of-work
[4] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsi_emp_a&lang=en
[5] https://www.ilo.org/global/topics/future-of-work/publications/WCMS_591502/lang--en/index.htm

destruction and job creation, but also jobs being reconstructed by functions and in time and place.

Whether we will see a continued employment growth, or not, is more a question of macroeconomic policies than digital technologies. The heavy employment losses between 2008 and 2013, 5 million jobs in EU28 can all be explained by mismanagement of the financial system, and of mistakes in macroeconomic policies, not by trade and technology. The good employment performance during 2014-2018 could be a seen as a learning experience for more growth-oriented policies: both monetary and fiscal policies, by the EU and the ECB and by Member States. The 2008 financial crisis was met by austerity and restrictions. The new double lockdown crises must be met by investments and fiscal policies to promote a healthy and productive recovery.

The structural challenge: the two-speed-labour market

The existing mismatch on the labour market can be illustrated by the metaphor of "the two speed labour market". It is a quite simple explanation of complex interactions between supply and demand. There are two sides of the labour market. On the one side there is the economy, businesses, big and small enterprises, public organisations, entrepreneurs: a mix of organisations, employing some 240 million people (before Covid-19).[6]

On the other side there is the labour force, 240 million employed: men and women, experienced workers and newcomers, skilled and unskilled, most of them in gainful employment, some of them entering the labour market, others in transition from one job to another. Then there are some 16 million unemployed, some of them, 6 million, long term unemployed.[7]

What do we know about the interaction between the economy and the labour force? We know that the pace of change in the economy is high. Some 10-20 per cent of new jobs are created in existing enterprises or in new ones, new jobs in the growing end of the economy, new jobs with new skills requirements. At the same time, existing jobs will be lost in the declining end of the economy. We also know that some of those losing their jobs will soon find a new job; however, many will not. Their skills from declining enterprises or positions, do not fit the new jobs. Redundancy, loss of jobs, will turn into unemployment. Too few are given a new start in the form of skills for the digital economy, existing skills do not match the changes in the economy, there will be bottlenecks in the growing end of the economy, and slower economic growth.

In the background document to the European Pillar of Social Rights, there are some striking facts from Member States on lack of action. As an average, only 10 per cent of those out of

[6] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsi_emp_a&lang=en
[7] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsq_ugan&lang=en

work were offered a new start in the form of retraining or upskilling. Most of the jobseekers must find a new job in the digital economy, lacking skills for this new world of work. A report written by Michel Servoz, a former DG of DG Employment in the EU-Commission, confirms the two-speed labour market: on the one hand, 90 per cent of jobs now require IT-skills, on the other hand 61 million people in the EU have insufficient basic skills.

Thus, too few springboards inside enterprises, and too few bridges back to work, for those who have lost their jobs. Too much intervention comes too late, leading to long term unemployment. The message from the European employment strategies and the European Pillar of Social Rights is clear, much more must be done. Policies have, according to the OECD, a key role to play to promote an efficient and inclusive digital transformation, by ensuring that the necessary complementary factors are in place, including enhancing initial education and training systems' ability to provide the cognitive, technical and managerial skills that are crucial to striving in digital economies.[8] Or, to quote the World Economic Forum: "We need a reskilling revolution"[9].

To summarise: It is not only technology and globalisation that is the threat. It is the lack of supporting policies that is causing social and economic damage. This is a big European problem of the past, and it will be a bigger problem of tomorrow: unless there is fundamental change in Member States´ political priorities.

The skills gap is widening

There are many ways to analyse and estimate the European Skill Gap.[10] The Cedefop study (2018) describes various approaches to the problem. The challenge does not only comprise the digital divide and new digital skills. In a broader sense it is about the matching of skills and future jobs, bearing in mind the current discussion of how many jobs and skills that will become obsolete in the next two decades to come. The skills mismatch is not only, however, a question of underqualification, but also the problem of overqualification or overeducation. According to Eurostat (2020) there is no generally accepted method to estimate skill gaps in the labour market.[11] One often used indicator is the recruitment gap, by enterprises reporting that they cannot find enough highly skilled and competent employees in their own field. Another approach is to ask employees about their need for skill upgrading, workplace learning and further education.

[8] http://www.oecd.org/eco/growth/digitalisation-productivity-and-inclusiveness/
[9] https://www.weforum.org/agenda/2019/04/skills-jobs-investing-in-people-inclusive-growth/
[10] https://www.cedefop.europa.eu/files/3075_en.pdf. Insights into skill shortages and skill mismatch. Learning from Cedefop's European skills and jobs survey. Cedefop 2018
[11] https://ec.europa.eu/eurostat/documents/7894008/9596077/Methodological_note.pdf. Based on EU Labour Force Survey (EU-LFS) data, the agency proposes experimental indicators measuring the "vertical" and "horizontal" skills mismatch, i.e., discrepancies between educational attainment levels (ISCED 2011 1-digit) and occupations (ISCO 2008 1-digit). "Horizontal" measures focus on misalignments between the educational field of the highest level of education attained.

A Cedefop estimate, based on European skills and jobs survey (ESJS, has shown that the existing skills of the EU's workforce fall about one fifth short of what is needed for workers to carry out their jobs at their highest productivity level. This calls for concerted action to stimulate further adult learning and training in Europe. This study also showed that 43% of EU employees experienced a recent change in the technologies they use at work. Digital technologies are used in many sectors of the labour market, and the demand for information and communications technology specialists is growing fast. In the future, 9 out of 10 jobs will require digital skills. At the same time, 169 million Europeans between 16 and 74 years: 44%, do not have basic digital skills.[12]

A common method is to describe the education gap between generations, social group or men and women. According to Eurostat (2020) there are about 34% of women in EU who have completed tertiary education, while 29% of men had reached this level. If we start, with the prediction that 50% of the workforce should have completed higher education level, we need a fundamental educational upgrading. Taking the alternative route and looking into vocational education and training, at least one in five employees need a longer skill upgrade for one year. Thirdly, the skill gaps can also be met by new combinations of workplace and job oriented short-cycle programmes.

What is the EU response to the skills challenges?

Recently, the Commission presented the European Skills Agenda for sustainable competitiveness, social fairness, and resilience.[13] It underlines the need for upskilling of existing skills and reskilling for new tasks. It is a major challenge for Member States, companies, and social partners, that not only comprises formal education, but also non-formal and informal learning arenas in society and working life. To open a wider range of lifelong learning, the Commission suggests using *"the EU budget as a catalyst to unlock public and private investment in people's skills".*

The Skill Pact is a concerted action of various measures, from the promotion of Skills Intelligence and better matching between demand and supply on the labour market, national skill strategies, highlighting vocational education and training (VET) in a lifelong setting and reinforced by *Centres of Vocational Excellence*, higher education and up-skilling of scientists, promotion of STEM (Science, Technology, Engineering and Mathematics) skills, and investment in skills supporting the green deal and the digital revolution. Finally, the new skills pact stresses the fundamental role of transversal and generic skills. "Beyond technical skills, the labour market increasingly needs transversal skills like working together, critical thinking, and creative problem solving."

[12] https://ec.europa.eu/digital-single-market/en/news/digital-skills-gap-europe
[13] https://epale.ec.europa.eu/en/content/skills-agenda-sustainable-competitiveness-social-fairness-and-resilience

New springboards and new bridges to work

In addition to reskilling and up-skilling, the combined impact of Covid-19, new green deal and digitalisation calls for new forms of career transition support. Helping employees' transition to new jobs and to re-orient themselves in the job market, are available to some extent in most countries. They are a means for attaining a fair labour market, as well as being a cog in social protection systems. These efforts come in many forms, and vary greatly between countries and over time.

Sweden has longstanding experience of Job Transition Funds, and the model bears resemblance to a collective insurance plan, which has proven quite successful. In Sweden: whenever restructuring involves reducing the size of the workforce, displaced persons have two main forms of support. In addition to the Swedish Public Employment Service (*Arbetsförmedlingen)*, there are also several Job Transition Funds (or Job Security Councils) that provide support for new employment. The job security councils are independent of the state and are the result of collective bargaining agreements between social partners.

The Social Partners' System for Transformation in Sweden

The Swedish system, built on the social partners with job transitions funds/job security councils, results in comparatively short transition periods (between being laid off and finding a new job) and high success rates. About 90 per cent of people who receive help from job security councils are employed elsewhere within six to twelve months. It is important to note that this system is based on collective agreements, and therefore only covers people who are affected by such agreements. Trade union organisations and employer organisations work for their members. The idea is that those who are not covered by a collective agreement instead receive support from the public welfare system. These include for example newly arrived immigrants, recent graduates from school and higher education, and those who are self-employed. The goal is for displaced workers to find a new sustainable and lasting source of income.

The report "Back to Work: Sweden" from the OECD notes that 'Much of the Swedish success can be attributed to the role of social partners who have developed a solid infrastructure to anticipate economic changes on the one hand, and manage structural change via the so-called Job Security Councils on the other.'[14] Although the Swedish system with job security councils is applied to uniquely Swedish experiences, and complements a labour model with a high level of representation of both workers and employers, aspects of the model can be translated and adapted to systems with a lower level of engagement. Essentially, the job security councils can most closely be compared to an insurance plan. The premium is paid

[14] OECD (2015), *Back to Work: Sweden: Improving the Re-employment Prospects of Displaced Workers*, Back to Work, OECD Publishing, Paris, https://doi.org/10.1787/9789264246812-en.

monthly by employers as a portion of 0,3 to 0,6 percent of the salaries, and the insurance kicks in when restructuring is needed.

More generally, European welfare regimes have crucial and supporting functions for job transition and efficient labour market transformation. The levels of provision of good child-care and care for the elderly, are fundamental also for labour market participation, both for men and women. Social protection, equality of opportunities and the right to good working conditions are necessary preconditions for economic development and growth. It is also the core vision of the European Pillar of Social Rights and the important role of the social dialogue on the European labour market.

What the EU and Member States must do

For the EU to get out of the current crisis, it needs to generate *recovery*, build resilience, and guide economies along the path of just, green and digital transitions. The recovery will have to be *inclusive* and *fair.* The European Pillar of Social Rights provides a compass to tackle the social and economic challenges of our time.[15]

The intersection of SDG and European Pillar of Social Rights provides a joint arena for the Future of Work in Europe. The current development of "work without boundaries" has been articulated by new working patterns due to the pandemic. "Work-life balance" has taken a new shape in the context of remote work, hoffices, and distributed workplaces. The new uncertainty of future of work and instable employment conditions for groups at risk, highlights to crucial role of values and objectives in the European Pillar of Social Rights. In times of technological disruptions, increasing unemployment and close down of many businesses, it is important not only to secure social protection in general, but also to create targeted missions for groups at risks: e.g., workers with low education, individuals with disabilities, workers being discriminated at work in various contexts.

The New Skills Agenda for Europe is a good start to address the challenges of 2020+. However, the triple challenges: digitalisation, climate transition and the pandemic, requires new policies and new investment in skills and transition.

A Mission

We would suggest the inclusion in this Agenda of a Mission on" Skills *for just transition and the digital transformation 2020-2030"* like the ones introduced by Horizon Europe: for climate, health, food, and oceans.

This is a new form to drive innovation and investment through explicit missions and goals. Such a mission on skills should be supported by the whole financial value chain, all available

[15] https://ec.europa.eu/social/main.jsp?catId=1487&langId=en

financial resources at national and European levels, and all sectors of the economy. It should be a joint responsibility for the social partners to test new forms and to develop "best *practice*" in a co-creation process, supported by Horizon Europe and ESF+.

New forms for transition mechanisms to be managed by the social partners

In the context of fundamental labour market and social transformations, policies for decent and sustainable jobs must be integrated with decent, secure, and sustainable forms of job transitions. Institutions, models, and tools to facilitate job mobility should be core functions in the European social model, and, also supported at national level.

Models and experiments of European Job Security Councils, based on transition fund managed and controlled by the social partners in collaboration with national and local governments, could be a central measure in a European toolbox for job shift and transition.

Just transition

The new recovery fund *Next Generation EU,* and other policy measures and investments in the EU, must combine both shorter and longer perspectives. It cannot mainly function as a first aid kit of economic aid for the next months or years to come. Nor can it only highlight the long-term mission to support the green deal, profound measures to limit climate change. It is also crucial to achieve a balance between social rights and healthy living and working conditions for European citizens, and at the same time support a recovery and a restart of main economic sectors in society.[16] The concept of "just transition" is crucial in an ecological sound transformation of industrial sectors, but it is highly important that it also considers the cost and benefits for the workers.[17] Grand challenges for future Europe are to develop and integrated social model combining digitalisation, reducing CO2-emissions in industries, and through intensified electrification of the transport sector. In addition to abolition of fossil-dependent energy systems, it is necessary to combat increasing inequalities between and within countries.

Workplace innovations

The Green Deal calls for a new and fresh look at workplace innovations to respond to the needs of various sectors of working life, e.g., the energy sector, the industrial sector, public servicer as wells as the broader service sector. The greening of work does not only include "green jobs" in agriculture, forestry, and energy production, but also sustainable working condition and sustainable production systems and products. Flexible work organisations are often a missing link between labour market and employment policies on the one hand, and

[16] Another investment from the EU Commission to facilitate labour market related transitions is the temporary Support to mitigate Unemployment Risks in an Emergency (SURE), which aims at mobilising significant financial means to fight the negative economic and social consequences of the coronavirus outbreak in various countries.
[17] https://www.etui.org/publications/socially-just-transition-through-european-green-deal

policies for occupational safety and health, OSH, on the other. Modern and innovative work organisations are a set of keys to connect measures as the meso-level as labour market policies and labour laws with the micro level at firms, workplaces, or individual workers' situation. AI, algorithms, big data, and new technology will make many jobs obsolete, but also create new jobs as part of the gig-economy. The ongoing automation, AI and other technology-driven changes at the workplace will promote productive and growth, but can also support polarisation on the labour market and negative reactions for those left behind. It is a challenge for politicians and social partners to make soft transitions, so that people embrace rather than fear these developments.

The Green Deal must be implemented in a coalition between social partners, business, and governments with the aim of integrating the various dimensions of the SDG: i.e., ecological, economic, and social dimensions.

New resources

Even before the pandemic, there was a big and growing skills gap. With the pandemic the skills gap is widening further. It is not easy to predict the content, quality and volume of skill development needs caused by the triple challenge of climate change, digitalisation, and Covid-19. We suggest, however, that the EU Commission should develop a transition capacity indicator corresponding to at least one fifth of the labour force and to recommend new springboards and bridges to work for the next years to come.

We are convinced that this is the most productive and profitable investment Europe can make. That will include a doubling of the investment plans in the European Skills Agenda, and new priorities at the national level. New models of cost-sharing between individuals, corporations and public interests are needed to facilitate vocational training and up-grading of skills. Learning accounts, targeted models of social and economic support, leave of absence and open access are other investment fields. All these measures can be seen in the light of the European Pillar of Social Rights, here in combination with Learning Rights which are also being promoted by Agenda 2030 and the SDGs.

It will help enterprises to find workers with the right skills and workers to find the way back to gainful employment. It will reduce social cost. It will pay off both in the short and the long run.

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Sustainable work in transition: Policy background, concepts and research arenas

Kenneth Abrahamsson

Abstract

The future of work is today discussed at global level in Agenda 2030 and SDG 8, by ILO and in the Global Deal, which is a multi-stakeholder initiative for social dialogue and inclusive growth. Future of work, social innovations and inclusive growth are also central policy missions for the OECD, the European Commission, and its agencies Cedefop, EU-OSHA and Eurofound. The European Pillar of Social Rights highlights the need for a European social model, promoting a progressive interplay between economic development, good working conditions and social protection. This article analyses concepts of quality of work, decent work, and sustainable work. Its title comprises different connotations of sustainable work in transition. Firstly, sustainable work has not received significant attention in the policy agenda on sustainable development. Secondly, new forms of work and the dissolution of the traditional workplace and standard employment relations call for a widened use of the content of sustainable work. Thirdly, the Green Deal, low carbon omissions and new energy systems will have substantial impacts on work organisation and production systems. Finally, digitalisation, labour market transformations and increasing job longevity make job shifts and skills upgrading more common, and sustainable work must be seen in a life-course and lifelong perspective.

Keywords: good work, job quality, employment relations, green deal, workplace innovations, the precariat, future of work

Introductory comment on sustainable development

The concept of sustainable development was launched by the Brundtland Commission in *Report of the World Commission on Environment and Development: Our Common Future* in 1988. The Commission focused on environmental sustainability: the survival of our planet, but also gave priority to social sustainability. In her foreword to Our Common Future, Gro Harlem

Brundtland underlined the need for a new era of economic growth that is both socially and environmentally sustainable, as well as socially responsible.[1]

> «Many critical survival issues are related to uneven development, poverty, and population growth. They all place unprecedented pressures on the planet's land, waters, forests, and other natural resources, not least in developing countries.»

The EU adopted its first Sustainable Development Strategy at the Gothenburg European Council in 2001. This was followed by the renewed Sustainable Development Strategy for the enlarged EU in June 2006. This defines sustainable development in the following terms: "Sustainable development means that the needs of the present generation should be met without compromising the ability of future generations to meet their own needs." The strategy's key objectives cover environmental protection, social equity and cohesion, prosperity and the EU's international obligations (European Council Document 10917/06).

It set out seven key challenges, with targets and policies to meet them, i.e., climate change, transport systems, sustainable consumption and production patterns, management of natural resources, public health equity, socially inclusive societies and quality of life and finally support for global sustainable development. Sustainable work and sustainable work systems were only mentioned indirectly in the EU Sustainable Development Strategy, but it is evident that health promotion and quality of life have central roles in the strategy.

In 2015, the United Nation launched the Sustainable Development Goals comprising 17 general goals and 169 sub-targets. SDG number 8 concerns decent work and economic growth. The SDGs also contain a strong social concern.[2]

> «The Sustainable Development Goals (SDGs) aim to encourage sustained economic growth by achieving higher levels of productivity and through technological innovation. Promoting policies that encourage entrepreneurship and job creation are key to this, as are effective measures to eradicate forced labour, slavery and human trafficking. With these targets in mind, the goal is to achieve full and productive employment, and decent work, for all women and men by 2030. »

The purpose of Goal 8 Decent work and economic growth is to promote inclusive and sustainable economic growth, employment and decent work for all. The UN SDG's focus corresponds to ILO policies for decent work (UN SDG 8).

> «Decent work means opportunities for everyone to get work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration. It is also

[1] https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf.Downloaded 2021-01-31. Quote from chairwoman's foreword.
[2] https://www.sdgfund.org/goal-8-decent-work-and-economic-growth. Downloaded 2020-10-20

> important that all women and men are given equal opportunities in the workplace. A continued lack of decent work opportunities, insufficient investments and underconsumption lead to an erosion of the basic social contract underlying democratic societies: that all must share in progress. »

The Global Deal for decent work and inclusive growth was launched 2016 by Swedish Prime Minister Stefan Löfven as a concrete input to the UN 2030 Agenda for Sustainable Development. Its purpose is to bring together various stakeholders to promote joint solutions, while still representing their different interests. Effective social dialogue requires mutual respect and trust, to create favourable conditions for collaboration between employers, workers, and governments.[3] This mission is now organised and managed in collaboration with the OECD.

In November 2017 the European Pillar of Social Rights was launched at an EU summit meeting in Gothenburg, Sweden. The vision of the pillar is to find a balance between economic development and growth, good working condition and social protection.[4]

> «The aim of the European Pillar of Social Rights is to serve as a guide towards efficient employment and social outcomes when responding to current and future challenges which are directly aimed at fulfilling people's essential needs, and towards ensuring better enactment and implementation of social rights. »

The European Pillar focusses three policy dimensions concerning future of work in the EU. They are equal opportunities and access to the labour market, fair working conditions and social protection and inclusion. The European Pillar of Social Rights are related to some of the SDGs, but not all of them. SDG 8 Decent Work and Inclusive Growth directly shares the same field of action as EPSR. Of particular interest are also SDG 1 No poverty, SDG 3 Health and Well-being, SDG 4 Quality Education and SDG 5 Gender Equality, SDG 9 Industry, Innovation and infrastructure and SDG 10 Reduced inequalities and finally SDG 17 Partnership for the Goal. It constitutes a major challenge for policies, research and, direct actions to analyse the intersection between Sustainable Development Goals and the European Pillar of Social Rights. The vision of the pillar underlines quality of work, workplace innovations and employment security (EU 2017, p. 5).

> «Innovative forms of work that ensure quality working conditions shall be fostered. Entrepreneurship and self-employment shall be encouraged. Occupational mobility shall be facilitated. »

> «Employment relationships that lead to precarious working conditions shall be prevented, including by prohibiting abuse of atypical contracts. Any probation period should be of reasonable duration. »

[3] https://www.theglobaldeal.com/about/. Downloaded 2020-10-08
[4] https://ec.europa.eu/commission/sites/beta-political/files/social-summit-european-pillar-social-rights-booklet_en.pdf. Downloaded 2010-10-15.

The need for good and constructive partnerships is also highlighted, with special focus on the social dialogue and the role of social partners.

> «Social dialogue plays a central role in reinforcing social rights and enhancing sustainable and inclusive growth. Social partners at all levels have a crucial role to play in pursuing and implementing the European Pillar of Social Rights, in accordance with their autonomy in negotiating and concluding agreements, and the right to collective bargaining and collective action. »

The concept of sustainable work has been developed over recent decades. It took several years, however, before workplace sustainability was adopted as a member of the sustainable development family. Hvid and Lund (2002) pointed early at the tension between environmental interests on the one hand, and labour markets and job protection interest on the other, by illustrating conflicts between the environmental movements and trade unions in the 1970s and 1980s. Today, social partners share a more positive view on the future of the Green Deal as a mission for Europe.[5] Its main purpose is to make EU's economy sustainable, by meeting climate and environmental challenges with powerful policy missions to create new opportunities together with a just and inclusive transitions. The Green Deal calls for comprehensive and long-term policies, and is also a future mission of the European Social Dialogue.

In practice, however, there are examples of the tension between different goals, e.g., Greenpeace in summer 2020 was blocking tankers from delivering oil to the Preem refinery in Lysekil, north of Gothenburg. This conflict illuminates the tension between low-carbon policies, and business and job protection interests, in plans to expand the refinery, a goal conflict that is currently creating headaches at the governmental level in Sweden. The conflict was avoided when the company, for business reasons, decided to withdraw its expansion plans.

Thus, the dynamic policy concept of sustainability is embedded in several policy circles with the biosphere and global survival as the broadest perspective, followed by climate change and environmental challenges, as well as sustainable energy systems. Social sustainability comprises welfare systems, health and living conditions. In a labour market context, it is common to talk about sustainable workforce providing good conditions for job entrants, people at work, as well as individuals in the transition to retirement. The focus of this article is on sustainable work systems and sustainable work, i.e., work environment, occupational health and safety, gender equity and no discrimination, learning and development at work, workers co-determination and participation, control and influence, as well as productivity and growth.

[5] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en. Downloaded 2020-10-08.

In search for definitions of sustainable work

The concept of sustainable work has been increasingly used in policy quarters and research over the last two decades. There are numerous definitions that sometimes overlap and in other contexts comprise a specific part of the concept. The Swedish Vinnova-supported *Platform for Sustainable Work in Horizon 2020* used this broad definition:[6]

> «Sustainable work highlights the dynamic fit between employees and working conditions and is a generic policy concept. Sustainable work promotes health, wellbeing, learning and influence, as well as productivity, innovation and growth. The goal is to promote continual growth and regeneration of human, social, economic and ecological resources. The strategic importance of sustainable work, as a resource for health, innovation and growth, is emphasised in the European innovation strategy, and also by the social partners. Therefore, sustainable work needs to be a more visible and coherent theme in Horizon 2020. »

Docherty et al. (2009) highlighted a balanced development of various resources operating in a work system. Sustainability is primarily identified with ecological and environmental issues, nowadays quite often connected with climate crisis and the striving for a low-carbon society. They focused on human and social sustainability at work, but also point to human, social, economic and ecological dimensions where business goals, social goals and job quality come together.[7]

Sustainable work as a policy mission was launched in 2001 during the Swedish EU Presidency, and by research from the then National Working Life Institute, abolished in 2007. The principles of workplace sustainability are built on the following basic assumptions formulated by Docherty et al. (2009, p. 7) and here presented in a shortened version:

- The opportunity to develop as a person, a professional and a member of a society through work experiences is a basic human right.
- The sustainability of human and social resources is one of the foundations of economic sustainability.
- Sustainability at work is one of the foundations for social development and sustainability of whole societies
- Sustainability of human and social resources is needed to secure ecological sustainability, "because only people and groups who operate sustainably are able to grasp, prioritise, and work toward ecological sustainability.

Eurofound has inspired the European discourse on job qualities and has chosen to highlight a life-course perspective on sustainable work (Eurofound 2015a, p.2).

[6] http://sustainablework2020.se/. Downloaded 2020-10-15.
[7] Docherty et al. (2009) Creating Sustainable Work Systems. Developing social sustainability and Docherty in Håkansta, C.& Abrahamsson, K. (eds.) (2008) Workplaces of the Future. Work-In-Net Foresight Seminar held in Stockholm, Sweden.

> «Eurofound's working definition of 'sustainable work over the life course' means that working and living conditions are such that they support people in engaging and remaining in work throughout an extended working life. These conditions enable a fit between work and the characteristics or circumstances of the individual throughout their changing life, and they must be developed through policies and practices at work and outside of work. »

The life-course perspective on sustainable work differs from an age-management perspective, focusing on adjusted workplaces for older workers. In a lifespan and job longevity approach, work environment for young workers could have negative impact on working conditions in middle-age or for older worker. High levels of job strain, physical requirements, noise and vibrations for young employees could have health repercussions later in life, and could shorten the occupational career.

Eurofound (2014) also launched the concept of sustainable work as a core concept in its previous work programme.8 Sustainable work is, according to Eurofound, a polysemic concept used in various contexts and social levels (Eurofound 2014, p.1):

- Individuals: capacity to perform a specific job and to remain on the labour market over the life course
- Organisations: companies' potential to develop efficient work organisations; ensuring both physical and mental wellbeing of the workforce and ensuring up to date adequate skills.
- Society: favouring inclusion on the labour market, increasing social cohesion, helping to reduce the drop-out and poverty rates.

Eurofound highlights three dimensions of sustainability, namely sustainability and ageing, sustainability over the life course and finally, sustainable work systems. The third mission emanates from the thinking of Docherty and his colleagues, by highlighting ting that human and social resources should not just be consumed, but also being preserved and regenerated and to allow them to grow and develop. Learning and development play a central role in this context (Foundation Seminar Series, 2014, p.7):

> «Learning is a key components of sustainable work systems, and must take place at all levels: individual, collective and organisational and beyond that among organisations in networks, coalitions and systems. Learning is key to support change. Instruments to contribute to it are development of vision within the organisation, participation in decision making of all stakeholders, development of partnerships and coalitions to stimulate dialogue, developing networks for collective learning from pooling experiences, reflective learning is important. Sustainability is a dynamic learning-oriented state. »

[8] See Foundation Seminar Series 2014. Sustainable work through the life-course. Background paper. http://www.eurofound.europa.eu/events/2014/fssdublin/index.htm

The promotion of green carbon-free jobs and production systems is bridging the gap between the global sustainability movement for ecological survival, and the focus on sustainable work systems. When the ILO (2013) is promoting sustainability, green jobs are at the centre of the policy mission. [9]

> «This report addresses two of the defining challenges of the twenty-first century: achieving environmental sustainability and turning the vision of decent work for all into a reality. It shows that not only are both challenges urgent, but they are also intimately linked and will have to be addressed together. While it is certain that environmental degradation and climate change will increasingly require enterprises and labour markets to react and adjust, the goal of environmentally sustainable economies will not be attained without the active contribution of the world of work. »

Decent and sustainable work has to be seen in a social, economic and ecological context, where the different levels and subsystems interact with each other, and also illuminate various challenges and goal conflicts.

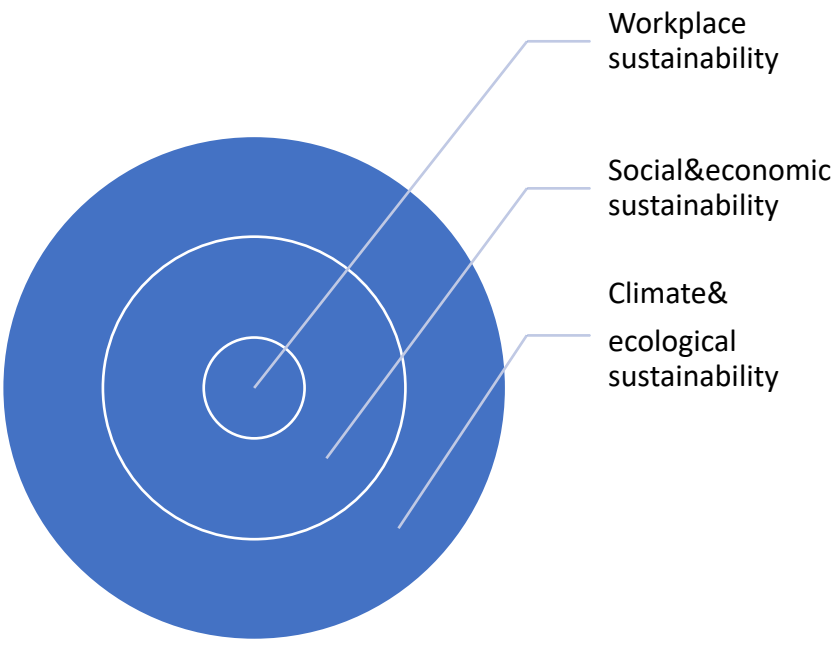

Figure 1: Levels of sustainability

[9] Sustainable development, decent work and green jobs, ILO 2013; page xi

Crossing the scientific boundaries of sustainable work

Policy development and research on working life and work organisations reflect a growing conceptual diversity. The concepts of good working conditions should, more and more, be replaced by sustainable work or sustainable work systems. The notion of workplace innovations has been in operation during the last two decades. The model of lean production tends to be used more and more in industry and in the public service sector. Digital Taylorism is another buzz-phrase, focussing on new patterns of division of labour in a polarised and segregated labour market. Flexible employment conditions for better or worse are covered by the concept of precarious work (Standing, 2011). The metaphor "work without boundaries" implies a dualism in flexibility; empowerment and flexibility from the employee's perspective or substitution flexibility as seen from employers' the production system perspective (Allvin et al., 2011).

One of many challenges in this context is to bridge the gap between sustainable work and the notion of workplace innovations. Sustainable working life, or sustainable work systems, are so far open concepts that need further specification. Common policy concepts in Sweden have been "good work" or "developing work", while the concepts of sustainable work and healthy workplaces are now being used more often. Thus, sustainable work has more and more been used in addition to social and environmental sustainability; and they all have high policy popularity both among agencies, social partners and other actors. Some international efforts have been made, however, to clarify the concepts (Fischer & Zink, 2012; Zink, 2014; Kira & Eijnatten, 2011). Eijnatten defines the concept in the following way (quoted from Fischer & Zink, 2012, p. 3904):

> «A Sustainable Work System is a work system in which the quality of work (i.e., employee's health, well-being, and personal development); the quality of the organisation (productivity, efficiency, the ability to meet the challenges of tomorrow's business); and the quality of connections with the environment (both nature and society) are constantly kept at the same high levels. Sustainable Work Systems should reproduce resources [...] [t]hey develop by growth in the amount of resources in a reproduction cycle. »

The illustration below highlights the scientific borders between various fields of research that have importance for sustainable work. The focus in this article is on occupational health and safety, on demand-control/stress and learning options, as well as productivity and value creation. Other relevant fields are employment relations/flexibility and boundaryless work including precarious working conditions, new technology, ICT and design, and new forms of work and management as well as leadership.

Figure 2. Intrinsic and external factors for sustainable work

The implementation of policies for sustainable work systems is not, however, an easy task. Fischer and Zink (2012) elaborate objectives and institutional barriers when you want to use human, social and natural capital, and at the same time consider personnel subsystems, technical subsystems, as well as the organisational and management structure. They underline the importance of sustainable work systems, but also express some doubts on how all objectives and conflicting goals from various interests could be solved in specific work contexts (Fischer & Zink, 2012, pp. 3904-3905):

> «In praxis, striving for "real" sustainability often is a hard job as systemic thinking in long-term and complex interdependencies is just not in the human nature. Besides this, all organisations, work systems as well as individuals only have limited resources to cope with the "daily business" and to meet the needs of their relevant stakeholders.»

Sustainable work and sustainable work systems are complex processes existing in organisational, technological, economic and management contexts, aiming at good, healthy and productive outcomes. Flexibility, boundaryless work and social dialogue make it difficult to design a specific and static sustainable work system. Sustainable work is striving for an optimal balance between social and workplace sustainability on one hand, and corporate goals for environmental sustainability, productivity and growth on the other. Sustainable work needs to be a high priority subject for negotiations between social partners, to set together a sustainable work deal, or collective agreements aiming for higher workplace sustainability. Another challenge is to catch a functional definition of green jobs.

The two faces of the good work metaphor

The Swedish discussion of Good Work, launched by the Metal Workers Federation during the 1980s and onwards focused on healthy workplaces, the interaction between work, education and learning, as well as the social support needed to create good working conditions both for men and women. Good Work as an infrastructure for work, welfare and life quality was presented by the Swedish Metal Workers Federation in a report from 1985, which comprised the following elements:

1. Job security
2. Equal and fair share of production results
3. Workers' co-determination
4. Collaborative work organisation
5. Skills and competence development at all levels
6. Continuing education/ lifelong learning
7. Flexible and employee-friendly working hours
8. Workplace equality and social inclusion
9. A healthy and risk-reducing work environment

The Swedish Trade Union Federation, LO, decided in its congress 2016 to initiate a new policy agenda on *Good work in our times* to be presented in 2020. One of the motions on good work at the 2016 congress focused on power relations at work. *Good work is the labour movement's vision that power, participation and responsibility should be shared between the workers and the companies. Today's concentration of power leads to undemocratic decisions, an oppressed working class, mismanagement with resources and exhausted workers.* The new LO Good Work project is an on-line dialogue with its unions and takes the form of webinars, research overviews, and focussed activities on union and workplace level. Due to the pandemic, the 2020 LO convention was held on the net, and the discussion of the good work concepts was postponed.[10]

It is interesting to make a distinction between good work as healthy and developing working conditions, and good work as a contribution to society, or a professional skill in a certain field of industry or public services. The latter view is reflected by Howard Gardner, Mihaly Csikszentmihaly and William Damon (2001) in the book *Good work. When Excellence and Ethics Meet.*[11] Good work in this connotation does not only comprise skills and competencies, but also professional ethics: a mental orientation that you contribute to good deeds.

> «People who do good work, in our sense of the term, are clearly skilled in one or more professional realms. At the same time, rather than merely following money or fame alone, or choosing the path of least resistance when in conflict, they are thoughtful about their responsibilities and the implications of their work. »

[10] https://www.lo.se/start/material/kongressprotokoll_2016_del_1. Downloaded 201015
[11] Howard Gardner, Mihaly Csikszentmihaly and William Damon (2001) Good work. When Excellence and Ethics Meet. New York: Basic Books.

Work ethics and reflective production are aspects that can be related to sustainable work and sustainable work systems. Sustainable work also, according to Hvid and Lund (2002) entails actions of reflection, but is also embedded in a structure of power. They argued that sustainable work has to be built on reflexive management characterised by high degrees of autonomy in production, in democracy and decision making, and value creation through an open dialogue.

Conceptual framework for quality of work

Working realities differ between countries, in various types of jobs and for different groups. Preventive initiatives in occupational health have roots in the late 19th century. Standards were not set to reach the highest levels of good work, but to avoid the most dangerous workplaces, to counteract risks and fatal injuries, to hinder dangerous exposure of chemicals, noise and too heavy tasks. Good work, in a historic sense, tends to start from the bottom-line, and define what is not acceptable and humane. Early legislation also focused on child-labour and women's nightwork.

Today, there are many concepts or models to describe job qualities. One strand is to look at attractive jobs from a life-course perspective, i.e., attractive jobs for young people or work ability and healthy for older workers. Gardner et al. (2001) have illuminated good work as good deeds, productive contribution or what in Sweden is labelled as "ett gott dagsverke": a good day of work. Biggs (2017) follows the Studs Terkel (1996) tradition of shaping the life and character of various occupations and work communities. "We may love our work, hate our work, find meaning in our work or none, but it's what we do all day long, and it shapes us." (Biggs, 2017, p.11) A common model is to describe good or bad jobs is the *Demand-Control, DC model* and its focus on job strain, control and stress (Theorell & Karasek, 1996). The DC model has been broadened to Demand Control, Resource model, the DCR model. They have inspired various streams on research on occupational health and safety in a work organisation perspective. Karasek (2017) discusses another variation of the model as the ADC model or the *Associationalist Demand Control* model, by including a wider societal context.

Work and identity are reflected in the concept of *coherence and meaning of work* promoted by Antonovsky (1996). *Work communities* and the social context of work are investigated and conceptualised in many different research approaches, e.g., work as communities of practice (Wenger, 1998), *working cultures* (Terkel, 1997) or *workers' collective* by Lysgaard (Axelsson et al., 2019) Paid and unpaid work: gender challenge and issues of work life balance is a field with increasing interest during last decades. Another metaphor is *healthy corporations* and *healthy workplaces*. *High road workplaces* (Parent-Thirion et al., 2017) in knowledge intensive and technology dominated environment is another sector of the field of good workplaces. Finally, we can once more point to the concept of sustainable work systems.

Eurofound and ILO (2019) share a definition of job quality in their joint report *Working conditions in a global perspective* (Eurofound and ILO 2019, p.1). [12]

> «Job quality is increasingly recognised as a major policy concern. It is central to the ILO's Decent Work Agenda and to the European Union's Quality of Work policies. For workers, for the enterprises and organisations that employ them, and for societies, there are benefits associated with high-quality jobs, and costs associated with poor-quality jobs. »

The EU conception of good work and inclusive work environments also focused on the mission of job-creation and diversity in working life.[13]

> «Regaining full employment not only involves focusing on more jobs, but also on better jobs. Increased efforts should be made to promote a good working environment for all including equal opportunities for the disabled, gender equality, good and flexible work organisation permitting better reconciliation of working and personal life, lifelong learning, health and safety at work, employee involvement and diversity in working life. »

Job quality can be assessed in various ways. In policies and in public debate it is common to talk about good jobs and bad jobs (Green, 2006). But what is a good job and what constitutes good work? The report *Indicators of Job Quality in the European Union* (2009) published by the European Parliament, underlines that job quality is a multidimensional concept that can be approached with different methods and various theoretical approaches. That report was launched when the slogan "more and better jobs" was an integral part of the European Employment Strategy and the Lisbon Strategy. It was also presented at a time when policy attention to good jobs indicators was at a higher level. There is no one single way to understand and measure job quality.

The multidimensional nature of job quality makes the development of a single indicator or a system of indicators more difficult as, prior to such development, it is necessary to define what aspects should be taken into consideration and their overall impact on job quality. Job quality can be approached in three ways according to the report. The first method is to look at job satisfaction as "an overall indicator of job quality". The second approach is to ask workers what makes a good job, and finally defining job quality from theories and models of social and medical sciences. Focus on job satisfaction is a direct and useful method in regional or national contexts, but has major weaknesses in international comparative studies, where there tend to be significant gaps between "subjective" and "objective" indicators. The second

[12] https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef18066en.pdf Eurofound and International Labour Organization (2019), Working conditions in a global perspective, Publications Office of the European Union, Luxembourg, and International Labour Organization, Geneva. Downloaded 2021-02-01

[13] European council (2001). Presidency conclusions. Stockholm meeting 23 and 24 March 2001.par. 26. Source: https://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/00100-r1.%20ann-r1.en1.html. Downloaded 2021-02-01.

method has both advantages and drawbacks. To listen to workers' voice about good jobs is part of active participation in the development of better working conditions. A challenge or a problem is to specify which dimensions should be used for expressing ideas or visions of good jobs, which also make international comparisons more difficult.

The third way comprises a number of scientific roads. Economists and sometime sociologists could use wages and labour compensation as an indicator of good jobs. Sociologists, psychologists and political scientists, as well as scholars from management science, could look at power relations and industrial democracy, and also participatory options. Traditional sociologist might look at alienation as a negative dimension of job quality, but might nowadays be more focussed towards skills, forms of autonomy or powerlessness. A more institutional approach from sociology, psychology and industrial relations can highlight issues in employment relations, precarious work or forms of skills development and career progression. Job quality can also be looked at from an occupational health and safety perspective looking at physical and psychosocial risks, injuries, illness and absenteeism. Finally, work-life balance studies could result in working time patterns, boundaries to private life, workload and stress. To sum up: job quality is a complex and multidimensional phenomenon. More broadly, the report (EU 2009) makes a distinction between work quality, job quality, and employment quality.

The OECD has developed a framework to measure the quality of jobs, with reference to three objective dimensions. They constitute, according to OECD "a comprehensive assessment of job quality. [14] This model differs from the labelling of job quality, work quality and employment quality.

- Earnings quality captures the extent to which earnings contribute to workers' well-being in terms of *average earnings* and their *distribution* across the workforce.
- Labour market security captures those aspects of economic security related to the risks of job loss and its economic cost for workers. It is defined by the risks of unemployment and benefits received in case of unemployment.
- Quality of the working environment captures non-economic aspects of jobs including the nature and content of the work performed, working-time arrangements and workplace relationships. These are measured as incidence of job strain characterised as *high job demands* with *low job resources*.

No attempt is done to bring the three dimensions together in a common index (Cazes et al., 2016, pp. 19-20).[15]

[14] http://www.oecd.org/statistics/job-quality.htm and http://www.oecd.org/sdd/labour-stats/Job-quality-OECD.pdf
[15] https://www.oecd-ilibrary.org/social-issues-migration-health/measuring-and-assessing-job-quality_5jrp02kjw1mr-en

> «Earnings quality, labour market security, and quality of the working environment are three complementary dimensions of job quality. They should be considered simultaneously, together with the number of jobs that exist (i.e., job quantity), when assessing labour market performance, well-being and the role of policies and institutions. These dimensions are broad enough to encompass the most significant aspects of job quality that shape workers' well-being. No attempt is made at this stage to aggregate them into a single indicator of job quality. Linking them together is not conceptually straightforward. »

Job quality is, however, not a static phenomenon. The Eurofound & ILO (2019) report on working conditions in a global perspective has a positive view on improving job quality (Eurofound & ILO, 2019, p.2).[16]

> «Job quality can be improved by reducing excessive demands on workers and limiting their exposure to risks: and also by increasing their access to work resources that help in achieving work goals or mitigate the effects of these demands. Each dimension of job quality can also be improved through workplace practices and policies. »

And furthermore, the report highlights the positive and dynamic functions of job quality (Eurofound and ILO 2019, p.11).

> «Many job quality features that are beneficial for workers are supportive of a positive and fulfilling quality of working life. Thus, high(er) levels of job quality are associated with health and well-being, work–life balance, financial security and skills development (Eurofound, 2016). Statistical analyses included in all national reports confirm these findings. »

Workplace innovations and sustainable work: similar and different

Workplace innovation has received growing attention and interest both in research and European policy formation. A valuable overview of this development has been presented by Oeij, Rus & Pot (2017) in the book *Workplace Innovation. Theory, Research and Practice*. It aims to clarify concepts, theories, models, experimenting and policy development. It also reflects shifting European policies from DG Employment and DG Grow. Furthermore, it contributes to clarifications of the concept and applications of WPI in a theoretical context. Another relevant and relatively recent book in this context is Helge Hvid and Eivind Falkum's (2018) book *Work and Wellbeing in the Nordic Countries. Critical perspectives on the world's best working life*. It has a stronger focus on the role of social partners, NPM in reforming and de-forming

[16] https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_696174.pdf. Downloaded 2020-09-26.

various professions and precarious work. The focus is mainly on Denmark and Norway. There might not be a Nordic Model: more Nordic approaches, as there is no European model, but various labour market regimes and working life patterns.

Sustainable work and workplace innovations are conceptual siblings with an overlapping DNA-structure. Sustainable work belongs to the larger family of job quality, which can be divided into job quality, work quality and employment quality. Thus, sustainable work reflects the goals and visions of good work and a healthy and safe work environment, while workplace innovation strives for a productive balance between organisational determinants and development on the one hand and good and healthy working conditions on the other. With some simplification, one might say that sustainable work, so far has a stronger focus on job quality and work environment over a life-course, while workplace innovation is stronger allied with work organisation research and innovative forms of work. An innovative work-organisation does not by definition become healthy and beneficial for the worker i.e., the theoretical discourse on the uberisation of work, and negative impact of platform work, could be good examples (Warhurst, Mathieu & Wright, 2017).

DG Grow presents a broader definition of workplace innovations covering various dimensions and levels of enterprises, economy and labour market.[17]

> «To stay at the competitive edge, companies need to invest not only in technological innovation but also in non-technological practices. Workplace innovation can mean many things such as a change in business structure, human resources management, relationships with clients and suppliers, or in the work environment itself. It improves motivation and working conditions for employees, which leads to increased labour productivity, innovation capability, market resilience and overall business competitiveness. All enterprises, no matter their size, can benefit from workplace innovation. »

The concept of workplace innovation exists in a cluster of ideas, models and driving forces. The approach represented by the EUWIN community underlines the role of employee-supported workplace innovations that also highlights the role of social partners and the workplace dialogues as a method (Alasoini et al., 2017). In the efforts to find a working definition, Oeij and Dhondt (2017) take an integral approach highlighting the combined role of improved organisational performance and quality of working life. Furthermore, they stress the interactive and participatory role for employees in the process and highlight four elements of a WPI model:

- Structural aspects (e.g., organisational design)
- Cultural aspects (e.g., leadership, coordination and organisational behaviour)
- Improve performance (e.g., productivity, innovation and quality)

[17] https://ec.europa.eu/growth/industry/policy/innovation/workplace_en. Downloaded 2020-09-19.

- Quality of work (e.g., wellbeing at work, competence development, employee engagement)

Thus, the WPI approach is not seen as a goal in itself but has an integral function to promote a healthy and productive workplace in an organisational climate of supporting employees, employers, stakeholders and customers. The impact of WPI should, according to Oeij and Dhondt (2017, p.76), be reflected in three types of outcomes: "organisational performance, quality of working life, and innovative capabilities of firms and innovative abilities of people." Powerful top-down management and regulations are neither sufficient nor effective to improve job quality and create a good work environment. "Framework agreements between the social partners and preferably governments as well are probably more successful. Such agreements could also be connected with national, sectoral or local workplace innovation initiatives." (Pot et al., 2017, p. 107).

Workplace innovations can be seen in relation to enterprise size and corporate structure. The conditions for large enterprises with standardised management models might differ from SMEs with a bigger variation in ways of organising work and productive systems. The OECD has recently looked at regional and national variations in learning patterns in SMEs in different countries (Lorenz & Potter, 2019). They found that shares of learning organisation and discretionary learning SMEs were greater in Nordic countries where learning organisation SMEs represent approximately 70% of SMEs in Sweden and Finland, and more than 40% in Denmark. It was lower in many eastern European countries, as well as in Italy, Turkey and Portugal. More generally, there are higher shares of learning organisations and discretionary work in knowledge-intensive business than in manufacturing, construction and transport sectors. It seems reasonable to say that learning organisations and discretionary work are prerequisites in workplace innovations, but they also play an important role in other models.[18]

From standard employment to atypical and precarious jobs

Employment relations have a strong impact on work environment and workers' health. When Guy Standing (2011) presented his study *The precariat. A new and dangerous class*, he also highlighted the dynamic relations between employment relations and quality of work. Traditionally, research into OSH-dimensions and quality of work analysed working conditions in large enterprises, or SMEs with employees following the pattern of standard employment.

Today, both standard employment relations and the workplace are much more flexible. Modern working life can increasingly be described as *Work without boundaries* (Allvin et al.,

[18] Lorenz, E. & Potter J. (2019). "Workplace organisation and innovation in small and medium-sized enterprises", *OECD SME and Entrepreneurship Papers*, No. 17, OECD Publishing, Paris, https://doi.org/10.1787/11732c0c-en.

2011). There are various ways and categories to describe jobs with or without employment relations. On each end of the scale, you have standard employment and unemployment. Between these categories exist temporary and precarious jobs, portfolio jobs and self-employment.

Eurofound (2015b) has identified a number of new forms of work, in which employment relations tend to be more complex; employee sharing, job sharing, interim management, casual work, ICT-based mobile work, portfolio work, crowd employment and collaborative employment. Many of these forms of work are not connected with traditional employment relations, but represent various forms for an employer to hire competence or skills for specific task. Precarious jobs have more often been connected to gainfully wage-earner with insecure employment relations, having temporary jobs are being made redundant. Precarious jobs, however, are also relevant for many self-employed persons, especially for unvoluntary self-employment or acting on a labour market where self-employment almost is a rule. Eurostat (2018) reports that self-employment could vary between six to eight percent in in Norway, Denmark, and Sweden up to 30 percent in Greece. Individuals being account-owners in small firms are often more vulnerable than individual being employed, and can rely on labour laws, social protection, and sometimes union rights (Conen & Schippers, 2020).

The focus of Standing (2011) is more the social category of the precariat as a new class on the labour market. The precariat is, however, very heterogenous, and the concept has different connotations various countries as working poor, being forced into more unsafe employment relations, belonging to a group of temporary or seasonal workers, or older workers on a post-work mission to add a low pension. Standing argues that there is a relation between precarious work and citizen rights, and workers in the precariat might be labelled as denizens or second- class citizens in the Athenian democracy. Precarious work can also comprise high levels jobs in the cultural sector as well as various form of portfolio consultant jobs. Kalleberg & Vallas (2017) define precarious work as "work that is *uncertain, unstable* and *insecure,* and in which *employees bear the risks* of work (as opposed to businesses or the government) and *receive limited social benefits and statutory entitlements* (Kalleberg & Vallas, 2017, p. 1*)*.

Rodgers (1989), also in Cohen & Shippers (2020), has identified four dimensions of precariousness; income adequacy for a decent standard of living, social protection by unions or the law, degree of certainty in long term employment conditions, and influence and control over the labour process. An additional dimension of precarious working conditions is the factor of multiple job holders. The insecurity aspect also implies subjective feelings of risks of being redundant, or not keeping a more continuous relation to a certain employer. There is also a relation between precarious work, work related injury and the risks of receiving a disability pension (Ojala & Pyöriä, 2019). In the light of the European Pillar of Social Rights, good provision of social protection is a necessity for individuals being caught by precarious jobs. More generally, there is an interplay between precarious jobs, households and social gradients, and forms of social protection by the welfare state.

There are also relations between precarious work and social conditions, and labour market position and social conditions of individuals are important health determinants (Van Aerden et al., 2017). A study in the US from 1995 – 2017 showed that women, and especially women with children, are overrepresented in precarious jobs in comparison with men (Albelda et al., 2020). A study of a Canadian population showed that immigrants: both males and females, more commonly work in-voluntary part-time work (Hira-Friesen, 2018).

A recent Swedish review on research of future work environment and employment relations pointed to the dynamic relation between forms of employment relations and quality of work (Sawee, 2020).

> «The significance of employment types for health and safety has gained increased attention in recent decades, both in research and among official bodies and international organizations. The primary reason is likely that both in Sweden and internationally, there is a lasting trend towards an increase in employment types that deviate from traditional, standard employment and these new kinds of employment are associated with an increased risk of illness, lack of work–life balance and a weak social safety net. »

The dissolution of employment relations in the gig-economy, with its direct connection between customer and producer, could have negative repercussions on income, work environment and social protection. In agencies taking care of self-employed persons administration and economic service, it could be complicated also for persons trained in labour law to define who is an employer, and who is an employee.

More generally, the standard employment form is still the majority for wage earners in Europe; even so there is a variation between North and South and East and West. In this majority of standard employment individuals, a minority go to the same office, fabric or service centre and work from eight to five each day. Work without boundaries is more distributed in place, in time and in functions. This development has been heavily accelerated during the Covid-19 pandemic, where remote work in the office sector tends to be more the rule than the exception.

Good jobs, bad jobs, or new jobs? Concluding remarks on future of sustainable work

What do we know then about future studies in the field of working life? In a Swedish study Bergman et al. (2010) reviewed some prominent writings on the future of work in recent decades. Their conclusions were that the meaning and dignity of work permeate many studies, but that there is a lack of basic perspectives on class and gender. In addition, they

point out that surprisingly few studies contain concrete predictions. Many studies have a normative approach, and they tend to highlight the desirable before the possible.

Job quality, employment conditions and skills requirements are significant dimensions of the European workplace. Are European jobs good or bad in an international comparative sense? It is, of course, not possible to give a clear and evidence-based response to such a broad question. One hypothesis could be that there are larger variations in job quality between Europe, and some other continents or countries with insufficient job protection, restricted or forbidden unions. lower wage and worse work environment. That does not mean that Europe can be characterised by good work, employee-friendly employment conditions and high wages. We know that there is strong inter-European variation in job quality, employment conditions and wages. The other side of the good job coin is a bad job. The visions of decent jobs, good jobs or sustainable work are more frequently used in policies, in programme documents for unions, social partners and governments. Bad jobs on the other side are also used in politics and unions, but may be more often by scholars from sociology, occupational medicine or organisational psychology, and also in comparative studies within or between countries based on various types of indicators.

The book *Are bad jobs inevitable? Trends, Determinants and Responses to Job Quality in the Twenty-First Century* (Warhurst et al., 2012) highlights driving forces and institutional mechanisms behind bad jobs and opportunities of good jobs in an international context. The introductory chapter raises seven major questions on good and bad jobs' discourse in the form of scenarios. The first scenario *Jobs are getting better* reflects the idea of upward convergence. Its opposite side is labelled in the second scenario *Jobs are getting worse* in line with Braverman's (1974) argument on degradation of work. Increasing stress and job strain at work, falling occupational health or more precarious jobs and uncertain employment conditions are taking that direction.

The third scenario focuses on the *Polarisation of Job quality*, a perspective being subject to an in-depth discussion among scholars on various ways to assess job quality, e.g., wages, working hours, employment conditions or job security. Scenarios four and five are illustrations of the polarisation idea and comprise *Good jobs are getting better* and *Bad jobs are getting worse*, a development often signified by growing income gaps. Finally, the authors presented a twisted development in scenarios six and seven where *Good jobs go bad* and *Bad jobs are getting better.* These seven scenarios illuminate the complexity in the development of job qualities in countries and regions with various labour market regimes and different institutional context, different positions of social partners.

So, what about new jobs? In recent years the discussion on job destruction, job creation or job retention has been quite hot, and shifted character when analyses and studies were deepened (Frey & Osborne, 2013). From the alarming signals that half of current jobs would be abolished or lost in cyberspace within the next two decades, due to digitalisation and technological disruption, today's predictions move in an interval between six or twelve

percent depending on type of work organisation, skill levels of the workforce and the number of low qualified jobs (Arntz et al., 2016). One possible development is that the gig economy and digitalisation can increase polarisation between good and bad jobs. The shifting character of the standard employment model to new employment contracts, increasing levels of temporary jobs, or patterns of self-employment, bogus self-employment included, will also contribute to shape the job quality of new jobs.

The European Agency for Safety and Health at Work (2018) published the future study on OSH risks and hazards *Foresight on new and emerging occupational safety and health risks associated with digitalisation by 2025 European Risk Observatory Report* two years ago. It was before the Covid-19 pandemic, and some of the risks might have been accelerated, due to the current threats to public and occupational health. The objective of the foresight project was to help to:

- have a better understanding of longer-term developments that could affect workers and how these may result from current policy decisions.
- consider priorities for OSH research, and actions that would prevent the occurrence of the possible new and emerging risks identified or minimise their possible negative impact in the future.

The rapid digital transformation of the world of work has fundamental impact on organisation of work and working conditions (European Agency for Safety and Health at Work, 2017, p.6).[19]

> «The emergence of new technologies, such as the IoT, AI, big data, cloud computing, collaborative robotics, AR, additive manufacturing and online platforms, has a profound impact on the world of work. Although the spread and prevalence of the application of ICT-ETs are currently varied across Europe and across different sectors and socio-economic groups, ICT is becoming an integral part of nearly all sectors, rather than a sector of its own. »

The future study comprised four scenarios on new and emerging OSH challenges relating to how ICT-ETs could change automated systems and work equipment and tools used. They should also focus on how work is organised and managed in forms of business models, hierarchies, and relationships. Finally, attention should be paid to the characteristics of the workforce, responsibilities for managing OSH, and the skills, knowledge and information required to work. The scenarios focussed on variations of governance and economic growth and were labelled evolution, transformation, fragmentation, and exploitation.

The report listed a number of new hazards or fields which needed more interest in the near future, such as: the potential for automation to remove humans from hazardous environments, but also to introduce new risks, particularly influenced by the transparency of

[19] https://osha.europa.eu/en/publications/foresight-new-and-emerging-occupational-safety-and-health-risks-associated. Downloaded 2020-10-08.

the underlying algorithms, and by human machine interfaces. Another field was psychosocial and organisational factors that will become increasingly more important, because ICTETs can drive changes in the types of work available; the pace of work; how, where and when it is done; and how it is managed and overseen. EU-OSHA also highlighted increasing work-related stress, particularly as a result of the impact of increased worker monitoring made possible by advances in and the increasing ubiquity of wearable ICT-ETs. Blurred boundaries between work and private life, 24/7 availability, and the online platform economy were also determinants influencing healthy working conditions.

The dissolution of the traditional workplace, with increasing ergonomic risks due to the increase in online working, and the use of mobile devices in non-office environments, was also mentioned in the study. Many aspects of cyber work and cyber risks, privacy and integrity, the algorithmic management of work and workers, AI, monitoring technologies and loss of control were also included workers lacking the necessary skills to be able to use ICT-ETs, cope with change and manage their work-life balance. Increasing job longevity, more frequent job changes growing numbers of self-employment have also to be considered looking ahead. Finally, the crossing border between public and occupation health was mentioned by the increase of sedentary work, a risk associated with obesity and non-communicable diseases, such as cardiovascular diseases and diabetes.

A more recent policy study on scenarios of the future of work from an occupational risk and health hazard perspective has been published by NIOSH (2020). It is also looking into new forms of work, the role of AI and Industry4.0 in new digital context of work (NIOSH, 2020, p. 1).[20]

> «Technology was identified as the primary driver of the future of work in most scenarios, and there were divergent views in the literature as to whether technology will create more or fewer jobs than it displaces. Workforce demographics, globalization, climate change, economic conditions, and urbanisation were also mentioned as influential factors. Other important themes included human enhancement, social isolation, loneliness, worker monitoring, advanced manufacturing, hazardous exposures, sustainability, biotechnology, and synthetic biology. »

This review comprises peer-reviewed literature, work scenarios from the grey literature, and themes in published literature. The first strand identified four fields of knowledge to be looked at in the future working life. The four scenarios which could overlap, were: (i) changing patterns of employment and work organisation, (ii) management of technological change and human–robot interaction, (iii) OSH challenges, and (iv) ethical issues. Driving forces for these scenarios are mega-trends like technology, demographics, globalisation and urbanisation. New and more automated industries and factory systems "cause a qualitative knowledge

[20] NIOSH (2020) Potential Scenarios and Hazards in the Work of the Future: A Systematic Review of the Peer-Reviewed and Grey Literatures.

transformation—from bodily and tacit into more theoretical and abstract knowledge and skills and from craftsman-like qualifications to more technical qualifications" (NIOSH, 2020). Other hazards of technology-based scenarios comprise changing employment patterns, precarious work, unemployment and underemployment, obsolescence of competency, as well as stress and work intensification.

Human-and-machine interaction in times of technological disruptions is discussed both in terms of job loss or attitudes, anxiety, and uncertainty of working with new technologies. Other risks in the field of occupational health and safety concern mental overload, work intensification, skills and jobs mismatch, but also issues of privacy, integrity and control. The review also highlights new ethical concerns in a more globalised and technology-driven world of work. The grey literature focuses more on the meso-level, by looking at business models, labour market change, social values, and the shift from manual to cognitive work. The third category, supplemental literature, is often built on common narratives of various types of work, and employment conditions which are extrapolated into future scenarios.

One such concern is the fragmentation of the traditional workplace, i.e., the distributed workplace, remote work and hoffices. This scenario has been sharply illuminated and speeded up as an adaption to the Covid-19 pandemic, and it also comprises social dissolution at work. Another trend being looked at is the shift from routine employment to non-routine work and employment relations, a development that also is supported by the tech-takeover of routine jobs. A social dilemma in some windows of opportunities of future work concern the risks and opportunities of vulnerable groups, workers with low education levels, disabilities or other constraints. Will they catch up with the new jobs with higher skill levels and work abilities, when many routine jobs are being abolished in the waves of new technologies? A more profound development is that increasing inequalities seems to be an underlying factor in the scenario. "The concept of unequal distribution of wealth, income, opportunity, gender, race, and access to information underlays many of the scenarios in the grey and supplemental literature." (NIOSH, 2020, p.20*).*

The NIOSH review comprises a broad landscape of various risks and hazards in the current labour market transformation and future of work. It highlights a mosaic of long-standing and already existing OSH-risks in current jobs, and new risk risks in more technology-driven work systems, where the human-machine interaction is escalating at higher skill levels with robots, cobots and the use of various forms of sensors. In the final conclusions, the authors look into new OSH-risks and hazards in the context of increasing job longevity in times of expanding new technology, AI and automation. Will they be able to embark on the new skill market or forced to leave the labour market after displacement? There is not a yes or no answer to this question. The answer depends on the provision of support service, adaptation of workplaces, and a continuous social dialogue at national and global levels.

Towards greener and more sustainable jobs in Europe

The table below is an effort to summarise various perspectives on good work ideas and work improvement programmes, in the context of four dimensions of quality; job quality with good work environment and healthy and safe jobs, employment quality and job security, flexible work organisation and, finally recognising climate and energy aspects. Two other crucial aspects are the role work improvement programmes for precarious jobs, and the role of workers participation, co-determination, and employee friendly models for change. Surrounding factors and determinants on macro level are the pace of labour market transformation, technology disruptions and the creation of new jobs. Covid-19, digitalisation, and the promotion of green and climate friendly jobs will speed up labour market mobility, and job shift for individual workers. Thus, sustainable work also needs to consider and develop sustainable employment systems that can manage the growing numbers of job shifts, career re-orientations and transitions.

The social concern about the jobs of the future is expressed in SDG 8 and in the European Pillar of social rights. In the article *Redefining working conditions in Europe*, Vendramin and Parent–Thirion (2019) analysed data and values on what constitutes job quality from the employees' point of view. They reflect over ideas and concepts of job quality, flexicurity and sustainable work. The Lisbon strategy launched the vision of more and better jobs, a vision that was distorted during the global financial crisis of 2008. Looking ahead, they argue for the idea of sustainable work. "Recently, the notion of sustainable work seems to have prevailed. It offers a more convincing response to an ageing population, to the desire to increase the proportion of older workers in the labour force, and also to the marked increase in musculoskeletal and psychosocial problems among workers of all ages." (Vendramin & Parent-Thirion, 2019, p. 274).

By shifting from decent work to sustainable work, they underlined the necessity of finding a good work concept that functions both in our times and in the future. Sustainable work does not only focus on job longevity, but it also stresses the need to consider and concern climate change, new energy systems and the road to green work. Stressing sustainable work in a life-course, and not only sustainable jobs, illuminates the crucial role of job transition, career development and the adaption to new work system as well as gender structures and work-life balance.

Table 1. Overview of work improvement programmes and quality focus with reference to sustainable work and green jobs

Work Improvement Programme/ Quality focus	Job quality/ OSH, Good DCR match	Employment quality – job security/working hours/skills	Flexible work organisation – Employee friendly or firm-friendly	Climate, energy& SDGs – low-carbon/ transformation
Decent jobs: Healthy & safe work conditions ILO/Global Deal	High OSH priority	Job security, union rights, freedom of expression	Inclusive growth, social inclusive workplaces	New focus in SDG perspective
Good work 1: Dignity & ethics Gardner et al. (2001)	Values and deeds: subjective job satisfaction	-	-	-
Good work 2: Power balance Swed. Metal Fed/ LO Sweden	High OSH priority	Job security, union rights, freedom of expression	Social dialogue and workers' co-determination	Green Deal policies not so visible from start
Human Sustainable work 1: Life- course work/Docherty/ Eurofound	OSH over the life course/	Job security and job shift support crucial in a life-course view	New forms of work, work-life balance, social partner dialogue	New synergies of sustainable work and the green deal
Ecological Sustainable work 2: Green low-carbon jobs EU/OECD/ILO	OSH priority for green jobs in agriculture, forestry etc	Job security and union rights also part of Global deal-decent jobs	New workplace innovations for low-carbon jobs-employee involv.	The major future challenge – Next Generation EU/ Global Deal
Workplace innovations 1: Dialogues for development EUWIN	High OSH-priority and job quality	Flexible employment relations	Strong focus on employee driven WP innovations – strong links with industry	Workplace innovations crucial to manage green deal
Workplace innovations 2: Sustainable production systems EU Green Deal	Resilient energy system and new environmentally friendly material. OSH one aspect of many	Sustainable production systems – flexible employment forms in use	Sustainable and lean production models in high international competition	Global drive for green deal and low-carbon enterprises – need for just transition

The major challenge is how the vision and concept of sustainable work can be used to create good working conditions in a transformative labour market characterised by job destruction,

job creation and job retention. Individual working lives cannot not be characterised as a linear development in a context of lifelong employment at the same factory, office or service arena. Life is changing, jobs are disappearing, and others arise, the workers' individual job transitions can sometimes be explained in the form of a free choice, but more often caused by social, economic, technological determinants. A societal vision and model of sustainable work from comprehensive school to senior or post-work positions, presupposes a lifelong learning system integrating youth education, adult education and vocational education, higher education, and a broad range of staff-development and on-the-job learning (Vendramin & Parent–Thirion (2019), p. 294):

> «Sustainable work is a desirable horizon for Europe, insofar as it is likely to underlie a multidimensional approach to quality of work that will take into account working individuals as a whole, with their characteristics, their constraints and their trajectories. The ILO could also choose this direction, which is already reflected in the many points raised during the national dialogues on the future of work (ILO, 2017). Moreover, since the concept of sustainable work initially brought together two issues: that is to say, sustainable development and working systems, it could probably be used to combine the priorities of sustainable development and decent work. »

To sum up: sustainable work requires sustainable education and lifelong learning, i.e., less "what is sustainable work" and more of "what makes work sustainable". And in the context of the new demography with ageing and migration as driving forces, lifelong learning might also be transformed into long life learning. So sustainable work can be a desirable horizon, not only for Europe, but for quality of work in a global sense.

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Discussion Forum

The Swedish Platform for Sustainable Work in Horizon2020: in retrospect

Elisabeth Lagerlöf
Maria Albin

Abstract

The nationwide Swedish advocacy platform "Sustainable work as a resource for health, innovation and growth" started in 2013, with the aims of i) identifying possible openings for the research area within Horizon 2020, ii) implementing a strategy to impact Horizon2020, and iii) to connect Swedish and European researchers. The basis for this agenda was that, although work and working conditions have a major influence on the health, wellbeing and prosperity, these aspects were lacking or extremely fragmented in Horizon2020. Since this is a strong research area in Sweden, and seen as strategically important by the Social partners, it should be a Swedish priority for Horizon2020. The initiative was funded by Vinnova, co-funded by the participating universities, and supported by the Social partners and other stakeholders. The platform has extended the dialogue on the European research agenda within the Swedish research community, and gradually built a strategy to impact H2020. Over the years, our advocacy has also developed in interaction with the EU Agencies Eurofound and EU-OSHA, and with PEROSH. The focus has been on the pillars of Leadership and Societal Challenges (Horizon2020). The impact on the early calls in Horizon2020 was minor, while work and working life is much more visible in the later calls, and on the agenda in the drafts for Horizon Europe (FP9). The focus will now be on making the opportunities known to Swedish researchers, and on facilitating participation in applications.

Keywords: sustainable health, occupational safety and health, work environment, working life, H2020 impact

Introduction

Horizon 2020, the EU research and innovation programme for 2014 - 2020, was a mind-bending encounter for the European research society. Instead of the thematic approach used in previous EU Frameworks for Research and Innovation, the H2020 programmes was presented as Challenges to drive economic growth and create jobs, and thus was an investment in EU's future. It was placed at the centre of the EU's blueprint for smart, sustainable, and inclusive growth and jobs, *Europe 2020*.

In 2013, a strategy for increasing the Swedish participation in H2020 was developed by Vinnova, the Swedish Innovation Agency. Through financing national advocacy platforms, they wanted to stimulate mobilisation and co-operation between different Swedish actors with common visions, goals and to formulate causes to position strong Swedish research areas on the European level.

The focus of the platforms was to have an impact on upcoming Work Programmes (WPs) in H2020, and enable the actors to network and co-operate in the competition about Calls. This should be done by presenting EU relevant and convincing Swedish proposals, either by themselves or together with partners in Europe.

A group of Swedish researchers applied for the funding of a platform on *Sustainable work as a resource for health, innovation, and growth*. The aim for the trial term of six months were

- Highlighting key research areas applicable to different "windows" in H2020
- Outlining a roadmap for an advocacy strategy on national and European level and a framework for an advocacy platform
- Identify other EU-funding possibilities for research and implementation of sustainable work

The long-term aim of the platform was to

- contribute to the inclusion of research about sustainable work, as a resource for health, innovation, and growth, in H2020
- strengthen the co-operation between strong research environments within the research field and the social partners and other actors in Sweden and abroad
- promote synergy and co-operation between OSH-research, sustainable work and innovation models in private and public environments
- create possibilities for interdisciplinary science meeting places in the public and private sectors, and strengthen the Swedish research for applications of EU-funding

Sustainable work - a strong Swedish research area

The research focus of the platform on sustainable work was based on the concept of Good Workplace; a research tradition that started decades ago in Sweden. Already in 2009, during the Swedish EU Presidency, the two main work life research funding agencies, FAS Research Council and Vinnova, organised an international conference that resulted in a joint declaration:

> "European policymakers need to include sustainable work systems and work-oriented innovation in the growth strategy if Europe 2020 visions is to be achievable. However, this is not sufficient; policymakers together with enterprises have to create the conditions under which more advanced forms of workplace innovation will occur on a large scale." (FAS 2009)

To include sustainable work research in H2020 should be an important resource for health, innovation and growth in EU. A healthy working environment includes important factors that contribute to growth, value processing and development, and has importance for long-term competitiveness. A bad work environment does not only lead to losses of production and thus great costs for companies and businesses, but also generates ill health, loss of income and loss of quality of life for the individual, as well as long-term social costs and a burden on social security, most of which will harm already socioeconomically vulnerable groups.

To drive economic growth, it is not enough to create job, without taking into consent how the concepts of work and jobs has changed. By creating not only jobs, but also sustainable work, could be a resource for health, innovation and growth.

Sustainable work is a generic policy concept to describe the dynamic fit between employees and working conditions. Underpinned by a commitment to promote continual growth and regeneration of human, social, economic and ecological resources, sustainable work promotes health, wellbeing, learning and influence. See article in this issue by K. Abrahamsson: "Sustainable work in transition. Policy background, concepts, and research arenas".

Thus, the *first* aim of the platform was to boost work environment research in a broad sense (including accidents, chemical and physical health risk, ergonomics, psychosocial factors) based on prevention. Swedish research on working environment was at that time, together with the other Nordic countries, among the most prominent research centres in this field. However, few projects were EU-funded.

Secondly, research was needed on the organisation of work, productivity, and performance, both in Sweden and in other European countries. Important was also to better understand the dynamic relation between co-determination and the social dialog, the digitalisation of work, and factors that drive innovation. There was a need to analyse and strengthen the basic conditions for a prolonged working life. The Nordic countries also had a long tradition of

comparative studies on work, welfare and health. Furthermore, there was substantial experience of research on work organisation, workers co-determination and involvement.

Thirdly, even though sustainable working life was strategically important both for the Swedish Social partners, and Government, the Swedish national report about the content of H2020 did not at all cover this research field. However, sustainable work was emphasised in the European Innovation Strategy, and also by the EU Social partners.

Fourthly, since the Swedish National Institute for Working life was abolished in 2006, no national institution existed for this research aera. The researchers at the Institute were transferred to smaller university units all over Sweden (with a 3-year grant). Many of the senior researchers at the Institute were in the age group of 60+, and when they retired, no means for replacements were granted by the government. This had resulted in a lack of leading research profiles, a reduction of the total funding in this field and the number of international contacts, networks and collaboration projects had decreased. The research had become more discipline-oriented, and thus there were fewer big interdisciplinary projects.

Thus, it was timely to apply to Vinnova for an advocacy platform. The platform could be an important tool to promote synergy and co-operation in the research area of sustainable work and health. A network platform was based on four working life research University centres in Umeå, Gävle, Stockholm and Lund, which also co-founded the platform. A consortium was also formed with the Social partners and some representatives for private and public enterprises. Hence the platform structure could provide good opportunities to position national interests in relation to H2020, as well as to coordinate national actors and interests in order to tie in at a European level.

The roadmap to an advocacy strategy

The grant was approved in October 2013. The main target for the platform in H2020 was the work programme of the Societal Challenge *Health, Demographic Change and Wellbeing*. It was too late to influence the focus areas of this topic, but the proposed Calls were described in a rather open way, and it could be important that terms relevant for work were included. Proposals were sent to include words such as “labour” and “work environment” in the different Calls and thus the platform did have some impact on the final Calls.

When the other WPs were presented, the platform carried out a detailed search for openings of sustainable work and health. In many of them a few specific Calls could be found that might cover our field of research, see figure 1. But further explorations of the Specific Challenges of each Call showed that the Calls were rather narrow in scope (covered only factory work, but not the service sectors, or that health risks of new technologies were not included, e.g., nanotechnology, biotechnology.

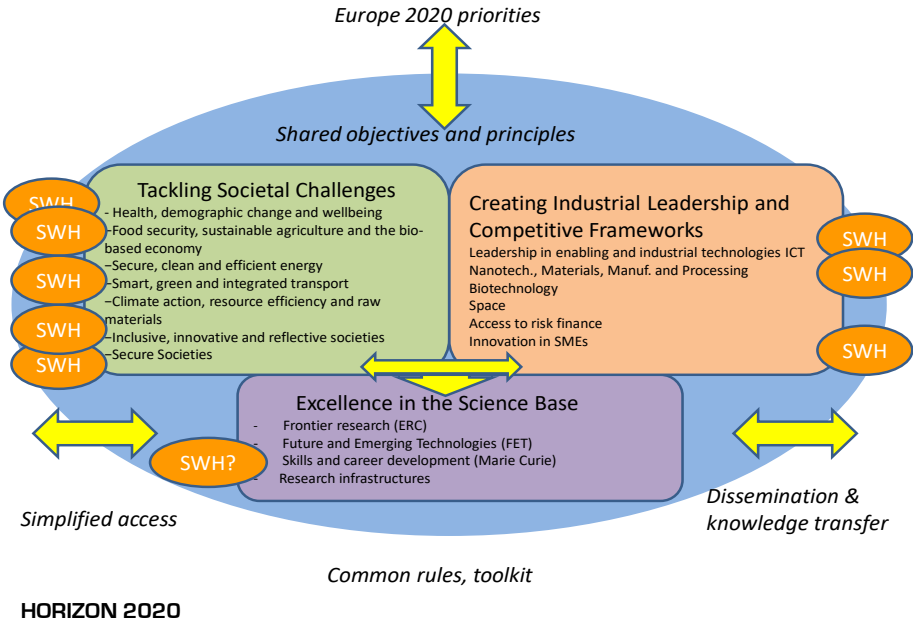

Figure 1. Horizon2020 programme sections and specific programmes of interest for Sustainable work (SWH) based on a picture by the European Commission.

The *first* step in our advocacy strategy was to identify the decision-making process of H2020, both at national and EU level. Independent experts from the member states assist the Commission with tasks in connection with H2020. First the focus areas of a programme are decided by experts in an Advisory Group, and then the work programme is decided by a Programme Committee: both with a member from all member states.

Then every Member State also have a Committee for each programme with additional experts. Every programme also has a National Focal Point to give advice about the specific programme. Grants offices to help with H2020 applications were organised at the larger Swedish universities.

The platform had a resource demanding task to identify the organisations, relevant experts and members of the Swedish as well as the Commissions H2020 Programme Committees, since the broad research area of the Platform covered many programmes. The absence of a Swedish national institution with close contacts with government experts and the Social partners did not improve the situation.

The *second* step was to identify and contact European researchers and organisations with interest in sustainable health. At European level, contacts were identified in relevant European network, such as the newly started European Workplace Innovation Network (EUWIN), but also with other EU-funded networks, such as "Work-In-Net" and "ERA-OSH". Contacts were also made with the Partnership for European Research and Occupational Safety and Health (*PEROSH*), a federation of fourteen European OSH-institutes in thirteen Member States. *I*mportant contacts in European institutions, such as DG Research, DG Employment, DG Sante, DG Research, and DG Connect, were also identified.

The *third* step of importance for the advocacy work was to provide an overview of on-going working life research in Sweden, Nordic and other EU countries. The European Agency for Safety and Health at Work (EU-OSHA*)* in Bilbao was of great help, since they just had carried out a review of current occupational and safety (OSH) research areas and highlighted new emerging risks. One representative from the platform was invited to their conference in October 2013 and presented the aims of the platform. Both EU-OSHA and Eurofound (the European Foundation for the Improvement of Living and Working Conditions) welcomed the Swedish initiative, since both Agencies had worked intensively for the inclusion of research on working life and work environment in H2020.

Based on our information the platform decided on the following roadmap to H2020:

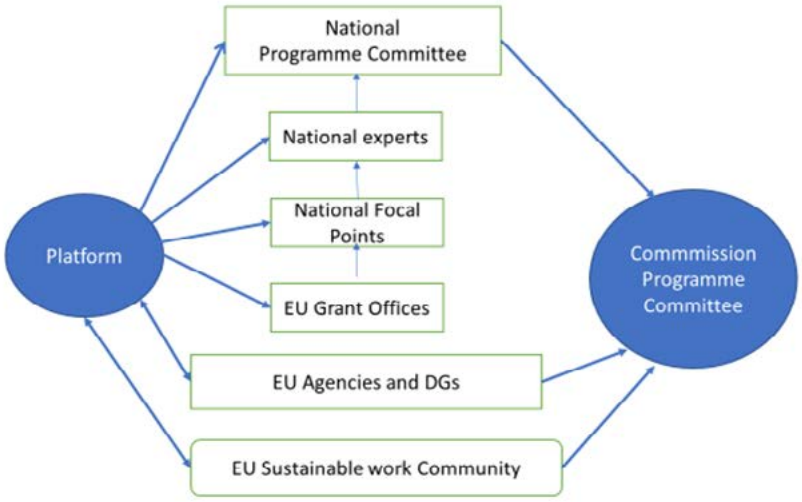

Figure 2. The initial advocacy strategy

The Swedish Social partners endorsed the platform and offered possibilities for intervention research as well as support to implement the results at the workplaces. The platform also had assistance from the Swedish Work Environment Authority, the Swedish Social Insurance Agency, as well as the Swedish Association of the Swedish Engineering Industries.

Platform activities 2014 - 2016 and the impact on Work Programmes 2016-2018

The application about the prolonged platform to Vinnova for 2014 to 2016 was approved. The main activities were aimed at three programmes:

- Industrial leadership: Nanotech, materials, manufacturing and processing, and biotechnology

- Societal Challenge no 1: Health, demographic change and wellbeing
- Societal Challenge no 6: Europe in a Changing World - Inclusive, innovative and reflective societies.

The main advocacy approach was via Swedish contacts, but also via joint approaches with the European research community, and the EU Agencies responsible for sustainable work issues. A website was developed for the platform to inform about focus areas, work programmes, upcoming Calls in H2020, as well as conferences and meetings of importance for researchers interested in H2020.

The platform had a good relationship with the experts of the national Programme Committee on *Health, demographic change and wellbeing*, and had the possibility already from start to send them proposals regarding the draft versions both for the WP 2015 and 2016- 2018 WP. In addition, the platform exchanged these proposals with other European researchers to try to co-ordinate the input. The proposals were well received by research institutions in Denmark, Spain and the UK, and the comments were forwarded, as their own, to their national Programme Committees.

In collaboration with the EU-OSHA, the platform took part in the development of three "Position Papers", which were sent to the Commission describing high risk areas in need of research. In addition, the platform proposed a focus area for 2016-2018 "Europe at Work: sustainability, productivity and human growth" to the Swedish Ministry in Education and Research in co-operation with the Grant office at Lund University.

The purpose of the collaboration with different networks, both in Sweden and EU, was to gather information, and contribute to boosting research with a focus on sustainable working life and sustainable development. The contacts with the Joint Programming Initiative More Years Better Lives helped to introduce the concept "sustainable work" in the EU scientific review *Understanding employment participation of older workers* (Apt 2015). DG CONNECT was very helpful in providing contacts and opening doors. This led to a small seminar in Brussels 2015 to present the platform at *the European Summit of Innovation for Active and Healthy Ageing*.

The platform took part in two meetings about Eurofound's project on Sustainable work, and participated in two seminars organised by the European Workplace Innovation Network (EUWIN). To improve international collaboration outside EU, the platform was presented at international conferences, i.e., Collegium Ramazzini and Well-being at work in 2014, and the ICOH conference and the epidemiological network EPICOH in Seoul 2015.

In Sweden, the concept "Sustainable work" was early recognised and adopted among policymakers and researchers. Already in 2014, the platform organised a conference, *Sustainable working life in Sweden 2020,* together with the Swedish Work Environment

Authority and the Swedish Social Insurance Office. The message from the participants, consisting of about 120 researchers, Social partners, and companies, was:

- re-establish a national platform for work environment research, co-operate at all stages, and disseminate the available knowledge. To strengthen the knowledge supply, more Swedish and European research funding is needed.
- Co-operation between research and development should be strengthened with support from the European Social Fund (ESF).
- researchers and organisations should improve the use of international networks. A national contact point should be created for international co-operation.

The sustainable work concept, the platform, and H2020 was presented at major Swedish conferences, such as the Forum for Working Life Research (FALF) 2015 and 2016, as well as at FORTE Talks 2014 and 2015, arranged by the Swedish Research Council for Health, Working Life and Welfare. Of importance was also the collaboration with the Platform for "Nanosafety and Nanomaterials" regarding the impact on workers' health, and with the newly started Swedish AFoU network: Workplace-related R&D for Sustainable Working Life. The network is an initiative for national co-operation to increase research and development for sustainable work and sustainable development in organisations.

Co-operation with the European Social Fund (ESF) led to the development of an ESF-funded national thematic platform on sustainable working life. The thematic platform was launched in 2017, and our platform and the AfoU network for workplace-related R& D were assessed as strong fellow actors.

The impact of the platform's advocacy

1. *Impact on Calls 2014-2015 and Work Programmes 2016-2017*. The Platform considered the impact to be limited for the WP 2016 – 2018, as there were no Calls with a direct focus on sustainable work. On the other hand, terms like work, working conditions, and sustainable work appeared in the texts as aspects of importance among other key issues in some Calls through the advocacy work. The proposals had been well received by the Swedish Programme Committees and co-ordinated efforts with via the European contacts also helped. The expected synergies of our attempts to influence the national Programme Committees in other member states was limited. Other activities, such as the Position Papers, took a long time to finalise. Therefore, the proposals reached the Commission too late to be taken into consideration for the 2016-2018 WPs.

The platform was able to follow SC1's work programme step by step, and discovered that once the first draft version had left the Commission the scope for impact was limited. The platform proposed that focus areas such as "Ageing at large", "Sustainable health and prevention", "Environment and Health" should include the ageing worker, workplace health promotion, and that environment should also explicitly include the work environment. The

proposals were included in the draft Calls, but they disappeared in the final version. The main part of the WP was instead directed toward "prevention of diseases".

2. Strengthen the dialogue with businesses, Social partners and public authorities. The attempt to present the concept "sustainable work" as an important research and policy area in Sweden resulted in better co-ordination between the platform and the official Swedish channels. Examples were the conferences with the Work Environment Authority and the Social Insurance office and a new Government Declaration. Sustainable work was further promoted by the European Social Fund as a national thematic project area in Sweden. The dialogue with business, social partners and authorities was improved. However, the dialogue with companies was still in its infancy.

3. Contact point for Nordic and European researchers. The platform had strengthened the international network, and served as a contact node for European researchers. The website was improved by a community-function and a newsletter via e-post. But very few Swedish sustainable work and health researchers were actively looking for international partners or were asked to co-operate in EU-funded H2020 projects. One reason was that it was difficult to find Calls that included sustainable work research, but many researchers, used to looking for risk at work, were also confused by the terminology of the Calls, where the Specific Challenge, not the health risks, of a project should be presented.

At the end of the first grant period, the platform realised that the impact so far was slight, but there were good possibilities to improve the situation, and thus applied for a continuation of the grant for 2016 – 2018. However, the evaluation of the platform by two external experts engaged by Vinnova were doubtful about the possibility of making an impact on H2020 by the sustainable work platform:

"The thematic area of this platform is very broad and not addressed by any specific part of the H2020 work programme. Although still expansive, areas have been targeted by the platform for emphasis: sustainable work health and development. (…) There is no SIO/SIP (Swedish government paper re H2020) for this area, but a strong research tradition in Sweden" (https://www.vinnova.se/en/**).** The Platform is driving efforts to structure the Swedish work/life discipline through examining knowledge gaps and pinpointing research needs. Thus, the effort of making a more visible presence in H2020 (work life issues) is still in its infant stages, with a long and difficult way ahead."

The new grant was approved for 2016 – 2018, and Vinnova should be commended for recognising the strength and potential of the area, as well as supporting the platform, in spite of recognising the difficulties of impacting the European research agenda.

Platform activities 2016 – 2020 and the impact on Work Programmes 2018-2020

The aims for the Platforms advocacy work 2016 - 2018 were:

1. Impact on relevant Work Programmes in H2020 for 2017 and 2018 - 2020 resulting in at least one Call about sustainable work in the most relevant programmes. The goal was also that sustainable work and work life should be more visible in the next Framework programme for Research and Innovation 2021- 2027, *Horizon Europe*
2. Increase participation as co-applicants in WPs 2018 -2020 among Swedish work life researchers
3. Strengthening the concept sustainable work, by anchoring and spreading it widely to make an impact on research and labour market policies

The advocacy strategy needed to be improved. The new plan for the Focus areas and Work Programmes for 2018-2020 was three-fold.

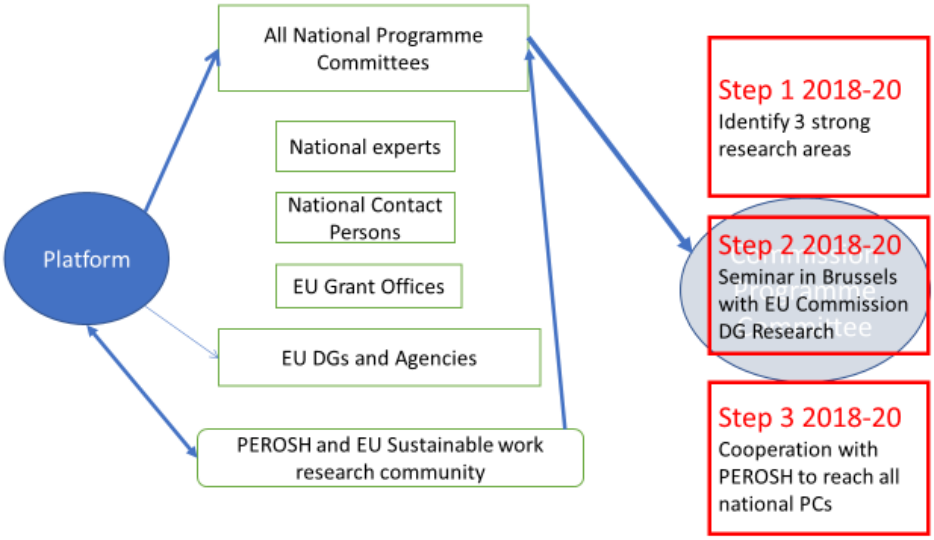

Figure 3. The most effective strategy for impact

The first step was to identify strong research areas, by producing Position Papers covering broad strategic topics for sustainable work. The four papers were produced in co-operation with PEROSH, and other European researchers:

- *Novel technologies and sustainable work*, i.e., the impact on digitalisation on work
- *Workplace health strategies for sustainable and inclusive growth*, particularly targeting the ageing working population with chronic illness and long-standing health problem
- *Sustainable work and the increasing work force diversity*, i.e., unemployed, migrants and older workers, including increasing health disparities between socioeconomic groups

- *Integrated health and safety concepts for large infrastructure projects and new working environments,* i.e., develop a preventive culture in large European infrastructure projects.

The second step was to use the position papers at the consultation stage for the WPs 2018-2020, before the issue of Focus areas and first drafts of WPs. The platform increased the contacts with the Commission, both by contacting members of the most important H2020 Advisory Groups, and by organising a seminar in Brussels in April 2016 to present the four concrete examples of how sustainable work could be included in the WP 2018 - 2020.

The purpose of the workshop was to improve the research proposals, and relate them to the current EU policy context of smart, sustainable, and inclusive growth. The contributors and participant of the workshop were from the Commission, i.e., DG Research and DG Employment, the Parliament, Eurofound, EU-OSHA, the Swedish Ministry of Labour and a few research organisations represented by PEROSH. The seminar was followed by a visit to the DG Research to further discuss the proposals.

Conclusions from the workshop and the visits were:

- A general acceptance of the four presented tracks of research. Relevant comments to consider were that
    - the fourth proposal about OSH risks in large infrastructure project did unfortunately not fit into the present structure of Horizon2020. The platform was advised to drop it.
    - since the present accepted projects within the Societal Challenge of *Health, demographic change and wellbeing* had been more directed toward illness than health, and thus proposals towards prevention of health and wellbeing could be welcome in the 2018 – 2020 WP.
- The impact by the development of technologies, i.e., digitisation, was to be balanced via a strong link between the Leadership pillar and the request of "technology neutrality" in the Societal challenges pillar. So far it had not been the case, and the impact of digitalisation on the work force needed to be included.
- The platform was advised to take an approach where, instead of presenting sustainable work as *one* programme area, the presence should be found in as many of the present WPs as possible.
- The importance of the proposals by the Platform may increase due to the launch of the *European Pillar of Social Rights*, that covers the future labour market in Europe, quality of work and new forms of work, and the need for social protection.

The third step was to try to present the same proposals to the national Programme Committees in as many Member States as possible. In co-operation with PEROSH, at least 14 of the Members states could be included. Once a first version of a work programme was published, proposals were exchanged, and a final joint proposal was then sent to the contact

persons in the member states. They in turn contacted their expert in their national Programme Committee. In this way, the same proposals for change arrived from several Member States, and resulted in a high number of sustainable work-related issues in the Work Programmes of 2018-2020.

The activities of the platform increased the efforts to exchange ideas and to present the new programmes, and how to apply for an EU-project among Swedish researchers and companies, for instance at the yearly FALF-conferences and the meetings with the AFOU-network.

A "search conference" *EU-funding for sustainable work and health-related research projects* was organised in Stockholm, together with PEROSH for about 50 researchers in the autumn 2017 to present the new 2018-2020 Programmes. The speakers were from DG Research, PEROSH, EU-OSHA and Eurofound. Examples of successful EU- projects co-ordinated by Swedish and European researchers were presented. Parallel workshops for potential matchmaking were included.

Furthermore, co-ordinating efforts and networking at a global and European level took place at international conferences such as 'Work 2017', the EUWIN meeting in Leiden, the EPICOH-meeting in Edinburgh the Nordic Work Environment Meetings, the Nordic Work Life conference in Finland, and at a Nordic meeting on the future of work "Opportunities and challenges for the Nordic model". EU-OSHA organised meetings about the future of work, and presented the report 2017 on "The impact of ICT and work localisation on OSH 2025". The results of the co-operation between the platform and PEROSH were presented for the PEROSH members at their yearly meeting in Rome 2017.

The final activity of the platform in 1918 was to organise the conference "Nordic approach to sustainable work – towards new EU Challenges", where more than 100 researchers and representatives for the Social partners took part. The focus was on Nordic research, and how to succeed in creating sustainable work in a European context. The mission was to present the platform's approach to impact H2020, but also to focus on Horizon Europe, the next research and innovation framework programme.

The impact of the platform's advocacy 2016-2020

1. *Impact on Calls 2018- 2020*. The new advocacy strategy of the platform resulted in more than 25 Calls covering sustainable work-related issues in the final H2020 Work Programmes, such as

- The Leadership programme included seven Calls, among them Risk Governance of Nanotechnology or Skills needed for new Manufacturing jobs.
- The Societal Challenge (SC1) of Health, demographic change, and wellbeing had six Calls, for instance Mental Health at the workplace, or Adaptive smart working and living environments supporting active and healthy ageing.

- SC 2 Food Security, Sustainable Agriculture and Forestry, Marine etc, had three Calls, i.e., Integrated health approaches and alternative to pesticide use.
- SC 3 Smart Green and Integrated Transports had four Calls, such as Marine Accident Response or Demographic change and participation of women in transport.
- SC 7 Europe in a Changing World had five Calls, such as Social and economic effects of migration in Europe and integration policies or Research for inclusive growth: the socioeconomic effects of technological transformation.

The new advocacy strategy really paid dividends. The work with position papers and comments on draft documents have also been highly appreciated by the European colleagues. The co-operation will continue in the new research and innovation framework programme for 2021 – 2027, *Horizon Europe*. The efforts have mainly been directed at the second pillar, the Global Challenges and European Industrial competitiveness pillar, that supports research into societal challenges, reinforces technological and industrial capacities, and sets EU-wide missions with ambitious goals tackling some of EUs biggest problems (health, climate change, clean energy, mobility, security, digital, materials, etc.).

2. Increased participation as co-applicants. Even though the WP 2018-2020 made sustainable work research more visible, the Swedish participation in H2020 projects was still low. But what obstacles do the Swedish working life researchers experience? According to the match-making conference in 2017, the main difficulties with H2020 Calls were

- the demands for big interdisciplinary projects, aimed at European problems and solutions,
- how to find and include prominent researchers from other Member States, and
- in addition, it was too complicated to apply, the administrative support to the projects was not fully financed, the projects were too big, and it was too time-consuming to find and apply.

To overcome these difficulties Vinnova supported the platform with a grant for 2019-2021 principally aimed at increasing Swedish participation in H2020 and Horizon Europe. Several search-seminars have taken place in co-operation with Swedish Grant Offices, and side events to increase international collaboration and networking have been planned and organised at international conferences. Due to the Covid-19 pandemic, this activity has unfortunately now been reduced.

Instead, a miniweb survey (Håkansta et al., 2020) was distributed in in June 2020 to over 300 Swedish researchers active in sustainable work and health research in Sweden. They had been project leaders, or had taken part, during the last decade, in projects funded by the main Swedish Research Councils in this field. 303 surveys were sent out via email, and 132 fully answered questionnaire were received. 22 % of the respondents were professors, 37% senior researchers, and 39% were PhDs or post-doctorates.

About half of them had applied for or participated in EU-funded research projects or networks during the last decade. Presently 26 researchers are involved in EU-funded projects. 20 of them were in H2020 projects or earlier framework programmes, four in Cost Actions, three in education-oriented projects, such as Erasmus, and one researcher had a Marie Sklodowska-Curie Action.

The majority of the respondents with EU-funded projects said that international collaboration was important for their own research, and almost 40% of them needed the grant to fund their own research. The EU-project had a positive impact on their personal career, and resulted in an increased number of contacts and opportunities. However, the survey also revealed that most of the respondents had rather small networks: one to five persons, and it was mainly through conferences and meeting they established and maintained their network: not through joint research or co-applications. These results are important to take into account when improving the collaboration strategy. The survey will be followed up at the end of 2021.

The aim to inform the industry and increase the collaboration between researchers and companies about H2020, was not as successful as the other Vinnova platforms. The broad area covered by our platform necessitated that projects are carried out in almost all sectors, and therefore made it difficult to reach and inform the companies. One exception was the mining industry, where good co-operation already existed between companies and researchers.

3.Strengthening sustainable working life as a concept. The positive impact by the platform on the content of H2020 was mainly depending on the improved advocacy strategy, but the outcome should also partly be ascribed to the revival of the policy discussions about the future of work. During the past two decades, jobs and labour market structures have been subject to fundamental changes. Increasing digitalisation, the new wave of automatization and robotics, and new ways to organise work has led to a new debate on job losses, job destruction, job redesign and job creation. A major change had occurred within jobs, with increasing demands of new skills, on the job training, and transition skills to meet frequent structural or organisational changes.

The Commission also saw the need to integrate digitisation in all Industrial technologies and Societal Challenges programmes. It was essential to combine digital technologies with other advanced technologies and service innovation, such as big data, internet of things, 5G etc. Digitalisation also alters the conduct of research, such as open science, skills need and user involvement. Thus digital-physical integration was substantially increased in the last H2020 programmes, and the research should address the societal impact, including on the workforce, of the digital transformation.

The political dialogue and national consultations within EU about the *European Pillar of Social Rights* played a part of the outcome. Well-functioning and fair European labour markets,

effective and sustainable social protection systems, and the promotion of social dialogue at all levels is at the heart of the policy.

On the global scene, ILO, OECD, IMF and the World Bank and independent policy think tanks also made significant contributions to the debate and policy formations regarding the future of work. ILO emphasised its longstanding policy commitment to full and decent employment. These goals were shared at the European level, with a strong commitment for full employment, social inclusion, and safe and sustainable work. The quality of jobs, the need for social protection, and improvement of living conditions are major policy missions in the *UN Sustainable Development Goals*.

Concluding remarks

1.The right input at the right time.

The aim of the project was to have an impact on the H2020 different programmes by presenting "the visions and goals and to formulate causes to position a strong Swedish research area". To promptly have an impact, it was vital that the causes were proposed already at the consultation stage of a H2020 programme. To be able to do that, you needed to have authoritative, high-level contacts in the Commission, and knowledge of major European research priorities, as well as support from a national institution with close ties to your scientific field. A strong interest in the research area among relevant ministries and social partners would also help, as well as a high ranking on the government's policy agenda.

This was not the case for the advocacy platform for Sustainable work when it was established. Sustainable work research: a strong Swedish research area, no longer had a responsible authority on national level. The research field has been depreciated by the then current government, and the research was mainly conducted at rather small, discipline-oriented units at Swedish universities. Thus, the platform's actions had to be accomplished as a complement to the formal structures.

As a result, the platform had to spend a lot of time and efforts to find the appropriate programmes in H2020 and contacts at the Commission and the EU Agencies. Due to the broad concept of "sustainable", the provision of an overview of on-going research was also time-consuming.

The impact was limited on the first and the second H2020 programmes, but concepts such as *"work"*, *"working conditions"* and "*sustainable work"* began to appear in the Calls as one aspect of importance among other key areas. In Sweden, the concept of sustainable work started to have a generic policy impact, as it highlighted the dynamic fit between employees and working conditions. It was also a theme for the European Social fund in Sweden.

Finally, in the third programme 2018-2021, the efforts of the platform were successful. At the consultation stage, position papers about sustainable work adapted to the EU strategy were

presented, and they were likewise presented to the relevant Directorates. In addition, once a draft of a Work Programme was presented, the proposals for change were coordinated and proposed from many Member States. The impact on the third H2020 programme was of considerable proportions: more than 27 Calls in five different programmes. Of importance for the outcome was also the Commission's decision that Calls should address the societal impact of the digital transformation including *on the workforce*, and the policy discussions about the European Pillar of Social Rights.

2. A need for a more active Swedish role in EU research and international collaboration

It is too early to evaluate the progress of the platform regarding EU collaboration. It was first in the third H2020 programme 2018-2020, that one could easily find Calls of interest concerning sustainable work. Therefore, the focus of the platform to the end of 2021 will be to increase the international research collaboration in this field. Some obstacles to and proposals for reaching this goal are

- Many of the Swedish research groups within the sustainable work and health area may be too small to be able to apply to large EU projects. As a co-ordinator you need to take a widespread role in research co-operation of large projects, bridging natural sciences, technological development, and societal issues.
- The funding in Sweden for sustainable work research is still sufficient for smaller projects and consequently, lack of funding is not a strong driver for increasing international collaboration. It is mainly when a researcher estimates that there is an obvious chance to get EU-funding, that they are willing to apply to EU-projects, as they see them as big, complicated, and administratively heavy. The Grants offices at the universities could make a difference here.
- Swedish universities should promote more interdisciplinary research, methodology and education to expand the impact of innovative and sustainable work research.
- There is a need for a European postdoc school on innovative and sustainable work including resources for networks, arenas and meeting places for young scholars and postdocs.

3. Horizon Europe, European Pillar of Social Rights, and the Green Deal as driving forces for future research on innovative, including and sustainable work.

There is still a significant lack of attention to the dramatic changes that are taking place nowadays in the world of work within Europe and globally. Effects on work and work patterns in society should be a vital part of all new technologies and developments appearing in the European research programs, the European Pillar of Social Rights and the Green Deal. Digitisation and climate change will seriously impact employment across economic sectors and regions, such as job losses, impact on business assets and business interruptions, impact on working conditions and OSH, and forced short-term and long-term migration. Therefore, the proposals in Horizon Europe must focus on impacts, exemplified by the following issues:

- The new world of work will lead to a growing diversity in forms of employment, and it will deeply influence the quality of jobs and work environment, health and safety at the workplaces, as well as workplace learning and career development
- At the same time, the new narrative of work also offers unprecedented opportunities in terms of autonomy for the individual, healthier and longer life, and more innovative and open cities. These opportunities should be available to all individuals to avoid increasing polarization between good jobs and bad jobs, disruption, and insecurity for the lives of many, and broader inequity and inequality.

To summarise, the concept of work plays an important role in the new research and innovation framework Horizon Europe. The Union wants to maintain its lead in innovation and research through strengthening the response to global challenges in areas such as the environment, health, the Social Pillar or the economy.

But how can we evaluate the impact our platform on Horizon Europe? We and our European research Colleagues have at least been part of, or maybe even reinforced, the process to enhance the concept of sustainable work as an important challenge in the new world of work.

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Eurofound's Reference Framework: Sustainable work over the life course in the EU

Franz Ferdinand Eiffe

Abstract

Demographic change has triggered policy debates and responses across Europe. The need for keeping workers in employment longer is a consequence that requires rethinking: new solutions for working conditions and career paths helping workers to retain their physical and mental health: as well as motivation and productivity, throughout an extended working life. Eurofound has defined sustainable work as the interplay of working and living conditions being such "*that they support people in engaging and remaining in work throughout an extended working life*" (Eurofound, 2015, p.5). The definition of sustainability in the context of work implies simultaneous efforts towards achieving individual, social and economic work- and labour market-related goals that will enable the needs of the present worker to be met without compromising his/her ability of future work. Identifying and analysing the factors and actions underpinning sustainable work throughout working life has been a research priority for Eurofound since 2013. This article discusses the Eurofound reference framework of sustainable work over the life course and its components. It presents sustainable work outcome indicators on the societal and the individual level and provides some reflections of how those can be used jointly to map overall beneficial work environments for sustainable work. The article investigates contextual factors such as infrastructures, workplace practices and job quality. The specific role of motivation is also highlighted with empirical analysis. The paper closes with conclusions and a policy outlook.

Keywords: Sustainable work, life course perspective, EU context, indicators

About Eurofound

Founded in 1975 and located in Dublin, Ireland, the European Foundation for the Improvement of Living and Working Conditions (Eurofound) is a tripartite European Union Agency, whose role is to provide information, advice and expertise on working conditions and sustainable work, industrial relations, labour market change and quality of life and public services, to support the EU Institutions and bodies, Member States and Social Partners in

shaping and implementing social and employment policies, as well as promoting social dialogue on the basis of comparative information, research and analysis.

Introduction

Demographic change has triggered policy debates and responses across Europe. The need for keeping workers in employment longer is a consequence that requires rethinking: new solutions for working conditions and career paths helping workers to retain their physical and mental health: as well as motivation and productivity, throughout an extended working life. Given the pressures of demographic change, a work environment needs to be created that satisfies the needs of different groups of workers: not only older workers but also those with care responsibilities, for example, or people with physical disabilities or mental health problems, to allow for the participation of the largest possible numbers in the labour force.

Eurofound has titled the broad goal set out by this statement as '*making work sustainable over the life course*'. Identifying and analysing the factors and actions underpinning sustainable work throughout working life has been a research priority for Eurofound since 2013. In a first step, the rather expansive concept of sustainable work was illuminated by a framework that explains our approach, and that has been used as reference point for a range of Eurofound research projects examining different aspects of sustainable work (e.g., Eurofound, 2015, 2016a, 2017a, 2017b).

In this paper, the Eurofound reference framework of sustainable work is introduced and its components are discussed. Section 2 presents sustainable work outcome indicators on the societal and the individual level, and provides some reflections of how those can be used jointly to map overall beneficial work environments for sustainable work. Section 3 investigates contextual factors such as infrastructures, workplace practices and job quality. The specific role of motivation is highlighted in section 4 based on empirical analysis. The paper closes with some conclusions and a policy outlook.

The Eurofound framework of sustainable work over the life course

Eurofound first published a conceptual paper on Sustainable Work over the Life Course in 2015. There, sustainable work is defined as the interplay of working and living conditions being such "*that they support people in engaging and remaining in work throughout an extended working life*" (Eurofound, 2015, p.5). Eurofound hence takes he perspective of the working individual being in a concrete job situation (job quality, work organisation) that interacts with its private life domain. Key features are around job quality, work-life balance, developing skills and employability, having enough earnings etc. The issue of addressing critical life events and being supported through transitions is a further crucial element in our approach. In addition, the framework opens a societal perspective by emphasising the central role of policies,

infrastructures, regulations and practices in shaping both the individual and work context to unfold within the institutional settings and socio-economic developments

With the objective of bringing this concept a step further, Eurofound commissioned a feasibility study (Virtanen et al., 2018) with the guiding research question of how and to what extent the conceptual framework can be operationalised in order to measure outcomes of sustainable work and associated determinants. Based on extensive literature research and the consultation of leading experts in the field, the authors of this study developed, together with Eurofound, an analytical reference framework mapping out the main constituents of sustainable work and their interrelations as illustrated in Figure 1. Consequently, the single components of the reference framework were operationalised, and key measures selected, composing a final dashboard of indicators.

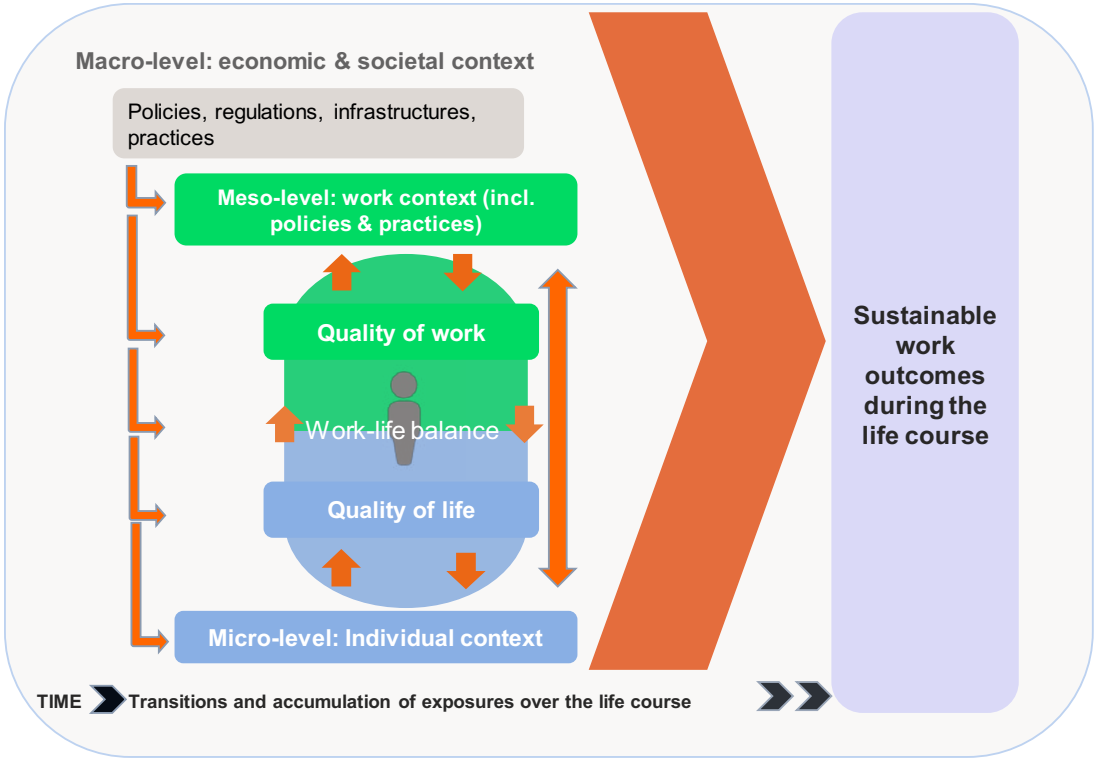

Figure 1 Eurofound Sustainable Work Framework
Source: Virtanen et al, 2017 © Eurofound

What are sustainable work outcomes?

Can sustainable work be measured? Yes and no. No, because there is no single indicator which captures the whole nature of the phenomenon as outlined above; and yes, because as the literature demonstrates, there are various indicators that summarise outcomes reflecting a sustainable work environment. However, there are many ways of measuring one or other aspect of sustainable work, and previous research has shown various efforts of how to do it (e.g., Fleuren, 2019). Eurofound's approach adds a new angle to this debate in bringing both

the macro- and micro-perspective together, arguing that both essentially contribute to understanding the full scope of the phenomenon.

Sustainable work outcome indicators were proposed by Eurofound, in order to operationalise the framework`s underlying definition as quoted above ("*engaging and remaining in work throughout an extended working life*"). They refer to increased labour market participation across the life cycle. The indicators hence quantify objectives related to sustainable work or results of sustainable work environments on various levels (individual, macro). First, they capture the societal and economic objective of keeping workers longer in the labour market due to population ageing, demographic change and financial constraints (e.g., as regards sustainable pension systems and public finance). Secondly, they refer to the individual worker and his/her labour market trajectory (fulfilling work; ability to work until/beyond retirement age; labour market history and transitions).

The definition of sustainability in the context of work implies simultaneous efforts towards achieving individual, social and economic work; and labour market-related goals that will enable the needs of the present worker to be met without compromising his/her ability of future work. This requires for one sustainable conditions at the current job (e.g. regarding effects on workers' health), the worker's ability, willingness and motivation to do this job (or a similar one) now and in the future (health, skills, work engagement) (see e.g. Eurofound, 2018a) and the institutional preconditions for workers to participate in the labour market (available jobs, employment levels, labour market services). While the selection of indicators depends on various factors such as the scope of the study, data availability and data quality, Eurofound suggests a couple of specific indicators on two levels that are comparable across EU Member States.

Macro-level

The indicators proposed at societal level illuminate various aspects of what the OECD (2006) once called Live longer, Work longer. While the outcome indicators deliver snapshots of the situation of Member States at a certain time, they also feed into policy debates of giving people better choices and incentives to continue working at an older age. They allow for evaluating whether *work systems* are sustainable from a macro-economic policy angle, and deliver useful evidence for policy makers to design policies encouraging greater labour market participation at an older age, by "fostering employability, job mobility and labour market demand" (ebd.). The following indicators were suggested:

Senior employment rate of workers aged 55plus: This indicator was included in the final list for two reasons: First, the employment rate of older workers (and especially its development over the years) gives evidence of a country's capability/capacity to keep the ageing workforce in the labour market. Besides the general employment level and labour market structure, the indicator also highlights how well the interplay of institutional and economic incentives

(negative or positive) works in encouraging a later transition from work to retirement. Secondly, senior employment levels also imply labour opportunities for this age group and available jobs. Senior employment levels in themselves, however, would say little about the overall sustainability of work in a broader understanding. Factors that impact on senior employment at the company and/or local levels would also include age management programmes and initiatives, with the focus of a smooth transitioning from work to retirement with benefits for companies as regards knowledge retention. While there is a longer tradition of such practices in some countries like Sweden or the Netherlands (e.g., Wikström et al., 2018), it requires a cultural shift and change in HR management in other, particularly Eastern European, countries (e.g., Joniaková & Blštáková, 2015).

The duration of working life provides a measure of the average number of years for a given country and year. It complements the employment rate of older workers by exploring how many years today's young people are expected to be active in the labour market throughout their life course (under the currently prevailing age-specific participation rates). This information adds the life course perspective to the mere quantitative level of employment and can be used to monitor developments in relation to early retirement. The average is computed over all adults in a specific country, and is hence strongly influenced by the proportion of the inactive population outside the labour force. Therefore, no conclusions can be derived about the number of years people who are currently employed, work. The indicator instead emphasises the combined effect of the proportion of the active labour force and life expectancy (Eurostat, 2020). Variation of the measure is mainly explained by the general participation rate. The measure relates to the discussion of sustainable work as it accounts for systemic career interruptions (e.g., shorter duration of women due to childcare responsibilities) and differences in pension ages (between men and women / between workers of different countries).

The final indicator proposed at the macro-level is the measure *of healthy life years (HLY) at age 65:* The life expectancy of the population beyond retirement age indicates the general health of a population. Whether extra years of life gained through increased longevity are spent in good or bad health is a crucial question introducing the concept of quality of life (years enjoyed free from the limitation of illness or disability) and highlighting the well-functioning/wellbeing of a society and its institutions. The indicator hence complements the other two by estimating average health prospects when reaching retirement age /leaving the labour market. HLY also monitor health as a productive factor as it not only improves the situation of individuals, but would also relieve public healthcare expenditure and further boost the likelihood that people continue to work later into life (Eurostat, 2020).

Figure 2 jointly explores the development of all three indicators over a time span of 19 years (2000-2019) for the EU27. Overall, the indicators provide evidence that people work longer today, and that higher proportions of men and women aged 55-64 are active labour market participants than back in 2000. The average duration of working life has increased as has the number of healthy life years at age 65. The main driver of these developments was the

continuous growth of female labour market participation, with substantially shrinking gender gaps in all employment-related indicators. This increase went on even during the years of the economic and financial crisis and the subsequent recession (2008-2013).

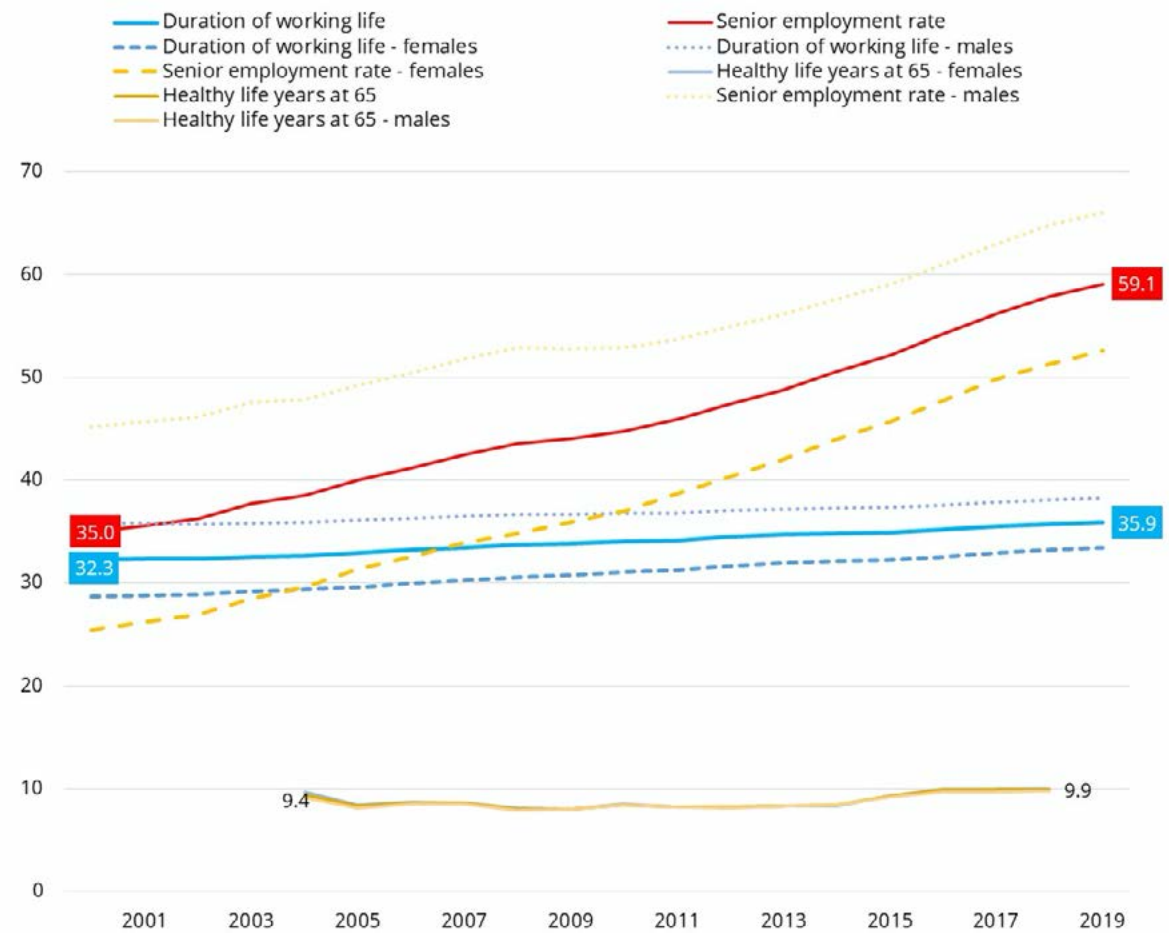

Figure 2 Macro-level sustainable work outcomes, EU27
Source: Eurostat

However, the figure looks at the EU as one single labour market, while both developments and levels differ largely across Member States. Senior employment rates, for instance, range from 79.8% in Sweden to 48.9% in Luxembourg. Similarly, the duration of working life is highest in Sweden, Denmark and the Netherlands with over 40 years and lowest in Italy, Croatia and Greece with figures around 33 years. Healthy life years at 65 range from 15.7 in Sweden to 4.4 in Slovakia. This highlights that both health- and labour market-related sustainable work outcomes vary hugely among Member States, and makes a case for country-level analysis and monitoring.

Micro-level (individual)

The outcome indicators at individual level explore work engagement, work ability and health outcomes. They are a crucial complement to the macro-level measures as they introduce

individual work outcomes. Data availability at the micro level lacks well behind the long time series and well-established data basis of the macro indicators. Some are only available for a single year, and the concepts behind (such as work engagement) are relatively new. Still, we believe that a first step is achieved with these indicators being part of the EWCS programme. Inclusion into the LFS and further conceptual development would be desirable for future monitoring.

Work engagement (tot. / 55+) has been defined as a "positive, fulfilling, work related state of mind that is characterised by vigour, dedication and absorption" (Schaufeli & Bakker, 2003). The concept describes the relationship of the worker with his or her work and the organisation (Green et al., 2017; Van Dam et al., 2017). Engagement has emerged in the last years as the concept that meets both the interest of workers and employers. It was proposed as sustainable work outcome, as it is positively associated with well-being, high levels of job performance and hence sets the conditions for the worker being able to enjoy and stay at work. Engagement at work is an incentive to keep on working. Social partners and public authorities can set the conditions under which engagement flourishes, such as favourable workplace practices, staff involvement etc.

Self-perceived health status of workers (overall/aged 55plus) is the second micro-level indicator suggested. The proportion of workers reporting very good or good health is based on EU-SILC and available since 2008. It has been extensively tested in terms of validity and reliability. Workers` health is both the precondition but also to a certain extent the outcome of labour market participation. Sustainable work is inextricably linked to health and previous research has shown strong links between population`s health and work ability (Eurofound, 2019b, Söderbacker et al., 2020). Some scholars have however argued for a broader conceptualisation of (occupational) health in terms of overall wellbeing as such measure "integrates, but goes beyond, the traditional OSH goal of protecting workers from occupational hazards, to include preventing illness and promoting worker health" (Schulte et al., 2019).

The *attitude towards the sustainability of the current job* can be captured via the EWCS, where respondents are specifically asked 'Do you think you will be able to do your current job or a similar one until you are 60 years old?'. For respondents aged 56 or older, the question was changed to: 'Do you think you will be able to do your current job or a similar one in five years' time?'. The fact that the proportion of respondents that were unable to answer the question is similar for older and younger workers, might indicate that the question is no more difficult to answer for younger people than it is for those who are older. Nevertheless, the answers to these questions reflect the perception of employees towards the sustainability of their current job. Analyses of which aspects of the job contribute answering 'Yes' to this question shed light on what workers think is important for them to be able to remain in work. From a data quality perspective, the item is however far from being perfect, and further cognitive testing and other data quality measures would be needed.

Overall assessment: taking a joint perspective

Table 1 below gives an overview of all sustainable work outcome indicators proposed by Eurofound, and illustrates the width band in each of them across EU27 Member States. The table illustrates the wide range of outcomes among various countries and highlights that there is room for improvement within the European Union in making work overall more sustainable. It emphasises the point that monitoring should take place at Member State level.

Table 1 Overview of sustainable work outcome indictors (micro- and macro-level).

	Work engagement (all workers) (Scale 0-100)	Work engagement (55+) (Scale 0-100)	Very good or good self-perceived health status (all workers) %	Very good or good self-perceived health status (55-64) %	Able to do your current job until the age of 60 (or in 5 years time if > 56), %	Employment rate (55-64) %	Duration of working life (years)	HLY at age 65
Value corresponding to 0=min	68.5	63.5	59.6	26.0	47.7	40.5	31.8	4.4
Value corresponding to 1=max	79.9	84.3	92.9	88.6	79.0	80.7	46.3	15.7

Source: Eurofound, Eurostat

A monitoring tool could take a joint perspective, categorising the sustainable work environment as per a country`s overall performance in the outcome indicators, both at the micro and macro-level. For both analytical and illustrative purposes, composite indicators on both levels could be developed based on normalised sustainable work outcome indicators. On this basis, a sustainable work scale could be developed mapping countries of different categories: Countries with comparatively (i) high outcomes in both societal and individual level outcomes (ii) low outcomes in both, (iii.) a combination of either high macro-level and low micro-level outcomes or (iv) the other way around. However, such exercise would require in-depth debates among policy makers, experts and civil society in selecting a final dashboard of outcome indicators and on weights assigned to them.

The context of sustainable work

In the Eurofound conceptual framework, sustainable work requires a match between the job and availability for work. At certain points during the life course, difficulties may arise in one or both domains. During these transitions, external support might be needed. Transitions take place not only between jobs, but also between employment and unemployment, periods of learning or caring, or when returning to work after a period of illness. Eurofound emphasises two levers that can be used to increase the chances of achieving a match between work and the individual: the improvement of job quality (to better match a person's availability for work) and improving availability for work (to better match the demands of the labour market). Finally, attention should also be paid to policies and practices that support not only those who are employed, but also those who are currently outside the labour market,

due to, for example sickness absence or unemployment, taking into account the work-life balance, health, work ability, and skills. It is obvious that, from a labour market perspective, some groups face pronounced disadvantages as for instance those with functional impairments, disabilities or chronic diseases. As previous research has shown (e.g., Eurofound, 2018b, 2019c), their options for sustainable work need hence to be boosted by courageous policy responses. These range from social and labour market policy mixes to social partner agreements, the design of the workplace and company-level action (such as applied return-to-work schemes, flexible work arrangements and generally better recognition).

The core context: Job quality

The most direct and obvious determinant of the sustainability of work is the characteristics of the job. Eurofound's job quality framework (2012, 2017) assesses working conditions along seven key dimensions measured at the workplace level based on data from the EWCS. Job quality is defined as an objective measure of the potential impact of the characteristics of jobs on the well-being of workers:

- *Skills and discretion:* the opportunities for workers to exercise autonomy, apply their skills, participate in the organisation and develop professionally
- *Social environment*: the extent to which workers experience both supportive social relationships and adverse social behaviour
- *Physical environment*: the degree to which workers are exposed to physical and environmental risks at work
- *Work intensity*: the level of time, workload and emotional demands that put pressure on workers
- *Prospects*: the degree of job security and opportunities to progress in one's career
- *Working time quality*: the duration, scheduling and flexibility of working time arrangements
- *Earnings*: the income from work

How do these seven dimensions affect the sustainability of work over the life course? Although this is basically an empirical question that has to be answered by research (see preliminary analysis in Eurofound, 2019), three features of job quality have to be taken into account particularly in order to understand its relationship to the sustainability of work: firstly, each of the dimensions affect the well-being of workers; secondly, although they are often empirically correlated, the relative importance of the different dimensions can vary across jobs; and finally, high quality in one dimension may compensate for lower quality in another. For instance, higher earnings can help to compensate for certain working time quality or work intensity issues. However, one dimension can never perfectly substitute for another, and it is questionable whether certain elements of a job can really be compensated for. Certain physical demands, for instance, cannot be compensated by earnings, as they can have an

irreversible negative impact on health. In practice, workers may combine either negative or positive scores on all or several dimensions

Employability and skills

Individual skills and competencies are crucial to entering the labour market and to remaining at work. Lack of skills can result from initial low-level qualifications, changing requirements, obsolescence of skills over time, or simply structural changes in the demand for labour. Keeping skills updated throughout the life course in a changing labour market is challenging. Continuous development of competencies and acquisition of qualifications depends both on lifelong learning opportunities and a person's life and work circumstances. However, a high level of employability is, besides the supply of jobs, one prerequisite for achieving employment security. Conversely, low levels of employability put individuals in danger of losing attachment to a labour market where job security cannot be guaranteed.

Company practices and workplace social dialogue

Company-level policies are the crucial place for the proper implementation of practices related to sustainable work. The job climate in this regard is shaped by the way in which government regulation and collective agreements are applied in practice, the workers' voice is heard (or not) and worker participation evolves. Company and workplace practices provide the "meso-context" in keeping people being engaged and healthy at the workplace. Companies implement measures affecting job quality but also as regards achieving a better fit between the needs and abilities of the individual and the requirements of the job, and to improving the overall work environment.

Workplace practices and the approach to workplace social dialogue touch upon the core of the work experience. How do companies organise their day-to-day business, and what is the role of employees in the organisation? Inclusive HRM practices and strong employee involvement in decision-making are associated with beneficial performance outcomes as regards innovation, productivity or workplace wellbeing (Eurofound, 2016; 2017). Work engagement is positively associated with organisational justice and other motivational features linked to an active role for the employee at the workplace (Eiffe, 2018). High-involvement workplaces better manage to assign active roles to staff, and increase employee commitment and work engagement with positive impacts on performance and productivity. Many workplace practices such as regular staff meetings, employee involvement in decision making or official employee representatives at the workplace all are positively associated with sustainable work outcomes (Eurofound, 2016a, 2020).

However, an active approach to making work sustainable, can help to achieve overarching social objectives. Practices contributing to such goals include, for instance, age management in companies to prevent the premature exit of workers. Apart from adapting the job and the workplace, a possible revision of the role of older workers can be helpful. As the strength of

the productive characteristics of the old and the young may differ considerably, there is great potential for diversity management to exploit the complementarities of these characteristics and to widen the scope for mutual learning between generations.

Work-life balance

The reconciliation of working and private life is an important element in the sustainable work framework, as it marks the intersection between job quality and quality of life. The framework ultimately regards a lack of work–life balance as a barrier to employment. The perspective is broader, in the sense that it also takes into account more than just the work-family balance, explicitly taking a life-course perspective, and acknowledging that work and life demands and resources differ across the life-cycle. Striking a balance between work and other aspects of life is increasingly fundamental for workers, and especially so for those with care responsibilities. A balance between employer-friendly and employee-friendly flexibility is also struck at the workplace level. This does not mean that there is a strict trade-off. Many companies in the EU already promote workplace policies that are conducive to work-life balance, in order to attract and retain workers. Modernised work practices such as teleworking, part-time work and flexible working time must be considered as instruments to improve the work-life balance, so that reconciliation becomes feasible. (Eurofound, 2018b).

Social partners

Although the institutional arrangements and levels of inter-institutional co-operation differ across countries, in most Member States social partners have a role to play alongside the public authorities. Case studies indicated that the social partners have been instrumental in promoting sustainable work in many Member States (Eurofound, 2016a). Social partners often raise awareness, initiate discussions, provide support, and campaign on a number of questions related to low pay, lifelong learning, health and safety, gender equality, and sustainable work as a whole. They need to be heard in the processes of legislation drafting. In some cases, the social partners may use tripartite negotiations to give advice, or put proposals to the government on several issues related to sustainable work, which may have some concrete outcomes. For example, the National Labour Council and the Labour Foundation in Belgium, as well as the Social and Economic Council in the Netherlands, have played a major role in developing advice, which has often been adopted subsequently in key legislation.

For this to work best, however, the social partners need to have an incentive to co-operate and find a compromise. If this happens, it often leads to a better-supported agreement, which can be defended to the workers and employers more easily. Apart from institutionalised tripartite co-operation, various policy frameworks, information campaigns, committees and network projects (usually government-led) may also boost partnership efforts between relevant social partners and policymakers.

Overall, a strong role taken by the social partners is significant in successfully pursuing strategies contributing to sustainable work and creating a favourable working environment. In general, their contributions can have a wide impact on comprehensive approaches and relevant sectoral policies. Nevertheless, much depends on the institutional and legal frameworks in which the social partners operate, and the extent of inclusion such frameworks provide.

Legislation, policies, infrastructures

Legislation and public policies intervene at points outside of the workplace across a life course. Social protection systems assist with critical life events (providing, for instance, income support for transition periods, sickness insurance, child benefits, unemployment benefits and pensions). Quality services, for example a comprehensive care infrastructure, provide support, ideally in a coordinated and integrated way. Through legislation, rights to certain working time and leave options (such as part-time work and parental leave) are guaranteed. A range of policies are aimed at creating inclusive labour markets through labour market activation, tackling labour market segregation, and improving access to employment for the disadvantaged. Legislation establishes rights to non-discrimination, including the adaptation of workplaces to workers with special needs, and to lifelong learning. Social partners are involved in the shaping and implementation of these policies and legislative initiatives.

The role of work motivation for sustainable work

Motivational factors are a key in the decision-taking towards transiting from work to retirement (Pohrt & Hasselhorn, 2015). Labour market participation in general, and staying in the labour market until or beyond reaching eligibility for pension, require some degree of individual motivation. Particularly, as regards older workers, their motivation of remaining or re-entering the labour market is key for the overall employment rate of this group. Evidence has shown that motivation shifts from extrinsic factors, such as income or reward to intrinsic sources (such as perceiving the job as meaningful) with increasing age (e.g., Barnes-Farell & Matthews, 2007). The meaningfulness of the job is hence a core factor to keep people in the labour market at older ages.

Eurofound research (Eiffe, 2019) has highlighted the link between motivation and a couple of sustainable work outcomes on the micro-level. The results show that motivation at work, either intrinsically driven by the content of the job, or by organisational factors such as recognition of work well done, appropriate payment, career prospect or fairness, is important for employees in various regards. Motivated employees have higher levels of work engagement, a lower likelihood of their work negatively affecting health, less days of sick leave, and are generally more likely to perceive their job as sustainable. The results also emphasise that motivational categories are linked to varying extents to sustainable work outcomes in all age groups.

Conclusions and policy discussion

Eurofound`s concept of sustainable work acknowledges the need of welfare states to extend working lives, and to adapt to new risks (in terms of social protection) by emphasising the necessity to keep a balance between policy measures at the macro-level, favourable work environments and workplace measures and improved job quality. A further essential element is the life-course perspective, underpinning the need to focus on workers of all age groups. This makes sustainable work a complex policy area for which a holistic approach is desirable.

In turn a focus on extending the statutory retirement or other labour-market related measures is not enough to make work sustainable over the life course. Policy makers need to be aware that the workplace itself, and related practices resulting in the perception of justice, recognition, fair payment, career opportunities and motivating environments, matter to achieve this goal (Bakker & Demerouti, 2014). Hence, work organisation and technological processes need to be designed, so that high-quality jobs result (e.g., Docherty et al., 2008). The systematic measurement of motivation and wellbeing at the workplace can help to develop alert systems for intervention. Consequently, the sustainability of work also, and particularly needs to, be addressed at the workplace. Companies must be prepared and willing to keep and invest in older employees. Governments can support good workplace practices with workplace innovation funds and other instruments to provide consultancy and training. Other, more global, policy measures can build upon such practices.

Eurofound has provided empirical evidence supporting hypotheses on pathways as outlined in the analytical framework of sustainable work (Figure 1): Obvious relationships were for instance found between favourable socio-economic developments, well-functioning welfare-state institutions and overall positive sustainable work outcomes. Previous research also highlighted correlations between high-involvement workplace measures, such as workplace social dialogue and employee involvement, and sustainable work outcomes. Most importantly: Job quality matters, and must be considered the core determinant of sustainable work outcomes.

For monitoring purposes, indicator dashboards can be useful to keep track of developments across various aspects of sustainable work. It was shown in this paper that various indicators capture different phenomena and distinct aspects of sustainable work on micro-, macro, and potentially also on meso-level. Selections of specific indicators are normative choices, and are furthermore based on statistical criteria such as data availability and data quality. While these aspects do not impose problems in themselves, it is essential to properly justify these choices (for instance via broad policy debates involving civil society) and make them explicit. Synthetic measures of sustainable work to illustrate overall desirable outcomes are useful complements supporting the holistic perspective.

However, more research is clearly needed to explore the effectiveness of sustainable work policy mixes. This regards the implementation in various sectors of the labour market (particularly against the backdrop of the growing service sector), assessments of big

industries vs. SMEs and the relevance of the concept for various types of workers such as self-employed, platform workers and many others.

Policies addressing sustainable work

Making work sustainable, according to the Eurofound framework, means from a policy point of view to first have technological and organisational design in place to create high quality jobs. This is the basis for creating a fit between structural characteristics of a job (job quality), and the characteristics of an individual in relation to work (abilities, needs, health, skills, etc.), so that they can interact complementarily at the workplace. From a macro-economic point of view, policy makers need to react to developments with growing numbers of retirees straining public budgets and slowing economic growth. Interventions should take place at all levels: government level (legislation, regulation, public services, infrastructure, public funding), sectoral and company level (collective agreements, social dialogue) and individual level (lifelong learning, new learning, upskilling, employability, etc.). In the following a few areas are highlighted (without being exhaustive), where all actors have a stake:

Following up on the OECD Council recommendation on Ageing and employment

In 2015, the OECD put forward an age-friendly agenda in three broad policy areas with the main objective to promote employment at an older age. These included (i) improving incentives to work at an older age, (ii.) encouraging employers to retain and hire older workers and (iii) improving employability of older workers by adopting a life-cycle approach. (OECD 2019). This is very much in line with the Eurofound sustainable work agenda, and needs to be implemented as part of a new EU 2030 strategy. All areas are crucial for achieving better sustainable work outcomes, and need to be addressed by policy makers at national and EU level.

Activation policies for young and old (life-course perspective)

While the share of the economically inactive population has substantially declined over the past 15 years (from 27.7 % in 2000 to 21.7 % in 2019 in the EU27), there is still a lot of potential to further integrate inactive people of all age groups into the labour market. A focus must be put on young people not in education, employment or training (NEETs) with the objective to prevent scarring effects for further career paths. Further enforcement of youth guarantees is needed at Member State levels. Customised active labour market policies are key to re-skill and up-skill people at risk of or in unemployment. Policy makers and social partners need to align forces to keep older workers employable and productive to prevent skill obsolescence. A strong focus should lie on closing the age gap in digital literacy.

Work-life balance policies

The reconciliation of work and private life or work and personal responsibilities is a crucial element in the sustainable work framework, and is key for starting employment, remaining in or returning to work, work engagement and productivity at work (see Eurofound 2018). Work-life balance needs hence to be put at the core of employment policies at EU and national

level: This includes family leave entitlements and flexible work arrangements for parents and carers as set out in the Directive for work-life balance (adopted in June 2015).

Gender equality and gender mainstreaming

Though it was not the focal point of this paper, it is well known from previous research that there are substantial differences in sustainable work outcomes between men and women. Gender mainstreaming, and a focus on gender equality, is hence indispensable in designing sustainable work policies. Occupational inequalities in sustainable work are also to be assessed from a gender perspective. Female-dominated occupations as for instance health and care fare relatively poorly regarding many dimensions of job quality, and are over-proportionally exposed to emotionally demanding work (Eurofound, 2020a, 2020b) with serious repercussions on health and well-being.

High involvement workplaces

Previous research has shown that involving workplaces, and well-functioning workplace social dialogue, are likely to produce more motivated, more engaged and more productive and healthier workers (e.g., Eiffe, 2018, Eurofound, 2016; 2017b, Kornelakis et al., 2018). Such evidence should encourage employers and social partners to implement inclusive measures in companies, and to increase employees' voice and active participation in organisational decisions at the workplace.

Return-to-work schemes

Return-to-work schemes can help to facilitate the re-entry into the labour market after spells of long-term sick leave, for instance of cancer survivors. Multidisciplinary interventions of physical training, psychological and vocational elements can improve return-to-work. Some authors suggest rehabilitation outpatient services in communities or reintegration teams at large workplaces and/or multinational corporations (de Boer et al., 2015). Important shifts in the policy making process are required to guarantee the provision of equitable and supportive legal frameworks for ill-workers. To this end, employment, health and social security systems must co-operate in order to set up coherent return-to-work pathways (Kiasuwa et al., 2018).

Addressing job quality

The key message of the Eurofound Sustainable Work Framework is that job quality and working conditions are at the core of keeping people engaged and working longer at a better health. Past EU strategies and initiatives (such as the Lisbon Strategy or Europe 2020) have incorporated the view that the conditions under which work is performed need to be looked at. The OECD has agreed in its job strategy that the quality of working environment will be closely monitored. The Joint Assessment Framework (JAF) of the European Commission tracks job quality as a non-recommendation semester objective, and Eurostat provides information on quality of employment on its website. The European Pillar of Social Rights stresses the importance of fair working conditions. However, this proclamation needs to be further filled

with substance at all levels. A coherent system of regularly monitoring working conditions with key indicators in each dimension could be the backbone of a future Europe 2030 strategy on Employment and Job Quality.

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Discussion Forum

OSH in the future: where next?

William Cockburn

Abstract

Since 2002, when the Community Strategy on Health and Safety at Work called on the European Agency for Safety and Health at Work to set up a Risk Observatory, EU-OSHA has worked to address the challenges presented by the changing world of work. As our society evolves under the influence of new technology and shifting economic and social conditions, our workplaces, work practices and processes are constantly changing. These new situations bring with them new risks and challenges for workers and employers, which in turn demand political, administrative and technical approaches that ensure high levels of safety and health at work. Changes that are underway due to digitalisation, for example, affect not only the tasks that make up jobs, but also the nature of work in terms of how it is organised, and how it is managed and supervised. Digitalisation also provides important opportunities, whether through the automation of dangerous or monotonous tasks, or facilitating the work of the labour inspectorate. Europe benefits from a comprehensive body of OSH regulations, but if the OSH challenges posed by the new world of work are to be managed and the opportunities realised, it is essential that social dialogue should be at the centre of regulation, support and guidance, enforcement and monitoring.

Keywords: digitalisation, automation, future of work, platform work, artificial intelligence (AI), robotics, occupational safety and health (OSH)

The European Agency for Safety and Health at Work (EU-OSHA) located in Bilbao, Spain, was established in 1994 as a tripartite information agency. It contributes to improving the working environment, as regards the protection of the safety and health of workers, by increasing and disseminating knowledge in that area. In achieving its tasks, the agency works closely with universities and research institutes in Europe and beyond. As part of its 'Risk Observatory' activities, it has carried out a number of projects over the last ten years, focusing on the identification of new and emerging occupational safety and health (OSH) risks. This article

draws on that work, as well as presenting some of the thinking that underpins its current research projects, such as a foresight on OSH risks related to the circular economy, or a wide-ranging four-year activity on OSH and digitalisation.

Approaches to regulation and prevention of occupational safety and health (OSH) risks, and to promotion of workers' health and wellbeing, have adapted to major changes in the world of work since the first laws on child labour appeared over two hundred years ago. In recent years, the need to ensure that these approaches are 'fit for purpose' has become a widely recognised priority, due to the influence on the world of work of certain 'mega-trends'. These changes, such as the growth of global trade, supply chains and labour migration; the impact of ICT and other new technologies; changes in the composition of the labour market; and climate change; have been addressed in a number of initiatives with important impact at policy level.

In 2016, ILO launched the future of work centenary initiative, in order to understand and respond effectively to the ongoing changes in the world of work, and to be able to advance its mandate for social justice, including decent jobs for all. Similarly, the EU Strategic Framework on Health and Safety at Work 2014-2020 identified a number of major challenges, including new and emerging risks, such as those linked to application of new technology, organisational change driven by developments in ICT, and increasing workforce diversity and demographic change. More recently, the European Commission Communication 'A Strong Social Europe for Just Transitions' addresses the multiple challenges Europe is facing: climate action, digitalisation and demographic change. The Communication builds on the principles of the European Pillar of Social Rights (EPSR) in the pursuit of fair working conditions.

With the proclamation of the EPSR, the European Parliament, the Council and the Commission affirmed their strong commitment to the fundamental rights of workers, and to improved living and working conditions. Principle 5 of the EPSR underlines the need for quality working conditions, including innovative forms of work. Principle 10 of the pillar stresses workers' right to "a high level of protection of their health and safety at work" and to "a working environment adapted to their professional needs, and which enables them to prolong their participation in the labour market". In concrete terms, the European Commission has outlined actions on new forms of (precarious) employment, platform work, digitalisation, dangerous substances, work-related accidents, cancer and demographic change.

At more of a research level, a number of international initiatives are underway to address the impact on OSH of these challenges, and to highlight how OSH can contribute to their mitigation. One of the most important of these initiatives is the Global Coalition on OSH. This was proposed at the XXI World Congress in 2017 as a multi-stakeholder partnership, to promote the critical contribution that safe and healthy working environments make to decent work, global health and sustainable development. Within the Global Coalition, EU-OSHA leads

a thematic group that aims to map research activities related to OSH in the future. With this, the group hopes to:

- Foster collaboration and pooling of resources among the collaborating organisations
- Share knowledge from relevant research and data sources, as well as know-how regarding research methods and dissemination strategies
- Provide greater visibility for research and other types of initiative, and help achieve higher impact in terms of target group influence and awareness
- Identify gaps in knowledge with the aim of stimulating research initiatives and funding
- Avoid duplication of ongoing or completed work

These initiatives all aim to address challenges linked to the 'changing world of work', but what does this actually mean in reference to health and safety at work?

What do we mean by OSH in the future?

There are different ways that this question can be addressed, but a useful approach is to examine the so-called 'five Ws' or 'elements of circumstance'; the who, what, where, when and why.

WHO will be the worker of tomorrow? The workforce changes over time as society evolves, in terms of age, gender, health, level of skills and education. For example, there may be more or fewer migrant workers, or a greater or lower participation of persons having a physical or mental impairment.

WHAT will work consist of? Automation and digitalisation is changing the nature of work. Jobs change or disappear, as tasks are automated. At the same time, new jobs are created, taking advantage of technological developments. However, automation is an investment, and will not replace or substantially change jobs for which there is a ready supply of cheap labour. A so-called 'hollowing out' of the labour market may take place, resulting in a demand for workers with 'people skills', technical and scientific competence, but at the same time also for low-skilled workers to cover '3D jobs', those that are dirty, dangerous and dull, and which are not 'worth' automating.

WHERE will work be carried out? The trend in Europe over recent years is for workers to be less in a traditional workplace, such as the factory floor or office, and more likely to be working on the move, or from home, or in clients' premises, or in private homes. Again, these changes are driven largely by digitalisation, but they are also the result of the increase in service sector jobs and the greater participation of women in the labour market, with both men and women making greater use of telework. Indeed, many people have started to work from home for the

first time because of the COVID-19 pandemic, and this will likely lead to a long-term increase in systematic telework.

WHEN will work take place? Globalisation and digitalisation are driving growth in non-standard hours, as business takes place across time zones, and workers are able to be contacted through mobile devices that are always at hand. This may lead to an 'always-on' culture, blurring the distinction between work and family life. Europe is likely to see further increase in part-time work, and more flexibility in work hours. At the same time, there may also be an increase in the pace and intensity of work.

WHY and how will work evolve this way? As mentioned above, the main drivers of change are globalisation, climate change, demographics and digitalisation; however, some drivers are unforeseen, such as pandemics. Important changes affecting OSH in the future relate to the increasing use of atypical forms of employment (zero-hours contracts, online platform work, etc.), particularly when they result in false self-employment and lower levels of worker protection. The effectiveness of OSH policy and practice is also challenged by the growth in sub-contracting, as well as through supply chain effects and globalisation, and in some cases due to the pressure for (de)regulation. OSH has to adapt to advances in technology and increasing complexity in the world of work, while at the same time facing a weakening evidence base to support policy and practice, as longstanding sources of reliable data disappear or become inadequate.

Against this backdrop, EU-OSHA relies on its Anticipating Change activities to provide credible, good quality data on new and emerging risks to policy makers and researchers, so that they can take timely and effective action. In 2014, EU-OSHA carried out a scoping study that identified the impact of ICT and work location on OSH, and since 2016, EU-OSHA has been undertaking extensive research on digitalisation and OSH. Research to date includes a large-scale scenario-based foresight on OSH risks posed by changes in ICT, their use and their impact on the nature of work; expert discussion papers to stimulate debate on specific topics; and a study on regulatory and policy developments in the EU associated with the online platform economy and its potential impact on OSH. From 2020, an EU-OSHA 'OSH overview' builds on this work to provide further information for policy, prevention and practice on the challenges and opportunities for OSH as a result of digitalisation. This OSH overview will be followed by an EU-wide Healthy Workplaces Campaign commencing in 2023, dedicated to raising awareness of how to prevent work-related risks associated with digitalisation and OSH.

The main technology related challenges for OSH identified in EU-OSHA's work to date are summarised below.

What does digitalisation mean for occupational safety and health?

Digitalisation offers the potential for innovative and exciting developments in the workplace, that can improve working conditions, reduce OSH risks and make work accessible to persons that have been excluded because of physical or mental impairment. However, digitalisation also presents new challenges. By anticipating the potential challenges for OSH, we can maximise the benefits of such new technologies, while ensuring that working environments are safe and accessible.

The development of digital technologies, such as artificial intelligence (AI), advanced robotics, widespread connectivity, the internet of things and big data, wearables, mobile devices and online platforms, is changing the nature and location of work, who works and when, and how work is organised and managed. Digital technologies now provide essential services to all sectors of our economy and society. These developments can create new challenges for OSH and its management. The rate at which these developments are taking place is faster than ever before.

Robots are becoming mobile, smart and collaborative. Intelligent machines are taking over a wide range of not just manual but also cognitive tasks, previously done by humans. Workers are increasingly overseen by monitoring technologies and algorithms, to the extent that in the future they could be managed by 'intelligent machines'. The 24/7 globally interconnected economy requires ever more flexible work organisation, and has given rise to new forms of work, such as online platform work. In this context, psychosocial and organisational risk factors deserve particular attention, as they may give rise to higher levels of work-related stress and poor mental health. New safety and ergonomic challenges are emerging as well, including risks of functional safety associated with cybersecurity. Last, but not least, digital technologies and new forms of work present challenges for the application of OSH regulations.

Most of the discussion around digitalisation is about the quantity of jobs, but it should also be about job quality, and OSH is an important aspect of this. EU-OSHA's work aims to support a smart, sustainable, productive and inclusive economy, including safer and healthier workplaces for all in the digital world of work, by minimising the possible negative impacts of digitalisation on workers' safety and health, and by maximising the prevention opportunities offered by digital technologies. This has become more relevant than ever, as the digitalisation of the economy and society is now a widely stated priority of the European Union.

While digitalisation offers great opportunities to reduce occupational risks, such as by automating dangerous tasks, it is important to recognise that investment in new technology is required, usually on the part of the employer. Under certain conditions, these investments are unlikely, for example, where cheap labour is readily available, competition is high and profit margins are low. Unless governments foster appropriate conditions for such investments, ensuring decent minimum working conditions, it is likely that there will be a

polarisation of jobs, with high-quality skilled jobs at one end of the spectrum and low-skilled, 'dirty, dangerous and dull': so-called '3D jobs', at the other.

How is digitalisation shaping our working lives and workers' safety and health?

Advanced robotics and artificial intelligence

Advances in digital technologies are inevitably shaping our future. From increasingly sophisticated robots that replace workers in customer-facing roles, to additive manufacturing technologies (3D printing) that produce human organs, the potential of innovations in digitalisation to meet growing demand and increase productivity is vast. However, increased levels of automation, and the constant monitoring of workers by digital technologies, will in many cases reduce person-to-person contact, and increase performance pressure, with potentially detrimental effects on workers' mental health.

Smart cobots

Collaborative and smart robots, so-called cobots, will become a familiar presence in the workplace as highly developed sensors make it possible for people and robots to work together. Amazon already has 100,000 AI-augmented cobots supporting its distribution activities. Most cobots are equipped with self-optimising algorithms, allowing them to learn from their human colleagues. With the increasing use of AI, robots will be able to carry out not only physical tasks, but increasingly cognitive tasks also. Robots are already able to perform a variety of cognitive tasks autonomously, such as supporting legal casework or medical diagnoses, and will also become commonplace in customer-facing jobs. This means that the use of smart robots is expected in many different sectors and settings, such as in the care sector, hospitality, agriculture, manufacturing, industry, transport and services.

Robotics allows us to remove workers from hazardous situations, and improve the quality of work by handing repetitive tasks to fast, accurate and tireless machines. Cobots can also facilitate access to work for many people who are currently excluded, for example by supporting disabled people or ageing workers in the workplace.

However, the growing proportion of mobile, smart robots in the workplace may increase the risk of accidents, as injury could occur from direct contact with robots. As smart robots are constantly learning, although efforts are made to factor in all possible scenarios in their design, they may behave in unanticipated ways. Workers having to keep up with the pace and level of work of a smart cobot may be placed under a high level of performance pressure. This may have negative impacts on workers' safety and health, particularly mental health. Increased working with robots will also significantly reduce contact with human peers and social support, which is also detrimental to workers' mental health.

'Flippy', an autonomous robotic kitchen assistant that can learn from its surroundings and acquire new skills over time. Shown at work in a kitchen alongside 'co-workers' helping to fulfil customers' orders (Courtesy to "Miso Robotics").

Exoskeletons

Body-worn assistive devices, so-called exoskeletons, have been introduced in some workplaces to support workers carrying out manual handling tasks, while reducing the load on the muscular system. While the extent of their broader deployment is still unclear, exoskeletons have already proven to be beneficial in specific settings, such as for military applications or in medical care settings. Although the potential benefits of exoskeletons to support workers with physical impairments, or to prevent work-related musculoskeletal disorders, could be of value, it is also necessary to take into account that such assistive devices give rise to new concerns in relation to OSH. The long-term effects of exoskeleton use on physiological, biomechanical and psychosocial parameters are unknown. Moreover, according to the hierarchy of control measures, collective technical and organisational prevention measures should always be considered first, and individual technical prevention measures such as equipping a worker with an exoskeleton are seen as the last resort.

Big data, artificial intelligence and algorithms

Mobile, wearable or embedded (in the clothes or body) digital monitoring technologies are increasingly used to monitor workers in real time. Work is increasingly overseen and co-ordinated by algorithms and AI based on big data, tracking data on workers' productivity, location, vital signs, stress indicators, micro-facial expressions and even tone and sentiment analysis. About 40% of human resources (HR) departments in international companies now use AI applications, and 70% consider this a high priority for their organisation. According to a survey of senior executives in a number of sectors and industries around the world, more

than seven out of 10 think that it will be common to use AI to evaluate workers' performance and set rewards in the next 10 years. Interestingly, however, four out of five would not want an intelligent machine managing them.

Pervasive monitoring allowed by AI-supported digital monitoring technologies can have a negative impact in particular on workers' mental health. Workers may feel that they will lose control over work content, pace and scheduling, and the way they do their work, that they are unable to interact socially or take breaks when they want to, and that their privacy is invaded. The use of data for example to reward, penalise or even exclude workers could lead to feelings of insecurity and stress. To prevent this, it is important to ensure transparency and consent in relation to the collection and use of such data. New types of smart monitoring tools may also provide an opportunity to improve OSH surveillance, support evidence-based prevention and increase the efficiency of inspections.

Smart personal protective equipment

Mobile miniaturised monitoring devices embedded in personal protective equipment (PPE) allow real-time monitoring of hazards, and can be used to provide early warnings of harmful exposures, stress, health problems and fatigue. Real-time advice tailored to the individual can be provided to influence worker behaviour and improve safety and health. Information could also be collated to help predict potential OSH problems, and spot where OSH interventions at organisational level are required. However, effective strategies and systems and ethical decisions are needed in the context of handling the large quantity of sensitive personal data that could be generated. A malfunction, or the generation of incorrect data or advice, could also cause injury or ill health.

Virtual reality and augmented reality

Virtual reality (VR) and augmented reality (AR) offer the advantage of removing many workers from hazardous environments, as they can be used for example to support maintenance tasks and for immersive training. AR could also provide contextual information on hidden hazards, such as the presence of asbestos, electricity cables or gas pipelines. However, the reliability of AR is dependent on maintaining access to sources of relevant, high-quality information and on whether or not it is up to date. VR and AR devices may also be a source of risks because of distraction, information overload, disorientation, motion sickness and eyestrain.

Additive manufacturing

The use of 3D printing will become more commonplace. Bio-printing is increasingly being used to produce biological products or organs. Advances in 3D printing capabilities will create great opportunities, with the addition of a fourth dimension expected to enable the production of materials that can change with time. All this comes with incredible potential, but possible new risks to workers' safety and health as a different population of workers is

exposed to manufacturing hazards and dangerous substances, including dust, in decentralised, small, even micro, companies. As items produced by additive manufacturing are often one-offs, OSH standards are also difficult to define or enforce.

Flexible work

Digital mobile technologies and widespread connectivity offer the opportunity for increased flexibility and a better work-life balance. However, they could also mean an increase in the demand for permanent availability, irregular working hours, blurred boundaries between work and private lives, and precarious forms of work.

Mobile digital devices

The global reach of mobile digital technologies is a key driver of the 24/7 economy. People no longer need to be in the same location, to communicate and exchange information. Flexible working environments are increasingly becoming the norm, facilitating a high degree of flexibility in working hours. Although this presents attractive possibilities for workers and the economy, there are potential safety and health risks. The balance mainly depends on whether the flexibility permitted by mobile working offers a real opportunity for workers, or is imposed by the employers for their own benefit.

The main OSH concerns are associated with the fact that workers are likely to experience an increased workload, excessive working hours, and an unhealthy work-life balance. Lone working and the feeling of isolation, the lack of collective support and problems related to reduced support from the organisation are also issues.

Musculoskeletal disorders may also become more likely, as flexible working environments and mobile digital technologies become commonplace. This presents a significant challenge for OSH, as many such environments are not ergonomically suitable, but employers have little control over them. Health problems such as obesity, type-2 diabetes and cancer may also become more prevalent as digitalisation increases sedentary working.

As workers become more dispersed and diverse, with 24/7 flexible working becoming the norm, overseeing and regulating OSH could become more challenging. With business hierarchies changing, and many workers either managing themselves or being managed remotely or by AI, there is likely to be a loss of clarity about who is responsible for OSH, and how it should be overseen and regulated.

Online platforms

Online platforms create new business models, by matching demand for labour with its supply, or allocating tasks to workers with minimal transaction costs. They can facilitate labour market access for vulnerable groups, and provide a regulatory opportunity to address undeclared work. Online platform work comprises a variety of working arrangements: generally 'atypical'

in some way, different types of jobs and many forms of non-standard employment, from high-skilled work carried out online to service work carried out in people's homes or other premises, and managed via web-based applications.

Consequently, working conditions also vary significantly, and so do the OSH risks, as they depend on the various specific work activities themselves. However, OSH risks can be aggravated by the specific features of online platform work. These include work requests issued at short notice, penalisation for not being available, the fragmentation of jobs into tasks with narrower job content, and subject to continuous evaluation and performance rating. There may be further pressures from increased competition, as the online labour market becomes global and accessible to more workers. Other potential risk factors include irregular working hours, blurred boundaries between work and private lives, unclear employment status, insecure income, poor training opportunities, no social entitlements such as sick pay and holiday pay, poor worker representation, and lack of clarity in terms of who is responsible for OSH.

Online platform work offers the benefits of flexibility, in terms of working time and place of work, but, in many cases, this flexibility is imposed on the worker. Workers in non-standard, poor-quality forms of work tend to have poorer physical and mental health. Where platform work results in false self-employment, it creates new challenges for labour protection and OSH management, and there are key questions around the responsibility for and regulation of OSH. In most Member States, the application of OSH legislation depends on an employment relationship, which is more difficult to establish in the context of specific features of online platforms, such as the triangular relationship of the parties involved, and the temporariness, informality, autonomy and mobility of the work.

How can we address the challenges and maximise the opportunities for safety and health at work?

As described above, digitalisation will bring new and emerging OSH challenges, but also opportunities. Swaying the balance towards the opportunities will depend on how the technology is implemented, managed and regulated. Digital technology in itself is neither good nor bad. Maintaining a balance, between the challenges and the opportunities presented by digitalisation, depends on the proper application of technologies, and how they are managed and regulated in the context of social, political and economic trends, such as workforce demographics, the state of the economy, social attitudes, governance and skills. Measures that could help to mitigate the OSH challenges presented by digitalisation include:

- the development of an ethical framework for digitalisation, codes of conduct and proper governance.

- a strong 'prevention through design' approach that integrates human factors and worker-centred design.
- the involvement of workers in the design and implementation of any digitalisation strategies.
- collaboration between academics, industry, social partners and governments on research and innovation in digital technologies to properly take account of the human aspects.
- a regulatory framework to clarify OSH liabilities and responsibilities in relation to new systems and new ways of working.
- an adapted education system and training for workers.

More generally, if the OSH challenges posed by digitalisation are to be managed effectively, and the opportunities it offers realised, it is essential that social dialogue be at the centre of Regulation, Support and Guidance, Enforcement and Monitoring.

Figure 1. European toolbox for a better working environment
Source: EU-OSHA

This approach, which may be described as the 'European toolbox for a better working environment', needs to respond to the challenges identified earlier in this article. In this regard, the goal-setting approach of the EU Framework Directive on OSH and its 23 related directives has proved remarkably resilient to the changes of the last thirty years. Although recently evaluated, and found broadly fit for purpose, the EU OSH acquis faces fresh challenges. It has to provide adequate protection to workers who may be working remotely, who may be managed by algorithm, who may be mixing work with private life, or who may be outside the traditional employment relationship, working as false self-employed.

What is EU-OSHA doing?

EU-OSHA makes available an extensive body of work on digitalisation and OSH, from in-depth foresight reports and discussion papers, and a major overview of research, policy and practices carried out between 2020 and 2022, to its Healthy Workplaces Campaign starting in 2023. There is also a dedicated web section with links to further information, which allows you to stay informed of the latest developments in the field. [1]

Foresight on new and emerging OSH challenges associated with digitalisation

This foresight study identifies key trends and drivers of change that will significantly transform workplaces by 2025 and explores the possible impacts of digitalisation on OSH using four scenarios of working life in 2025. As we cannot predict the future, the scenarios aim to aid strategic discussions, so that the potential OSH challenges can be anticipated and managed effectively. One of EU-OSHA's key objectives is to provide policymakers and researchers with the reliable information they need to take timely and effective action, and shape the safe and healthy workplaces of tomorrow.

Discussion papers

Our expert discussion papers aim to inform and stimulate debate on specific topics related to digitalisation, such as crowdsourcing, robotics, performance-enhancing drugs, 3-D printing, monitoring technologies and the e-retail sector.

Study on regulatory and policy developments in the EU associated with the online platform economy and its potential impact on OSH

This report describes the OSH risks that may result from online platform work, discusses the challenges that the online economy presents in relation to regulatory approaches to OSH, and offers examples of policies and regulatory efforts that are in place, or being developed. to address these risks and challenges.

Overview on digitalisation and OSH, 2020-2022

Between 2020 and 2022, EU-OSHA is running an 'OSH overview' project to provide information for policy, prevention and practice in relation to the challenges and opportunities of digitalisation in the context of OSH, as described in this document.
This OSH overview follows up on the foresight study on digitalisation and OSH, and incorporates the results of the third edition of EU-OSHA's European Survey of Enterprises on New and Emerging Risks (ESENER 2019[2]) on digitalisation in EU workplaces. The OSH

[1] EU-OSHA emerging risks web section: https://osha.europa.eu/en/emerging-risks/developments-ict-and-digitalisation-work
[2] EU-OSHA ESENER website: http://www.esener.eu

overview comprises a number of projects implemented through a combination of literature reviews, surveys, interviews, case studies, and reviews of policies and practices. It focuses on the following areas:

- advanced robotics and the automation of tasks and more specifically:
- the impact of the automation of tasks and changed job contents on OSH
- smart collaborative robotics (cobots)
- the monitoring of workers and OSH
- including new forms of managing workers facilitated by AI or algorithms, such as the gamification of work
- online platform work, with an update of EU-OSHA's regulatory and policy developments, as well as qualitative and quantitative research on OSH and online platform workers
- case studies of good OSH practices in the digital world of world:
- including in relation to technologies such VR, AR and smart PPE, to inform the Healthy Workplaces Campaign on digitalisation.

Upcoming Healthy Workplaces Campaign on digitalisation

The Healthy Workplaces Campaign commencing in 2023 focuses on digitalisation, which will raise awareness about practical resources on digitalisation and OSH.

This article has attempted to describe not only the important challenges facing occupational safety and health due to changes in the world of work, but also to identify opportunities. The changes are rapid, so the abovementioned 'European toolbox for a better working environment' will have to respond quickly, and effectively, adapting its key components to the five 'elements of circumstance' described earlier.

Fortunately, across the EU Member States, there is a wealth of expertise in occupational risk prevention, as well as experience of applying a broad diversity of approaches under a common regulatory framework. Although one of the smallest EU agencies, EU-OSHA is able to help exploit this expertise and experience through its research and its awareness raising work. In large part, it can do so because it is a tripartite network-based agency; the governments and social partners are central to all of the agency's activities, and they are replicated in its key network of national Focal Points. EU-OSHA's success also rests on its collaboration with Europe's leading researchers in OSH, whether in national institutes, in academia or in private business.

The agency seeks to use its limited resources in the most efficient way possible; forging links between the main players, identifying and sharing the best policies and practices, fostering research on the key issues, and raising awareness through the largest international campaigns on OSH. Collaboration with other key international organisations is also essential,

and EU-OSHA works closely with the ILO and WHO, with the other members of the Global Coalition on OSH and with other EU Agencies.

While the challenges may be more or less significant, and the opportunities more or less promising, what is certain is that our chances of successfully navigating the future will be far higher if all of those with an interest in OSH work together.

About the author

William Cockburn, Head of the Prevention and Research Unit, European Agency for Safety and Health at Work (EU-OSHA). He was born in the UK, and trained as a lawyer and then as an ergonomist. The EU-OSHA's Prevention and Research Unit develops the OSH content for the agency, including the European Risk Observatory, and contributes to the European dialogue on healthy workplaces.

Discussion Forum

Generating health and safety knowledge for innovative and sustainable workplaces: a PEROSH Perspective

Mary Trainor
Jan Michiel Meeuwsen
Paulien Bongers

Abstract

PEROSH is the Partnership for European Research in Occupational Safety and Health (OSH). The PEROSH vision is that policymakers, workplaces and other stakeholders across Europe are inspired by, and use, knowledge generated by PEROSH in their efforts to develop innovative and sustainable workplaces which are healthy and safe. PEROSH comprises 14 national research institutes from 13 countries on the continent of Europe. Each institute plays a key national role through their affiliation to government, health and accident insurance systems, or industry and trade unions. The partnership acts collectively to: strengthen co-operation on OSH research and accelerate the generation of knowledge in key areas of OSH; and disseminate and exchange knowledge and information on OSH issues. In 2019, The International Labour Organisation identified that PEROSH has "strong national and regional [European] policy impact". This paper gives an overview of PEROSH: an introduction to its history and strategy; governance and structure; and core activities including the PEROSH Joint Research Programme and the PEROSH international Wellbeing at Work conference series. It summarises PEROSH outreach and networking activities at national, European and global level. The paper concludes with reflections on the importance of robust scientific evidence. to underpin and inform the actions of stakeholders for a sustainable world of work which is healthy and safe.

Keywords: sustainable workplace, workplace innovation, occupational safety, occupational health, wellbeing at work, working conditions, PEROSH, international network, OSH

Introduction: PEROSH History and Strategy

In an ever-changing world of work, the promotion of the health and safety of the present and future workforce is crucial for guaranteeing a healthier, longer and more productive working life. National institutes for occupational health and safety (OSH) research in Europe play a distinctive role in anticipating, creating, and synthesising the evidence needed to underpin and inform the actions of: national policymakers; regulators; health and insurance systems; and industry and trade unions. However, workplace challenges transcend national borders. Recognising the opportunity in Europe to exploit synergies in their roles and research activities and to gear national funding through collaboration, in 2003 a group of these national institutes founded The Partnership for European Research in Occupational Safety and Health, PEROSH. The partnership operates through a formal Agreement (PEROSH, 2018). Today, PEROSH has 14 partner institutes from 13 countries on the continent of Europe. Each institute plays a key national role through their affiliation to government, health and accident insurance systems, or industry and trade unions ("social partners".) The partnership acts collectively to: strengthen European co-operation on OSH research and accelerate the generation of knowledge in key areas of OSH; and disseminate and exchange knowledge and information on OSH issues. PEROSH builds on the success of the international 'Sheffield Group: an informal network of directors of national research institutes for occupational OSH institutes. The network first met in 1989 at the laboratory of the UK Health and Safety Executive, HSE (at that time based in Sheffield.) Its members span four continents: North America (IRSST- Canada and NIOSH-USA); Oceania (NIOH-New Zealand); Asia (IIOSH- Israel, JNIOSH-Japan, KOSHA-South Korea and WSHI-Singapore); and Europe. (Information on these institutes is at: www.irsst.qc.ca; https://www.cdc.gov/niosh/; www.nioh.ac.za; www.osh.org.il; www.jniosh.johas.go.jp; www.kosha.or.kr; www.wshi.gov.sg.) The annual meetings are hosted by one of the institutes on a rotating basis, and continue to be chaired by HSE. PEROSH maintains strong links with the Sheffield Group, including biennial joint meetings of the institute directors.

The PEROSH Strategy 2019-2023, Research co-operation to promote a healthy, productive and innovative workforce (PEROSH, 2019a), sets out the mission, vision, activities, outreach and ambition for the partnership. The mission of PEROSH is to create and exchange new knowledge and practice on occupational safety and health, and make it accessible to policymakers, workplaces and other stakeholders in Europe. The PEROSH vision is that policymakers, workplaces and other stakeholders across Europe are inspired by, and use, knowledge generated by PEROSH in their efforts to develop innovative and sustainable workplaces which are healthy and safe. PEROSH seeks impact and adds value through the exchange of knowledge and good practices across Europe to the benefit of all. The PEROSH strategy sets out the following activities through which the mission and vision are fulfilled: (1) We pool resources and create new knowledge through joint activities. (2) We disseminate share and exchange knowledge on OSH issues between members and within Europe to all relevant stakeholders. (3) We provide the evidence base that informs and underpins

decisions by national and European policymakers on healthy and safe working lives. (4) We identify new research challenges in the field of OSH.

The generation and exchange of knowledge for use to develop innovative and sustainable workplaces that are healthy and safe is a 'golden thread', aligning the activities of PEROSH to its vision. These activities span the ongoing challenges to health and safety in today's workplaces, and anticipating and meeting the new challenges and opportunities from technological change, disruptive innovation and the changing world of work. They include research activities in relation to: technologies, materials and equipment in the work environment; demographic change and changing employment practices; and effective work organisation and leadership to reduce occupational accidents and ill-health, while promoting wellbeing at work.

This paper gives an overview of the partnership's: structure and governance; core activities including the Joint Research Programme, researcher exchange visits, biennial member research conferences, and the PEROSH international Wellbeing at Work conference series; and outreach activities at national, European and global level.

PEROSH Governance and Structure

PEROSH is governed by its Steering Committee (SC) which comprises the director general or research director of each member institute. The SC is responsible for the strategic direction and management of PEROSH, its finances, and decisions on admitting new member institutes. The SC currently meets twice yearly. Table 1 gives the 14 PEROSH member institutes. Each member institute plays a key national research role, through their affiliation to government, health and accident insurance systems, or industry and trade unions. Some national organisations are members through their OSH science and research institute or function (for instance AUVA, BAuA, HSE, TNO and Unisanté): these are represented on the SC by their OSH research director or equivalent. Decisions on new members consider, for instance, alignment to the PEROSH mission and vision, research quality, and commitment to research ethics.

Table 1. PEROSH member institutes by country in September 2020

Country	PEROSH Member Institute	
Austria	AUVA	Austrian Social Insurance for Occupational Risks (www.auva.at)
Denmark	NFA	National Research Centre for Work Environment (www.nfa.dk)
France	INRS	National Research and Safety Institute for the Prevention of Occupational Accidents and Diseases (www.inrs.fr)
Finland	FIOH	Finnish Institute of Occupational Health (www.ttl.fi)

Germany	BAuA	Federal Institute for Occupational Safety and Health (www.baua.de)
Germany	IFA	Institute for Occupational Safety and Health of the German Social Accident Insurance (www.dguv.de/ifa)
Italy	INAIL	Italian Workers Compensation Authority (www.inail.it)
Netherlands	TNO	Netherlands Organisation for Applied Scientific Research (www.tno.nl)
Norway	STAMI	National Institute of Occupational Health (www.stami.no)
Poland	CIOP-PIB	Central Institute for Labour Protection - National Research Institute (www.ciop.pl)
Spain	INSST	National Institute of Safety and Health at Work (www.insst.es)
Sweden	SAWEE (MYNAK)	Swedish Agency for Work Environment Expertise (www.sawee.se)
Switzerland	Unisanté	Centre for Primary Care and Public Health (www.unisante.ch)
United Kingdom	HSE	Health and Safety Executive (www.hse.gov.uk/research/)

All PEROSH strategic leadership, decision-making and governance is, so far as is possible, horizontal across the SC. To support the SC, there is a PEROSH structure beneath it as shown in Figure 1. The SC delegates responsibility for research co-ordination activities to the Scientific Steering Group, SSG. The SSG comprises the research director or head of science for each institute. Like the SC, the SSG operates on the basis of collective decision making. The SSG currently meets twice yearly, hosted on a rotating basis by the member institutes. It acts to stimulate information sharing and researcher exchanges between institutes, as well as new projects within the Joint Research Programme, and to monitor the progress, outcomes and benefits of these activities. The SC elects the SC chair and vice-chair, as well as the chair of the SSG: each role is for a 2-year period with an option for re-election subject to a maximum term of office of 4 years. The SSG chair reports to the SC meetings on the status of research activities. Each member institute pays an equal annual PEROSH subscription. This subscription is used to support the core PEROSH activities, in particular through: the appointment of part time paid officials, the Manager of International Affairs (MIA) and the secretariat; and the operation of its website (including the online repository of PEROSH publications), the PEROSH e-newsletter, and other media channels in line with the outreach ambitions in the PEROSH Strategy. The SC is supported in day-to-day operations by an Executive Committee comprising the SC chair and vice-chair, the SSG chair, and the MIA. Further working groups are appointed by the SC as necessary. The MIA reports to the SC chair and undertakes co-ordination, networking and outreach activities.

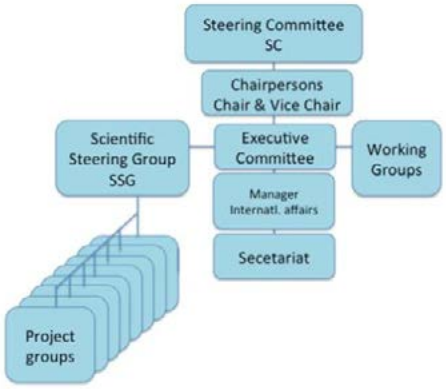

Figure 1. Structure of PEROSH under the Steering Committee of institute directors.

The International Labour Organisation, ILO (www.ilo.org) included PEROSH in a study of six OSH networks from different regions of the world: Europe, Latin America, Asia and Africa. The study aimed to understand how and why OSH agencies institutions, organisations and experts collaborate. Table 2 shows the characteristics of a successful network which ILO developed from this study. The ILO study report identifies that PEROSH has "strong national and regional policy impact" (Rantanen, 2018; ILO, 2019) and includes a detailed profile of PEROSH (*op. cit.* p151).

Table 2. ILO's characteristics of a successful OSH professional network for a region of the world (ILO, 2019)

Characteristics of a successful OSH regional professional network (ILO, 2019)
Collectively approved mission, policy, strategy, objectives, and targets, aiming at some kind of utility or (professional) productivity.
Limited number of members sharing the same vision (social capital), or membership determined by special criteria such as research area or institutional or professional status.
Practice of inviting members to draw up interest, competence, or activity profiles.
Clear rules regarding responsibilities, conditions of operation, sharing of activities, and division of work.
Well-identified coordinating body and focal point for speaking in the collective voice of the network.
Formal status and representative role in relation to other professional networks.

Coordinator or "leader" with competencies and capacities to lead the network's activities.
Certain degree of institutional support (for example, communication technologies), maintenance of websites, ICT platforms, data depositories, and financial resources for implementation of the above.
Genuine interest in outcome-orientation by carrying out collectively agreed-on functions, special projects, training and education events, organisation of conferences, and publishing of research results.
Annual meetings in vivo and publishing of a network newsletter or e-newsletter are considered important instruments for both cohesion and the functions of the network.
Growing emphasis given to behavioural and ethical principles in networking.

PEROSH Core Partner Activities

The core activities of the PEROSH partnership members include: identification of key research needs; the Joint Research Programme; a wide range of activities to share scientific knowledge and provide developmental opportunities for upcoming researchers; and the PEROSH international *Wellbeing at Work* conference series. These activities have developed since PEROSH began in 2003, building on the approaches found most effective to realise the partnership's mission and vision. The activities continue to grow and evolve, most recently with the first PEROSH international conference on *Prolonging Working Life*, hosted online in May 2020 by NFA (PEROSH, Online-a).

A) PEROSH Identification of Key Research Needs

Joint identification of key OSH research needs is a core partner activity. It supports: identification of synergies in existing and planned member institute research programmes; opportunities to leverage institutes' national funding through collaborative, co-funded research to meet common needs; awareness among policymakers and the wider research community in Europe and other stakeholders, of knowledge and evidence gaps to enable innovative and sustainable workplaces; and global research networking and activity. The distinctive research needs for each member institute are defined and agreed at national level, according to the institute's statute and role; for instance, some institutes focus on occupational ill health and accident prevention, and others on supporting return to work after injury or ill-health.

"Sustainable workplaces of the future – European Research Challenges for occupational safety and health" (PEROSH, 2012) sets out research needs that are common to several member institutes. Examples are research to:

A. Inform effective interventions to prevent work-related stress and musculoskeletal disorders and to support return to work of affected workers (the report notes that these are the leading conditions reported in statistics for sickness absence in Europe.)
B. Understand and promote safety culture in European enterprises, including effective diagnostic tools, noting that: "Accidents at work continue to result in high rates of fatal and serious injuries, hospitalisation, work absence, disability and premature retirement."
C. Understand positive factors that may improve worker wellbeing.
D. Support sustainable employability to prolong working life, nothing that in Europe: "Demographic change will lead and is already leading to ageing of the population."
E. Anticipate the possibilities and consequences of new technology, both the potential to support OSH, for instance by real time monitoring of the working environment, and the need to "reduce risks at an early stage" in the development of new technologies.

More recently, a review of European research priorities (Gagliardi et al., 2017) was carried out by an interdisciplinary group of PEROSH researchers from member institutes, including foresight specialists, using a modified Delphi study. The authors note that it is the first published study providing, "a reliable expression of the perspective of the European OSH Research Community together with an analysis of differences between European geographical areas." The highest priorities identified include new issues such as: "OSH management in new forms of employment (eg, crowdsourcing, internships, zero hours contracts); impacts of innovation and new ways of working (ie, telework, e-work, boundary less work); health and safety in human–computer interaction and the introduction of unsafe and unhealthy work equipment following the reduction of barriers to the free movement of goods." The researchers also note the high importance attributed to two transversal priorities: translation of research results into practical and effective tools; and support for OSH implementation in micro, small and medium enterprises. Figure 2 illustrates the differences in priorities by geographical area.

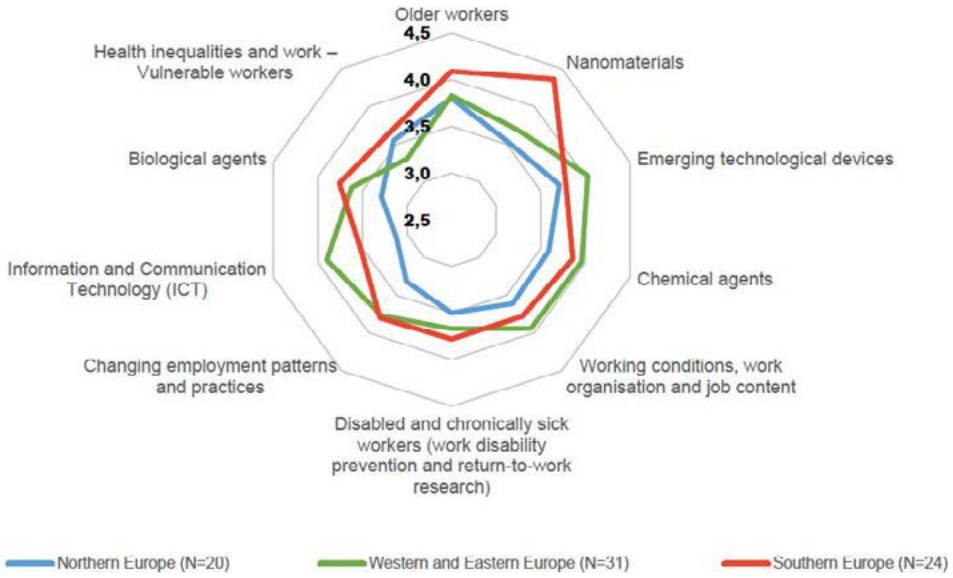

Figure 2. Research priorities by European geographical area on a scale of 5 (high) to 1 (low) from PEROSH study
(Gagliardi et al., 2016)

B) PEROSH Researcher Exchange Programme

PEROSH has an active programme of researcher exchange visits. These are short visits between institutes, typically one- or two-weeks' duration, often on a reciprocal basis. The benefits include: exchange of practical knowledge on laboratory techniques; support for current research through discussion with experts at another institute; introducing the upcoming generation of researchers to how evidence from another institute is used to inform and underpin the work of national stakeholders; and promoting new collaborative projects, either bilateral or within the PEROSH Joint Research Programme. Examples of researcher exchanges that facilitated or led to collaborative research on common evidence needs are: between FIOH and BAuA on the impact of working times on wellbeing for healthcare professionals (Karhula et al., 2020); and between TNO and HSE on insights into effective interventions for occupational asthma among bakery workers (Meijester et al., 2011). An example exchange that provided support and insights from host institute experts to an upcoming researcher is a visit to NFA by a new HSE researcher, to support a review of occupational asthma in wood and furniture manufacturing (Wiggans et al., 2016).

C) PEROSH Member Research Conferences

Since PEROSH was formed in 2003, it has continued to evolve, and introduce new approaches to strengthen knowledge exchange and networking between member institutes. In 2015, the inaugural PEROSH Member Research Conference was held. These biennial conferences bring together upcoming and experienced researchers from member institutes, and include a tour of the host institute's facilities. Speakers are from PEROSH with additional invited keynote

presentations including from European industry and from OSH national research institutes outside Europe. On average there are 70 delegates and 25 speakers per conference. Common to each conference is a focus is OSH impact. This covers both: multidisciplinary solution-focused, translational research by PEROSH institutes that is taken up by policymakers, regulators, industry and other stakeholders to improve occupational safety and health; and measurement and evaluation of the impact of OSH interventions and campaigns at national level. To support outreach activities, PEROSH publishes a conference overview, for instance videos of panel discussions and keynote speakers, or a 'Book of Abstracts' (PEROSH, Online-b,c,d). Each conference focuses on three key research topics aligned to the PEROSH vision for innovative and sustainable workplaces which are healthy and safe; Table 3 gives an overview. The conferences facilitate: *"exchange of information between our young researchers and experienced researchers around many of the important topics that are facing the OSH research community like additive manufacturing; the ageing workforce; and respiratory health,"* PEROSH SC member Professor Andrew Curran (PEROSH, 2016).

Table 3. PEROSH Member Research Conferences: themes and topics aligned to sustainable and innovative workplaces that are healthy and safe

Conference year and host institute	PEROSH Member Research Conferences: themes and topics aligned to sustainable and innovative workplaces that are healthy and safe
2015 CIOP-PIB, Warsaw, Poland	Theme: *Translational Research in Occupational Safety and Health* *Topic 1)* **Prevention through design: approaches** and applications in light of "Industry 4.0". Including: influence of machine and human autonomy; additive manufacturing; virtual reality. *Topic 2)* **Ageing at work:** Translational OSH Research in the context of demographic change. Including: good practice in prolonging working life; psychological and organisational aspects. *Topic 3)* **Tools for working environments** as means of translating research into usable e-solutions. Including: promoting evidence-based ill-health management; evaluation of mental workload.
2017 IFA, Sankt Augustin, Germany	Theme: *Innovative solutions for occupational safety and health* *Topic 1)* **Hazardous substances**. Including: leading indicators to track interventions to prevent lung diseases; metalworking fluid; di-isocyanate paints; workplace monitoring methods. *Topic 2)* **Smart industry.** Including: collaborative robots; 3-D printing; impact of change and the role of leadership; anticipated futures in digitalised full-time work at home. *Topic 3)* **Work-related musculoskeletal disorders.** Including: psychosocial risk factors; workplace interventions; sedentary working; prevention potential of personal monitoring devices.
2019 NFA, Copenhagen, Denmark	Theme: *Innovative solutions for Occupational Safety and Health* *Topic 1)* **Impact on society**: How do we realise and measure the impact of our research outcomes to improve workplace health and safety? Including: evaluation of campaigns. *Topic 2)* **Sustainable and prolonged working life:** How are we tackling current and emerging challenges? Including: foresight on digitalisation; training at schools; barriers and enablers. *Topic 3)* **Carcinogens and chemical substances:** How do we deal with occupational cancer and increase awareness of chemical exposures in the workplace?

D) PEROSH Joint Research Programme

PEROSH has an active Joint Research Programme of collaborative projects between member institutes. The programme was introduced in 2009 and is growing steadily, with around six to ten projects ongoing at any given time. When PEROSH was formed in 2003, member institutes were already collaborating through a range of ad-hoc opportunities and networking. The Joint Research Programme was introduced to realise the opportunities to exploit synergies in distinctive research needs that transcend national boundaries across the European institutes that form the PEROSH partnership. The Joint Research Programme provides the opportunity for national institutes to leverage their funding through collaborative projects, and avoid unnecessary duplication of research activities. Each institute within a project team arranges its own funding. Some projects include invited national research collaborators of PEROSH member institutes.

Many projects address the need to both facilitate and undertake the synthesis of research evidence. The common driver across PEROSH is the importance of robust evidence to underpin and inform decision making and advice to workplaces by national policymakers, regulators, and other stakeholders. These projects include development of review methodologies, as well as platforms and taxonomies to enable national-level research and survey data to be captured and used systematically for transnational evidence synthesis. For example:

1. One of the first projects, initiated in 2009, developed a "Clearing-House Methodology" to locate and gather good systematic reviews of key OSH topics in one place (Verbeek *et al.,* 2015). The authors note that: "Without a proper summary of the available research, it is difficult to draw inferences from science to [OSH] practice." The methodology includes inclusion criteria, search strategies and quality assessment. As part of the project, the team searched for, and assessed, available systematic reviews of 27 significant OSH topics. This has the added benefit of identifying to the wider research community, areas where there are research needs due to a shortage of robust studies to inform OSH practice. For instance, the PEROSH team identified that there were no systematic reviews related to occupational health and nanotechnologies. This gap was filled by the World Health Organization, WHO, (www.who.int) which set up an overarching programme of such reviews; an overview is in WHO (2017).

2. Work-related musculoskeletal disorders, MSDs, such as pain and disorders of the back, limbs and neck, are a significant concern in Europe. Many national surveys gather data on self-reported physical working conditions which are used to provide information on occupational risk factors for MSDs. A PEROSH project analysed six national surveys, and identified which physical working conditions are less well captured, including sedentary work conditions. This evidence can be used to inform updates to strengthen national surveys (Tynes *et al*., 2014). For instance, in Denmark

it is currently being used to inform discussions on what will be included in the next national survey.

3. The “NECID” database was developed to hold research data on potential exposure to nanomaterials (Pelzer, 2013). A challenge that is often faced in synthesis and meta-analyses of data and studies from different countries and research teams is a lack of consistency in data fields. The project aim was to enable consistency in data capture through a secure platform that meets the highest ethical standards, and is for use by screened research teams. A particular benefit within PEROSH was developing understanding of the legal, ethical, logistical and IT challenges for development and use of such databases.

4. A project reviewed European research literature on ergonomics of protective clothing for firefighters, including the potential benefits of smart wearable devices. The research produced evidence that can be used to inform updates on national standards to better protect firefighters (Młynarczyk *et al.,* 2019).

Many projects identify new avenues for exploration by the wider research community to deliver common evidence needs for European countries. For instance:

5. Most European countries use national surveys that offer information on the status and trends of working conditions and health, as well as at-risk groups of workers. A PEROSH project considered what could be learned from these surveys, to better understand which psychosocial factors are recognised by national workplace health authorities, companies and trade unions. The researchers compared the psychosocial dimensions covered in six national surveys and how they relate to two scientific models. They identified significant overlap in the national surveys as well as “new” dimensions that are not in the models. They conclude that: "These 'new' dimensions could inspire the research community to further investigate their possible health and labour market effects" (Formazin et al., 2014).

Another common theme is projects to develop evidence that can be used at national level to underpin advice and tools for OSH practitioners or companies on healthy and safe working practices. For example:

6. A PEROSH research team developed evidence to support actions by stakeholders to reduce work-related MSDs. They aimed to unleash the potential for knowledge exchange between institutes by generating a common framework for technical measures of physical work demands. They developed specialist technical information on assessing sedentary behaviour (Holtermann et al., 2017a, b) and arm elevation (Weber et al., 2017; Douwes, 2019). An indication of the outreach of this work is the ‘Best Paper Award 2017’ given by the Journal for Applied Ergonomics for the team’s practical technical guide for researchers and OSH practitioners on assessing

occupational sedentary behaviour (Holtermann et al., 2017a). It is intended that the outcome can be used to inform and support the development of national-level tools, guides and interventions. For instance, the results of this work informed the decision by the Danish Ministry of Labour to request the development and evaluation of a new technical system for measuring ergonomic work demands for use in national workplace surveillance (work now underway at NFA).

7. A project researched the "factors that contribute to successes with promoting safety and preventing accidents in companies that have adopted a 'Zero Accident Vision'" (Zwetsloot et al., 2015; 2017a; 2017b). The researchers undertook a survey of managers and workers in 27 companies across seven European countries (with over 8,000 respondents) as well as company interviews and national workshops. They identified, for instance, that in these companies, the approach is: creating safety rather than solely preventing accidents; seeing safety as a strategic rather than a tactical and operational challenge; and intrinsic rather than extrinsic motivation, i.e., "we want to" rather than "we have to". The research findings have been used by the International Social Security Association, ISSA, (ISSA, 2017) to inform their global "Vision Zero" campaign (ISSA, online) which is reaching out to companies, OSH professionals, and tens of thousands of workers globally.

8. A project developed evidence to help protect workers exposed to UV and IR radiation emitted by arcs, flames and thermal radiators. Exposure of workers can damage the eyes and skin. Simple, practical, risk assessments by companies are important to decide what protective control measures are needed. However, there was a lack of scientific evidence as a basis for risk assessment for *indirect* exposures, for instance a worker in the vicinity of a welder. The outcome of the project (Bauer et al., 2015) can be used as a basis to develop advice and tools tailored to national needs. For instance, in Austria it has been used to underpin a simple online risk assessment tool for companies (AUVA, Online).

Details of new, ongoing and completed projects in the Joint Research Programme are at (PEROSH, Online-e).

E) PEROSH "Wellbeing at Work" Group and International Conference Series

The importance of wellbeing at work has become an increasing focus for policymakers and industry within many European nations and globally. In 2009, nine PEROSH member institutes held a workshop at HSE to share information and identify common research needs (Fishwick et al., 2010). Participants suggested that drivers for research include: "societal costs, governmental policy, legislative positions, altruism and moral arguments within civilised societies." They identified that: "At the heart of the well-being debate is the paradox that 'good work is good for you, but work can also harm your health.'" They discussed the differences in

the way "wellbeing at work" as a concept is understood and identified various themes. These include that, "wellbeing is not defined as only the lack of mental ill health, but incorporates social and physical functioning. Well-being has to be a positive, sustainable concept of optimal functioning … with the emphasis on positive consequences for work ability and creativity."

The research needs discussed were in five categories: "(i) defining the rationale for improving well-being, (ii) developing evidence-based approaches that facilitate improved well-being and the prevention of negative influences, (iii) developing communications systems to improve the ongoing debate on these issues; (iv) using case studies to facilitate engagement with stakeholders on the benefits of the well-being concept, and (v) filling the evidence gaps and how to share these research findings." At the workshop, FIOH explained the plans they already had for a conference to bring together international thinking on this important emerging workplace need. Jointly, these activities led to what became the first in the series of PEROSH international Wellbeing at Work conferences (see Table 4) and the formation in 2010 of the multidisciplinary PEROSH Wellbeing Group, which continues today as the central focus of co-ordination for the series.

Table 4. PEROSH "Wellbeing at Work" international conference series

PEROSH "Wellbeing at Work" International Conference Series			
Series No.	**Host Institute**	**Year**	**Location**
1st	FIOH	2010	Helsinki, Finland
2nd	HSE	2012	Manchester, United Kingdom
3rd	NFA	2014	Copenhagen, Denmark
4th	TNO	2016	Amsterdam, Netherlands
5th	INRS	2019	Paris, France
6th	CIOP-PIB	Planning in progress	

An early activity by the PEROSH Wellbeing Group was to develop the PEROSH Wellbeing Tree, to help visualise and communicate about the different factors that feed into wellbeing at work. There are two versions, one for employers (see Figure 3) and one which uses more specialist language for researchers. Wellbeing Group members have used the tree in national-level engagement and articles; for instance (Lunt et al., 2014 a, b; Mockałłoz et al., 2016.) Lunt et al., 2014a, note that: "The Wellbeing Tree is not intended to be an empirical, testable model: rather, it shows in an intuitive way the great variety of factors that can affect wellbeing … The many different factors that contribute to workplace wellbeing are the roots of the tree, implying a clear relationship between investing in workforce wellbeing, and the benefits of doing so: the 'growth' of the tree, and the fruit it produces. The tree image also

helps to show the interdependence between the worker and the context of their work, in relation to wellbeing. The interaction of the individual and wider society can be made clear."

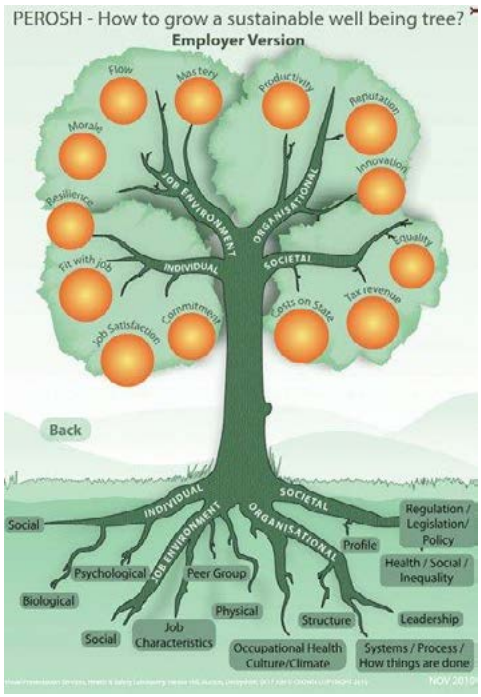

Figure 3. The PEROSH Wellbeing Tree: Employer Version.

Activities by the Wellbeing Group have included considering the impact of the changing world of work (Lunt et al., 2015), including transient working and greater flux in the job market. This identified that, "trends towards increased globalisation and technological advances could make it increasingly more difficult to maintain the classical attributes of a 'good job.'" The group has also investigated factors associated with job satisfaction in the general working population. This study used the Danish Work Environment Cohort Study with replies from 10,000 workers. In a paper called "Job satisfaction is more than a fruit basket, health checks and free exercise" (Andersen et al., 2017), the researchers identify that: "While psychosocial work factors and to some extent physical work demands are important for job satisfaction, workplace health-promotion offers appear to play a minor role." The researchers note, as the driver for their study, that: "Workers who are satisfied with their job are the cornerstones of healthy and productive companies." The group has also published a Good Practice Checklist "for workplaces that wish to do more to support everyone at work to be physically active and to reduce sedentary behavior" (Fishwick et al., 2014). The checklist's introduction for workplaces notes that: "In addition to the health benefits of increasing physical exercise, there is increasing evidence that regular sedentary behaviour can be harmful to health. Sedentary behaviour is a term used to describe prolonged sitting at work without regular active breaks."

The Wellbeing at Work conference series is providing an international platform that is building evidence to meet these research needs and facilitating cross-fertilisation of ideas and

approaches globally. Global research trends have been evident through the presentations given in the decade from the first to the most recent fifth conference. "We see a movement from very early understanding of wellbeing, pretty much risk factors… Now we're dealing with intervention studies in workplaces… We hope that as we continue to host these conferences, we start to develop solutions which are evidence based," David Fishwick, Chair of the PEROSH Wellbeing Group (PEROSH, 2019b).

F) PEROSH Information Sharing Workshops

Short, topic-based, Information Sharing Workshops are used by PEROSH members to exchange knowledge about priority research areas and evidence needs. In line with common priorities for PEROSH institutes, see above and (Gagliardi, 2017; PEROSH, 2012), topics include: transversal (translation of research to give impact;) sector or technology specific; specific diseases or ill-health with a high burden on workers; and cross-cutting OSH priorities spanning multiple workplaces. The topics span both current and emerging challenges to health and safety. Recent and current examples are workshops are on: "Metalworking fluid and respiratory ill-health" hosted at INRS, Paris, France, 2019; "Work-related stress and related mental-health issues" hosted at HSE, Buxton, UK, 2019; and "Health and Safety Guidelines for Intelligent Robots" to be hosted by TNO, online, in autumn 2020.

While the primary goal of each workshop is to share information, some lead to projects in the Joint Research Programme, or other activities. For instance, as noted above, the ongoing activities following the 2009 Information Sharing Workshop on "Wellbeing and Work" include the PEROSH international Wellbeing at Work conference series. All workshop topics align to the PEROSH vision for innovative and sustainable workplaces.

PEROSH Outreach Activities

The PEROSH strategy (PEROSH, 2019a) has five pillars. The first three focus on European and national outreach. The first pillar is: "*Outreach and visibility of PEROSH to European stakeholders*. PEROSH will take initiatives to reach out and contact on a regular base stakeholders in Europe. The ambition is to further raise the profile of its robust scientific evidence and foresight activities on important OSH issues in Europe." These activities include proactive dialogue with European Union institutions including EU-OSHA (www.osha.europa.eu) and EUROFOUND (www.eurofound.europa.eu). For instance, EU-OSHA used the PEROSH articulation of common research needs (PEROSH, 2012) to inform their identification of research needs (EU-OSHA, 2013). EU-OSHA has also requested to use the 2020 PEROSH Extending Working Lives international conference as an example of good practice in its OSH Campaign Toolkit (EU-OSHA, online). The second pillar is: "*Visibility of PEROSH at the National level*. Each member will provide knowledge and experience to PEROSH, and take home to its own national level the enriched knowledge produced by this partnership. The enrichment will be based on information from joint trend analyses, joint research projects and information

sharing events, and joint identification of key research needs. All members have their specific national dissemination channels, and will use these effectively." These activities are specific to each institute, according to their national statute, mission and key stakeholders. The host institute of PEROSH events has the opportunity to invite key national stakeholders. For instance, the 2019 PEROSH Information Sharing workshop on work-related stress was attended by two HSE policymakers in an observer capacity. (HSE is a government agency and the regulator for workplace health and safety in Great Britain.)

The third pillar is: "*PEROSH in Europe*. PEROSH was founded because workplace challenges in a globalised world transcend national borders. Sharing of knowledge and joint research activities by PEROSH members realises significant benefits. Therefore, research institutes in other European countries will actively be offered membership, if they have a national role and are willing to commit to the PEROSH mission, vision, activities and ambitions." Recent PEROSH outreach in Europe has included activities from 2016 to connect with the Swedish OSH research community, through attendance at meetings and conferences. In parallel with these activities, some individual PEROSH member institutes collaborated with the "Swedish Platform for sustainable work as a resource for health, innovation and growth in EU's Horizon 2020" (Sustainable Work 2020, Online). Although this collaboration was not a PEROSH activity, it was facilitated by the existing networking between PEROSH member institutes. In 2018, The Swedish Agency for Work Environment Expertise, SAWEE (MYNAK), was formed under the Ministry of Labour and Employment. Sweden does not have a national research institute. Therefore in 2020, building on the earlier outreach activities, SAWEE became a PEROSH member for an initial year, to explore a research partnership model in the Swedish context.

The fourth PEROSH outreach pillar moves beyond Europe: "*PEROSH in the world*. PEROSH is willing to share its knowledge, good practice and lessons-learned with similar OSH research organisations and networks across the globe. PEROSH maintains contacts with global players in the world of OSH research." Contact with global players encompasses a wide range of activities led by the members of the PEROSH Steering Committee, SC. These include: biennial joint meetings with the international Sheffield Group; engagement with the International Labour Organisation, ILO, the International Social Security Association, ISSA, and the World Health Organisation, WHO; an invitation to the newly formed OSHAfrica (www.oshafrica.africa) to attend an SC meeting hosted by IFA; and engagement with the International Commission on Occupational Health, ICOH (www.icohweb.org). The ICOH engagement is facilitated through PEROSH SC members who are, or have been, ICOH officials or board members. Similarly, the WHO engagement is facilitated through PEROSH member institutes that are WHO Collaborating Centres.

The fifth pillar is: "*PEROSH impact*. PEROSH will focus on the societal impact of its research results. The ambition is to demonstrate the added value of PEROSH research on occupational safety and health carried out by its members. PEROSH will endeavour to develop methodologies, and share approaches to measure and evaluate the benefits of OSH research results for policymakers, workplaces, insurance systems, and other stakeholders." This is an

ongoing strategic activity for PEROSH. The most recent PEROSH member conference took this as a key topic (see Table 3) and further sharing of approaches and good practice from across the partnership is planned.

Discussion and Outlook

The ongoing challenge for health and safety systems in Europe is to tackle the burden on workers, their families and society of life-changing workplace injuries, occupational diseases and ill health, and deaths at work: the loved ones who will never again come home at the end of the working day. The world of work continues to change. There are potential benefits and risks to workers from new technologies, materials and equipment, and disruptive innovation. Net Zero technologies, advanced manufacturing, smart sensors and the Internet of Things, cobotics and machine learning ("AI") are among the drivers for change. There are challenges and opportunities from demographic change and longer working lives, globalisation, deglobalisation, and changing employment practices including the gig economy and digitalisation. Robust work organisation and leadership is important to effectively control risks to health and safety while promoting wellbeing at work.

Today, the COVID-19 pandemic is fundamentally affecting work and society. Multitudes of scientists globally are developing evidence to combat the impact of the virus. Among them are scientists from PEROSH institutes, working according to their institute's national role or as part of national task forces. For instance they are: providing advice on suitability of personal protective equipment (PPE) for healthcare workers; investigating methods for PPE decontamination and reuse as a last resort if supplies fail; developing evidence to inform effective measures to control the risk of workplace transmission, and to identify its contribution to total transmission; and informing advice by government ministries to support the health of those working from home (CIOP, 2020; Marinaccio et al., 2020; SAGE-EMG, 2020; MvSZW, 2020; Vernez et al., in press). Foresight specialists are developing possible futures scenarios to support debate and decision making (Héry and Malenfour, 2020).

The ongoing challenge for national occupational safety and health research institutes is to develop, synthesise and translate robust evidence on current and emerging challenges, to anticipate future evidence needs for the changing world of work, and to transfer this knowledge to the health and safety system. Though PEROSH, 14 national institutes in 13 European countries are acting collectively to: strengthen co-operation on research, accelerate the generation of knowledge in key areas; and disseminate and exchange knowledge and information. Their common vision is that policymakers, workplaces and other stakeholders across Europe are inspired by and use knowledge generated by PEROSH in their efforts to develop innovative and sustainable workplaces which are healthy and safe. Since its inception in 2003, the partnership has continued to develop and strengthen its activities and outreach.

Acknowledgements and Disclaimer

This paper was prepared on behalf of PEROSH. The authors thank the dedicated researchers throughout the member institutes, whose activities are contributing to the development of innovative and sustainable workplaces which are healthy and safe. The paper is written, from the perspective of PEROSH activities, by the research function of the PEROSH member institutes. Its contents, including any opinions and/or conclusions expressed, are those of the authors alone, and do not necessarily reflect policy for any PEROSH member institute including the UK Health and Safety Executive.

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Stressors at work and elsewhere: a global survival approach

Lennart Levi

Abstract

The United Nations´ "Agenda 2030" aims, in an integrated manner, to address the entire multitude of major global risks: e.g., to end poverty and hunger, realise the human rights of all, and ensure the lasting protection of the planet and its natural resources. However, recent political changes put this bold initiative at risk. To increase the likelihood of success, higher education institutions worldwide should teach and train today´s students: tomorrow´s decision makers, to think both critically and ethically, to learn to cope with ethical dilemmas, and to apply systems-thinking approaches to serious and complex societal problems. The Covid-19 pandemic provides just one example of a complex and serious challenge necessitating such approaches. Promoting decent work, full employment and economic growth is one of the other major challenges. And neither of them can be successfully dealt with in a piecemeal manner.

Keywords: Agenda 2030, Sustainable development, Critical-ethical, Systems approach, Higher education.

According to Ban Ki-moon, former UN-Secretary-General, "We are the first generation to eradicate poverty, and the last to combat climate change". Antònio Guterres (2020), the present Secretary-General of the United Nation, emphasises that the "17 Agenda 2030 Sustainable Development Goals (SDGs) demand nothing short of a transformation of the financial, economic and political systems that govern our societies" and further that "global efforts to date have been insufficient to deliver the change we need, jeopardising the Agenda´s promise to current and future generations."

Mentioning the Covid-19 impact, he points out that "the livelihood of half the global workforce has been severely affected." Absence of decent work, full employment and economic growth is similarly likely to affect the livelihood, health, and wellbeing of humanity.

The world is not on track

In its Sustainable Development Goals Report 2020, the United Nations Department of Economic and Social Affairs (2020), in collaboration with over 200 experts from more than 40 international agencies, concludes that "one third of the way into our SDG journey, the world is not on track to achieve the global Goals by 2030 (...) Forecasts indicate that the [Covid-19] pandemic will push 71 million people back into extreme poverty in 2020 (...) Many of these people are workers in the informal economy, whose incomes dropped by 60 per cent in the first month of the crisis. Half of the workforce – 1.6 billion people - support themselves and their families through insecure and often unsafe jobs in the informal economy, and have been significantly affected. The impacts of COVID-19 are also increasing the vulnerability of the world´s one billion slum dwellers (...) As of April 2020, recommended or required workplace closures around the world affected 81 per cent of employers and 66 percent of own account workers (...)" This has already "led to a sharp increase in unemployment and underemployment, a decline in labour income and job-quality challenges."

The Report further points to the "much greater risk of child labour, child marriage and child trafficking", that "the world is now facing its worst recession in generations" and that "there is no doubt that the COVID-19 pandemic has shaken the 2030 Agenda for Sustainable Development to its very core."

We can, indeed must, cope with the situation and trends described above: by promoting "sustainable development" (SD). SD is usually defined as "a development that satisfies *today´s* needs: – without jeopardising the ability of *future* generations to satisfy their needs" (my italics) according to the Brundtland Commission (WCED, 1987).

The question of what actually constitutes SD is an entrance both to an improvement of living and working conditions, to poverty reduction through economic growth: and to protection of the environment.

In the question of method choice, however, opinions differ greatly. Some believe that it requires a return to a simpler life, where people approach nature, live self-sufficiently and locally, and where economic growth stops.

Others argue that SD requires stronger economic growth, where an explosion of technological innovations solves environmental as well as economic and social problems.

I have devoted almost my entire professional life to psychosocial environmental medicine, with a focus on occupational medicine. My intention has been to find ways to prevent noxious stress and disease resulting from it, and to promote health and wellbeing (Levi, 1959, 1971, 1972; Levi & Andersson, 1974; Levi, 1979, 1981, 1984; Cohen, Levi et al., 1986; Kompier & Levi, 1994; Levi, 2000), in line with what is now referred to as many of the 17 Sustainable Development Goals.

One source of inspiration has been our world´s leading social epidemiologist, Michael Marmot. In his search for the causes for disease as well as for health, his plea was to "look for (and subsequently target) the causes behind the causes"; i.e., the root causes. Marmot´s classical study (2004) of the significance of socioeconomic status, social protection and occupational health provides convincing arguments for such an approach.

A series of recent and most impressive searches for such causes is provided by the World Economic Forum´s annual reports on "Global Risks". They demonstrate that many risks at work and elsewhere are indeed real, powerful and likely to materialise. In addition, they usually are very complex, and highly *interconnected*, cf. Fig. 1.

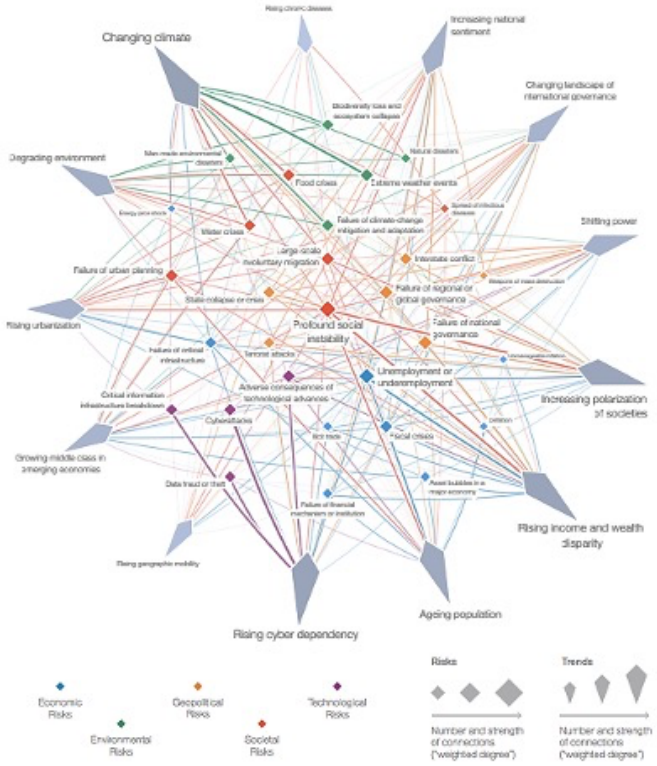

Figure 1. The Risks-Trends Interconnections Map 2018

Source: The Global Risks Report 2018 13th Edition, WEF

Contrary to what is true for much of today´s political practice, they cannot be ticked off one by one, or dealt with effectively with any quick fixes.

I have also been inspired by the discoverer of the biological stress concept, the late Hans Selye. Discussing the foundation for a good life, Selye disagreed with the Bible´s command "Love thy neighbour as thyself". In its place, he proposed "Earn thy neighbour´s love". To work

for a more humane future for humankind and its planet may be such a way (Karasek & Theorell, 1990).

To counteract the global risks described by the World Economic Forum, as well as the present mounting disaffection and disruption across the world, partly due to short-term and silo thinking by many elites, all 193 member states of the United Nations have agreed on an Agenda 2030, comprising 17 very ambitious Sustainable Development Goals (SDGs), and 169 targets. The President of the International Association of Universities (IAU), Professor Pam Fredman, has inspired me to try to integrate the latter approach with what Bo Rothstein and I initiated, promoting critical-ethical and systems thinking in all higher education (Poznan Declaration, 2014).

Focusing on the causes behind the causes: Agenda 2030

The SDGs are concerned with a wide variety of stressors, and accordingly intend to reach an entire package of interacting goals: end poverty; end hunger; encourage good health and well-being; provide quality education; promote gender equality; provide clean water and sanitation; promote affordable and clean energy; provide decent work and economic growth; address industry, innovation and infrastructure; reduce inequalities; develop sustainable cities and communities; encourage responsible consumption and production; take action on climate change; promote life below water; promote life on land; work towards peace, justice and strong institutions; and create partnerships to achieve these goals.

However, recent political changes put these ambitions at risk. To increase the likelihood of success for these 17 SDGs, higher education institutions worldwide must teach and train today's students: tomorrow's decision-makers, to think both critically and ethically, to learn to cope with ethical dilemmas and apply systems-thinking approaches to serious and complex societal problems (Levi & Rothstein, 2018; Hedenus et al., 2018). This concerns professionals belonging to the health, economy, technology, law and many other sectors.

Needless to say, the resulting stress and pathogenic effects of noxious exposures also depend on our individual and collective resilience and coping ability. Such aspects remain important targets for disease prevention and health promotion.

Adjusting the "foot" and/or the "shoe"

But they can never *replace* the situational factors focused on in this paper.
True, causality may imply a range of relationships. It can mean that a certain exposure or characteristic is *necessary*: enough for a certain disease to develop (such as exposure to lead causing lead poisoning). An exposure may also be *sufficient*: no additional influences or

vulnerabilities are necessary. Or exposure may be *contributory*, and neither necessary nor sufficient. The question also remains about whether an exposure really causes a specific disease: or if it "just" aggravates it, accelerates its course, or triggers its symptoms. If we keep all these options in mind, it becomes clear that work-related exposures may very often be a prerequisite for the development of specific diseases, as a sine qua non. On the other hand, it becomes equally clear that they may contribute to a wide variety of morbidity and mortality, a much wider spectrum than is usually realised.

As pointed out in the European Commission´s Guidance on Work-Related Stress (Levi, 2000), work-related disease prevention programmes can aim at a variety of targets, and be based on various philosophies. If the conditions at work: the "shoe", do not fit the worker: the "foot", one approach may be to urge the "shoe factories" to manufacture a wider variety of shoes in different sizes and configurations to fit every, or almost every, conceivable foot.
Whenever possible, such instructions to the "shoe factories" should be evidence-based: in other words, based on measurements of a random sample of all feet, all shoes, and of the existing fit. This is a first, diagnostic, step in a primary prevention approach on a population level.

Another approach, again based on primary prevention, aims at finding the right "shoe" for each individual "foot": promoting "the right person in the right place."

A third, complementary approach is to provide the owner of each foot with a "lasting device" to adjust available shoes to fit his or her feet.

A fourth, very important approach can address the inequity of various feet in various shoes (Marmot, 2004, 2015).

Examples of such amendments would be avoiding, e.g., overemployment, unemployment, exposure to noxious physical, chemical, and biological agents, organisational inadequacies, bullying, and insufficient training and instruction.

Developing critical and ethical leaders of the future

Students need to be made aware of the local, regional and global contexts in which they live and make decisions. Many of today's students do not grasp their role in, and responsibility to, the world, and large numbers do not seem to care.

A single course at college can only ever be a beginning. Families, media, religious bodies, primary and secondary schools and workplaces as well as higher education institutions must be educated and recruited to play their part.

The 2030 Agenda for Sustainable Development aims to promote the entire cluster of 17 SDGs and 169 targets. The critical-ethical analytical skills and systems-based approach mentioned above are indispensable prerequisites to achieving this.

By 'critical' we may refer to the application of careful, exact evaluation and judgement. By 'ethical' we may refer to a set of principles about the right way to behave. By 'systems' we may refer to a group of interacting, interrelated or interdependent elements forming a complex whole.

All this could and should be organised and implemented in collaboration with the social partners.

Universities need to start to become ethical leaders by looking first at themselves and lead by example. The Council for Higher Education Accreditation/International Quality Group and UNESCO's International Institute for Educational Planning have issued an advisory statement on combating 'corruption' in higher education internationally (CHEA/CIQG IIEP-UNESCO, 2016).

The statement, however, uses 'corruption' as a general term to designate a *broad variety* of malpractice in institutions of higher education, such as appropriation, bribery, cheating, corruption, deceit, embezzlement, extortion, favouritism, fraud, graft, harassment, nepotism, etc.: an ABC of misconduct.

To deliver the badly needed SDGs and targets, we need trustworthy, ethical, honest and impartial government institutions that exercise public power, oversee policies fairly and take into account their range, complexity and occasional incompatibility. These institutions are much more likely to promote trust and social capital which in turn improves health and well-being. Tackling corruption is vital (Levi & Rothstein, 2018).

It may also be noted that as early as in the mid-to-late 1800s, major companies have tried to give back to society while bolstering brand reputation. American economist Howard Bowen (1953) introduced the term "Corporate Social Responsibility, and the US Committee for Economic Development (1971) coined the concept of the "Social Contract" between businesses and society.

Over 2.000 universities and colleges world-wide

The International Association of Universities (IAU) with its over 640 member universities world-wide, has engaged itself for Agenda 2030 and its implementation, in collaboration with the Association of Commonwealth Universities and the Agence Universitaire de Francophonie. These three global university networks, with their *over 2.000 institutions*, have

called on the higher education sector to adopt policies which maximize their contribution to the Agenda 2030 across teaching, research and community engagement, and to incorporate education about and for sustainable development into undergraduate curricula. And IAU has designated 16 universities, each taking on one of the first 16 SDGs, and each in collaboration with a dozen or so allies for its specific purpose, but with an awareness of the dynamic interaction between all ingredients of the system.

Work on goal 17, which will consist of multiple organizations working together, is led by IAU. Gradually, additional institutions will be invited on board. The Cluster will be supported, monitored and steered by an IAU Working Group.

The European Network Occupational Safety and Health

SDG 8 aims at "promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all". This contrasts sharply with our current world´s labour market reality. Un- and underemployment remains high (ILO, 2019; UN, 2020) "Working conditions are often precarious and pathogenic, and in some countries child labour and slavery are not yet under control. As summarized by ILO, "*unemployment and decent work deficits remain high*" (ILO, 2019).

The resulting cluster of challenges to higher education inspired a major Conference on "Rethinking Higher Education, inspired by the Sustainable Development Goals", organised by Karolinska institute in collaboration with University of Gothenburg, Chalmers University of Technology and Royal Swedish Academy of Sciences (Karolinska institutet, 2019).

One of the Conference´s Workshops, "Decent work and economic development", subsequently developed into a Task Group: "SDG 8 – Promoting decent work and productive employment through Higher Education", recently endorsed by the ILO-led "Global Occupational Safety and Health Coalition". This task group comprises a dozen international experts and is managed by *Johannes Siegrist* (University of Duesseldorf) and the ENETOSH Group "Mainstreaming OSH into Education", coordinated by Dr. Ulrike Bollmann (Dresden).

The Task Group aims to collect and analyse examples of the implementation of SDG 8 in higher education, establishing links to SDG 3 and focusing on the quality of education SDG 4.

Involvement of the World Health Organisation (WHO)

The adoption of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals have provided a framework within which to strengthen actions to improve health and well-being for all and ensure no one is left behind. Despite overall

improvements in health and well-being in the WHO European Region, inequities within countries persist (WHO, 2019).

The WHO report identifies five essential conditions needed to create and sustain a healthy life for all: good quality and accessible health services; income security and social protection; decent living conditions; social and human capital and decent work and employment conditions. Policy actions are needed to address all five conditions. WHO´s Health Equity Status Report also considers the drivers of health equity, namely the factors fundamental to creating more equitable societies: policy coherence, accountability, social participation and empowerment.

Based on the above, WHO´s Regional Committee for Europe (2019) in its resolution on "Healthy, Prosperous Lives for All", requested its Regional Director:

- To support Member States in placing health equity at the centre of sustainable development and inclusive economies.
- To take the lead in exploring ways of bringing together policymakers from other sectors responsible for the determinants of health, including education, housing, employment, the environment, and poverty reduction, in order to develop a systematic approach to taking action.

Words do not cook rice: next steps

According to the Agenda 2030´s Target 4.7, it should be ensured that "by 2030 all learners (should have acquired) knowledge and skills needed to promote sustainable development". And the European Commission´s Strategy on CSR aims at "integration of CSR into education, training and research." It is obvious that such targets fit exceedingly well into the aim of this European Journal for Workplace Innovation.

But as a Chinese proverb formulates it: "words do not cook rice." There exists a very considerable gap between what we know, and what we implement (Levi, 2017).
Recognising the university sector's potential and responsibility to help shape the moral contours of society for the better and given the societal benefits from increased social capital, universities and institutions of higher education should shoulder their role as key agents of change, as stated in the Compostela Group of Universities' Poznan Declaration (2014). They should, inter Alia:

• Endorse a cross-faculty approach to broaden the curricula to include components of critical-ethical analysis and systems thinking (and, of course, Agenda 2030 based thinking, my addition).
• Appreciate the unique opportunity they have to shape professional identities. At universities, the norms and boundaries of acceptable behaviour are to a large extent

set for a number of professions. Universities have a possibility as well as a responsibility to help shape the normative contours of society for the better.
• Teach the teachers through the provision of pedagogical resources and training to a wide range of faculty.
• Develop partnerships with other universities, networks, national authorities for higher education and civil society organisations championing the critical-ethical agenda.
• Co-ordinate with national education authorities and social partners with regard to fulfilling the state's obligation under the UN Agenda 2030 SDGs.
• Talk the talk and walk the walk. In addition to teaching critical-ethical behaviour and promoting systems thinking, it is crucial that higher education institutions: as agents providing public goods, act accordingly, ensuring impartiality in teaching, student assessment and research and that matters regarding awards of degrees, employment and promotions are based on legitimate, transparent and objective criteria.

The Poznan Declaration was issued in 2014, i.e., one year before Agenda 2030. As mentioned above, an important addition to the declaration would be the Agenda´s Target 4.7: "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship."

Low costs, high gain

Considering the relatively low costs of implementation and the possible very considerable societal gains if these proposals are implemented broadly, this initiative has the potential to be extremely cost efficient in the long term. More important, however, is that, ethically, it is the right thing to do.

This is why we propose additional high-level conferences on such issues, with a focus on the implementation of Agenda 2030 (what should be taught, and how). Based on the outcomes of these, recommendations should be made regarding the necessary redesign of all higher education: - and for its subsequent and urgent implementation.

Acknowledgement
This article is based on contributions by Professor Bo Rothstein and the author to the World Academy of Art and Science and Roma Tre University's International Conference in Rome on 'Future Education' in November 2017, the European Commission's Working Group Meeting in Brussels in December 2017, an article for the University World News on November 9., 2018 and on Levi, L.: Stressors at Work and Elsewhere – A Global Survival Report. Contentment. New York: The American Institute of Stress, 2020 (pp. 46-51).

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High and rising senior employment in the Nordic countries

Bjørn Einar Halvorsen

Abstract

The employment of older workers is high and rising in the Nordic countries, and most seniors have flexible access to employment or retirement from their early sixties on. However, there is still potential for further improvements, even in the Nordic countries. The article describes and analyses this development, and the main policies and reforms behind it in the Nordic countries over the last 20 years. The article is built on a report to the Swedish Governmental Delegation for the Promotion of Older Labour.

Keywords: Senior citizens, job longevity, work environment, employment conditions and retirement in the Nordics

Introduction

Most seniors in the Nordic countries continue in gainful employment beyond the age of 55. This results in a high employment rate of older workers, compared with most other countries in Europe. In addition, the employment of older workers is rising remarkably over time. Much of this is due to the fact that new cohorts of seniors are consistently living longer, have better health and education, and many of them have had less physically demanding and health-risky jobs and working lives than previous generations of older workers.

The high and rising employment rate of older workers in the Nordic countries can also to some extent be explained by the *policies* that have been implemented in key areas. In some contexts, there is talk of a "Nordic model" for the economy, working life, social security and welfare. So also when it comes to older workers` employment and retirement. Much has been done when it comes to active and inclusive labour market policies, early retirement and pension reforms. However, more could be done by promoting employers to retain and hire older workers, and by promoting their employability throughout the whole of working life.

This article describes and analyses what is happening in the Nordic countries in respect of:

- High and rising employment and good working conditions for most older workers, but also potential for further improvements

- Economic policy aimed high employment and low unemployment
- Active and inclusive labour market policy and curbed early retirement
- Pensions- and retirement reforms
- Encouraging employers to retain and hire older workers
- Promoting employability throughout the whole working life
- Summary and concluding remarks

The article focuses on major national strategies, reforms and campaigns, as opposed to local measures at individual enterprises and workplaces. The text is mainly descriptive. The ambition is not to reveal causal relationships or effects of policies. This should be a task for closer research, I hope.

High and rising senior employment, but still room for improvements

The employment rates of older workers have increased markedly in the Nordic countries during the last 20 years (figure 1). The only exception is Iceland, where the employment rates of older workers are stable or slightly decreasing, but at a very high level. Except for Denmark, the employment of older workers also increased during the global financial crisis 2008-2010. We can hardly see any signs of the previous "lump-sum fallacy of labour" from the crisis about 20 years earlier, where a strategy was to try to reduce youth unemployment by extended early retirement of seniors.

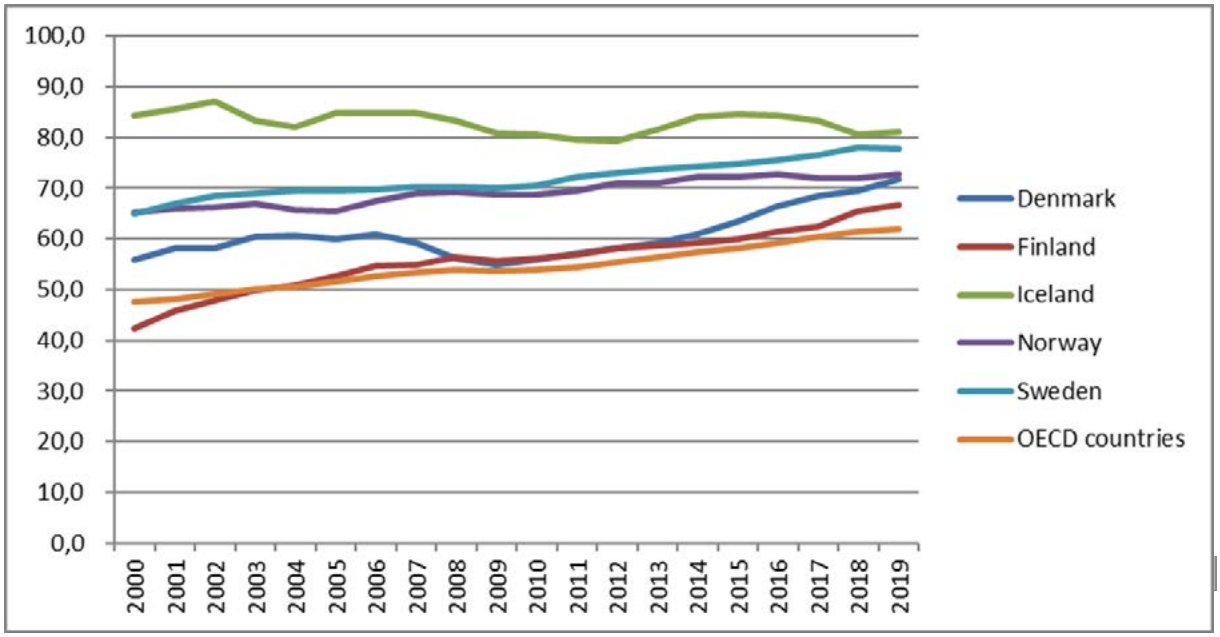

Figure 1. Employment rates 55-64 years old* in the Nordic countries 2000-2019
*Per cent of the population in each age group. Source: OECD Employment database

The employment rates of older workers are highest in Iceland, followed by Sweden and Norway. They are lowest in Finland and Denmark, but the senior employment rates have

increased most in Denmark and Finland. The employment rates in the age group 55-64 in the years 2019/2000 respectively were: Denmark 72/56, Finland 67/42, Iceland 81/84, Norway 73/65, Sweden 78/65 and OECD total 62/48.

The employment rates are relatively high among *both men and women* in the Nordic countries, with relatively small differences between the sexes (*figure 2)*. In Finland there is even slightly higher employment among women than among men in this age group (55-64). The employment rates (%) among men / women respectively in this age group in 2019 were: Denmark 76/68, Finland 65/69, Iceland 87/75, Norway 77/69, Sweden 80/76.

In other European countries with relative high employment rates, they have greater differences between men and women (Germany, Netherlands, Switzerland, Czech Republic). In other European countries, the employment rates are considerably lower among both women and men (Belgium, France, Italy, Greece and Poland). The average employment rates for all OECD countries in 2019 was 71% among men and 54% among women aged 55–64 years old.

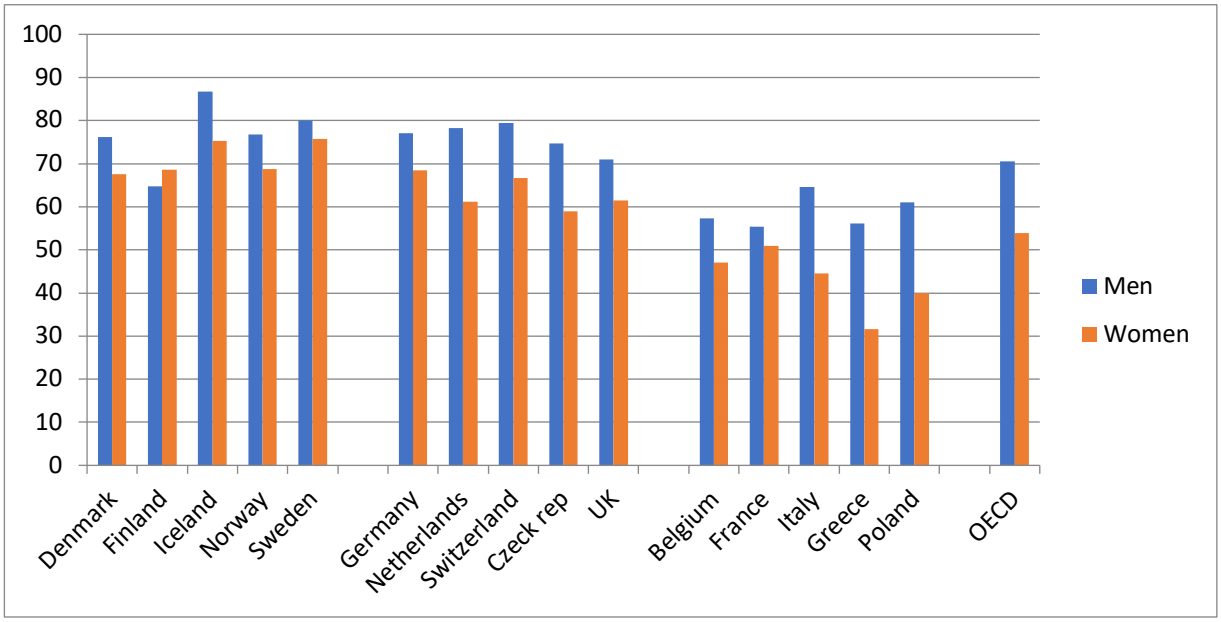

Figure 2. Employment rates 55–64 years. Men and women. Selected OECD countries 2019

Table 1 shows employment (%) in five-year age groups between the ages of 55 and 75 years in the Nordic countries in the years 2000 and 2019. There has been strong employment growth in all the senior age groups in all Nordic countries, except for Iceland, where they are slightly decreasing. The increase has been especially high among people in their sixties.

Table 1. Senior employment rates in the Nordic countries. Percentage of five-year age groups

	Denmark		Finland		Iceland		Norway		Sweden	
Age group	2000	2019	2000	2019	2000	2019	2000	2019	2000	2019
55-59 years	73	83	59	79	88	84	77	80	78	85
60-64 years	34	60	23	54	80	78	54	65	48	70
65-69 years	8	22	5	15	49	50	18	30	15	24
70-74 years	4	8	2	7	17	15	4	7	6	11

Source: OECD Employment database 2019. Labour force surveys (LFS)

There are stepwise decreases in employment rates around the ages of 60, 65 and 70 years in all the countries. This is at the ages where it was previously normal (or compulsory) to retire. This means that there is potential for higher employment among people also older than 60 years in the Nordic countries in the future.

Table 2 below shows a number of supplementary indicators for the situation in the labour market and working life environment, for seniors in the Nordic countries and for the OECD.

Table 2 Working life indicators for older workers in the Nordic countries and OECD 2018

	Denmark	Finland	Iceland	Norway	Sweden	OECD
Employment rate 55–74 years (%)	52	49	69	56	58	51
Employment gap W/M 55–64 years (%)	9	-2	11	8	4	14
Part-time job 55–64 years (%)	15	16	19	24	21	20
Temporary job 55–64 years (%)	4	9	3	2	7	7
Self-employed (%)	10	17	19	8	14	21
Retention rate 60–64 years (%) 1)	50	51	80	70	64	47
Hiring rate 55–64 years (%) 2)	8	10	5	4	9	9
Unemployment 55–64 years (%)	4	7	2	2	5	5
Of which unemployed > 1 year (%)	42	40	27	31	29	46
Higher education 55–64 years (%)	29	40	31	34	33	27
Participated in learning 55–64 years (%)	44	40	..	54	57	42

Source: OECD Older Workers Scoreboard 2018
Notes: 1) The proportion of workers aged 60–64 years who were in the same job five years earlier.
2) Proportion of workers aged 55–64 years who have been employed for less than one year in the same job.

Table 2 indicates that working life quality for older workers is generally good on average, as measured by these indicators. There are also certain nuances and differences between the Nordic countries. The table shows that:

- *The employment rate among people aged 50–74 years* is higher than 50%, and highest in Iceland, followed by Sweden and Norway.
- *The employment gap between older women and men* is fairly low: 8–10% difference in Denmark, Norway and Iceland, and 4% difference in Sweden. Finland has slightly (2%) higher employment among older women than among older men.
- The proportion of seniors (55–64) in *a part-time job* is quite low, and varies between 15% (Denmark) and 24% (Norway).
- The proportion of older workers (55–64) in *a temporary job* is lower than 10%, and is especially low in Norway, Iceland and Denmark (2-4%)
- The proportion of *self-employed* older workers (55–64) varies between 8–10% in Norway and Denmark and as high as 17–19% in Finland and Iceland respectively.
- More than 50% of older workers (60–64 years) have been *in the same job for more than five years*. This retention rate is highest in Iceland (80%), followed by Norway (70%) and Sweden (64%).
- Less than 10% of older workers (55–64) have recently *been hired for a new job*. They have been employed in their current position for less than one year. Iceland and Norway have the lowest hiring rates, and Finland and Sweden have the highest ones.
- *Unemployment* among older workers (55–64) is low. It is lowest in Iceland and Norway (around 2%) and highest in Finland (7%).
- By contrast, *the proportion of long-term unemployed (> 1 year)* among the unemployed older workers (55–64) is high: About 25% in Iceland, 30% in Norway and Sweden, and 40% in Denmark and Finland.
- The proportion of older workers (55–64) with *higher education* is around 30% in all the Nordic countries except in Finland, where 40% have higher education.
- Between 40% (Finland and Denmark) and 50–60% (Norway and Sweden) of older workers (55–64) have participated in *learning activities* during the last year.

The OECD report *Working Better with Age (2019)* gives a broad status and analysis about the situation and development for older workers in the OECD countries. The report confirms the relatively good situation and development in the Nordic countries. The conclusion is still that all countries: the Nordics included, should take further actions to boost the job opportunities at an older age. OECD recommends governments to take further actions in three broad areas:

- Rewarding work at an older age
- Encouraging employers to retain and hire older workers
- Promoting employability of workers throughout their whole working lives

Most political focus and reforms have been implemented within the first one of these broad areas, mainly by better work incentives, pension reforms and early retirement reforms. However, more can be done especially within the two other areas, says the OECD. Within the second area by addressing negative ageist attitudes and age discrimination in recruitment, promotion and retention, and by encouraging good practice by employers and leaders in

managing an age-diverse workforce. Within the third area by improving lifelong learning and skills recognition, by improving working conditions and job quality at all ages, and by providing effective employment assistance for older workers facing job loss or wish to find another job. These are important challenges and areas for improvement in the Nordic countries as well.

Economic policy aimed high employment and low unemployment

An important underlying factor behind the high and rising employment of older workers in the Nordic countries is the proactive, stabilising and inclusive economic policy that has been pursued. This has led to stable economic growth, high and stable employment, and low unemployment rates in countries.

Like most other countries, the Nordics suffered a sudden decline in the economy during the global financial crisis of 2008–2010, but the economic development stabilised rather quickly thereafter. The financial crisis had greater impact on the economy of most other Western OECD countries than in the Nordic countries, except for Iceland. The reasons are related to the economic policy and the labour market systems in the Nordic countries. Important advantages in the Nordic countries include:

- Stable, predictable institutional framework conditions
- Stabilising fiscal policy and monetary policy
- Tripartite collaboration on pay, employment and social welfare
- Active labour market policy
- A relatively high overall level of education in the population
- Social security for all through universal and relatively good social insurance schemes

This both presupposes and entails joint responsibility and mutual trust among people and between the people and the governmental institutions. (Andersen, Dølvik & Ibsen, 2014)

Active and inclusive labour market policy and curbed early retirement

All the Nordic countries pursue an active and inclusive labour market policy and working environment policy, on the basis of good regulations and institutions. Most policies and instruments are *universally designed*, with mainly equal individual rights and duties for everyone, regardless of their age, gender and other characteristics. Older workers are covered by the universal instruments in the same way as everyone else. There are also a number of measures and programmes that target older employees and jobseekers in particular. The situation for seniors on the labour market in the Nordic countries must therefore be considered in light of both universal schemes as well as more targeted programmes.

Denmark: Denmark has attracted international interest for its *"flexicurity model"* in the employment market ("easy to hire and easy to fire"). This entails relatively weak, by Nordic standards, employment protection rights, combined with fairly good social insurances and a very active labour market policy. Denmark's labour market policy in recent years represents something of a U-turn from its previous policy of encouraging early departure from working life. The voluntary early retirement pension scheme (*"efterløn"*) and other early retirement pensions have gradually been reformed and curbed, in favour of good incentives to continue working for longer. A number of political package deals have been assessed, processed and implemented. *The Employment Reform (2015)* was specifically aimed at people over the age of 50 at risk of long-term unemployment and possibly falling out of the labour market.

Finland: Finland's working life policy in the 2000s has mainly focused on addressing a combined stagnation and transition in the economy, combined with extensive early departure from working life. Several programmes and schemes have been implemented to promote a return to work and retraining for a new job and education in connection with staff cuts. In addition, there have been various working environment programmes to promote human relations management with a focus on older workers and a life-cycle approach, as well as for a good health and quality situation at the workplaces. An "unemployment tunnel" of extended and longer unemployment benefits for older people (55-65) into retirement has gradually been dismantled.

Iceland: The labour market in Iceland is quite flexible. There have been enormous changes in the wake of the financial collapse in 2008–2010. Iceland has the highest employment rate and lowest unemployment rate in the whole OECD area. Iceland has mainly *not* implemented new types of extensive active labour market measures. However, the government has recently drawn up a policy to help more older workers stay even longer in the workforce. Older workers can gradually switch to less physically demanding jobs and perhaps slightly less responsibility and a slower pace: in a mutual understanding of their own and the company's preferences. There is however, a significant early departure from working life by a disability pension.

Norway: Tripartite collaboration between the government and the social partners by income negotiations and in the labour market- and social policies is essential in Norway. This has led to good overall achievements when it comes to employment and working conditions, and not the least for older workers. The Labour and Welfare Administration (NAV) offers a number of types of labour market measures, and NAV also offers all types of public social insurance benefits for all Norwegians. Older workers are not a certain priority group for active labour market schemes, but they are overrepresented among the long-term unemployed, which is a priority group. There is widespread early departure from working life through disability pension in Norway, however. Much of this has its background in restructuring and downsizing of enterprises and workplaces (Halvorsen, 2019).

A government-appointed *Employment Committee* has last year delivered a preliminary report on improved policies and measures that can contribute to more people working and fewer people ending up on disability benefits (NOU 2019:17)

Sweden: There are few ALM programmes that are specifically aimed at seniors in Sweden. However, how they are implemented, dimensioned and practised can often be adjusted to target specific groups, such as older workers and long-term unemployed. Sweden has had good results by using positive economic incentives to promote employment of older jobseekers and other more vulnerable groups in the labour market. Sweden has also a good tradition and good achievements by working systematically with managing organisational restructuring and downsizing in businesses and working life in the best possible way for affected employers and employees. There was previously a high prevalence of sickness absence and disability retirement in Sweden. Introduction of guideline-limits on the duration of sickness benefit and an active rehabilitation chain are the key reform elements to curb this trend. The result is lower sickness absence and fewer people on disability pension, but on the other hand also higher unemployment and more people receiving social cash benefits.

Pensions and retirement reforms

There have been, and continue to be, extensive pension reforms implemented in all the Nordic countries. The main objective is to make the pension systems more sustainable in the long term with good intergenerational balance of benefits and costs. Incentives and mechanisms to stimulate to longer working lives and greater flexibility in the transition between work and retirement are central.

Denmark: *The retirement reforms* in Denmark have mainly focused on gradually raising the official retirement age and early retirement ages, and shortening the maximum period of early retirement pension:

- The general retirement age is going to be raised gradually from 65 years to 67 years.
- The voluntary early retirement pension age is being raised from 60 to 62 years.
- Longevity indexing of these age limits for receiving a pension in the longer term.
- Reductions of voluntary early retirement pension against old-age pension.
- More favourable reduction of old-age pension against earned income.
- "Seniors early retirement" for people who have less than five years until they reach retirement age and who are no longer able to continue working.

Work has also been initiated to simplify and improve the incentives to carry on working in respect of means-testing and reduction of different types of pension benefits against each other and against earned income. A new *"years-of service" early retirement pension* will be implemented from 2022, targeted towards persons 61 years and older with long and physically hard-working lives behind them.

Finland: Finland has implemented several pension reforms and has others in the pipeline. The main objective is more sustainable pensions in the long run by encouraging higher employment and a longer and better working life for older workers. *The 2017 pension reform* shall contribute to this, while ensuring adequate income for future retirees. A longer working life will yield higher annual pensions. The earliest possible retirement age is gradually being raised from 63 to 65 years up to 2027. From 2030, the future retirement age will be indexed in accordance with development in the expected remaining life expectancy of the relevant age cohorts. The reform also introduces incentives to continue working beyond the retirement age. Longevity indexation of accumulated pension rights earned from work has been introduced.

A flexible partial pension can be drawn as 25% or 50% of the accumulated pension from the age of 61, and from 64 years for people born in or after 1964. This lower age limit will also be indexed on the basis of expected remaining life expectancy starting from 2030. *A new "years-of-service pension"* was also introduced in connection with the 2017 pension reform. The pension is targeted towards older persons (61+) with reduced work capacity after long and physically demanding working careers.

Iceland: The general retirement age is 67 years, with a requirement of 40 years' residence to receive a full basic pension and 40 years' accumulation of pension savings to qualify for a full supplementary pension. The law on mandatory supplementary pension (occupational pension) entered into force in 1998, so no-one has yet earned a full supplementary pension. The earned supplementary pension can be drawn from the age of 60 years or deferred up until the age of 72 years, against deductions from - or additions to the annual pension respectively. From 2018, it is possible to draw half the supplementary pension against a corresponding reduction in working hours. The government aims to rise the general retirement age gradually from 67 to 70 years.

Norway: *The 2011 pension reform:* The overall pension system in Norway has gradually been reformed since 2011, inspired by the Swedish pension reform some ten years earlier. The objective is a more sustainable system with better intergenerational balance. The main elements of the pension reform in the Norwegian National Insurance Scheme are:

- Pensions earnings on all earned income throughout the entire working life. 18% of the annual work income up to a certain threshold is saved into an individual pension account, which is to be distributed over all the years of retirement.
- A guaranteed minimum pension for people with low pension earnings. Minimum level approx. NOK 200,000 (EUR 20.000) with 40 years' residence in Norway, and a lower level with shorter length of residence. Reduced by 80% against the earned pension.
- Flexible retirement age and pension withdrawals between the ages of 62 and 75, based on cost neutrality. Early pension withdrawal results in a lower annual pension, and vice versa.

- Longevity indexing of the accumulated pension account. Increasing longevity leads to lower pension per year, or you have to work longer for a certain pension level per year
- Accumulated pension assets are indexed in line with the overall wage increases, while the paid pension is adjusted 0.75% lower than the annual wage increases.

Pension payments are not means-tested (reduced) against income from work. Individuals are free to draw pension and continue working. Supplementary contractual pensions and occupational pensions are gradually being adapted to the reformed Norwegian National Insurance Scheme.

Sweden: The Swedish pension reform that took place some 20 years ago has acted as a template for pension reforms in many other countries. The core of the reform was to combine good characteristics of a defined-benefit system and a defined-contribution system. The main elements of the reform are:

- A transition from a "defined-benefit" system to a "listed defined-contribution" system. An annual pension premium of 16% of the annual income is accumulated over the individual's entire working life, in an individual pension account that is to be distributed over the expected number of years of retirement - The General Pension (AP).
- The individual's pension earnings are proportional with their annual income, with premiums paid over their entire working life, as compared with the previous system based on the income in the 15 best of 30 years.
- Flexible access to draw a full or partial pension from the age of 61 years. The longer the individual waits to start drawing their pension, the higher the annual pension they receive.
- A fund-based, individual, premium pension was introduced. 2,5 % of the annual income is paid into an investment fund with individual investment choices.
- Guaranteed minimum pension from the age of 65 years for people with low or no earnings in the General Pension (AP) scheme.

The future rules regarding retirement age and age limits will be linked to the development in average life expectancy through a "target age" (*"riktålder"*) system. This means that all the age limits in the pension system and in the rest of the social security system will be linked to life expectancy. The lowest age at which people can start drawing the general pension (AP) is going to be raised gradually from 61 years to 64 years. The age from which the guaranteed minimum pension can be drawn is going to be raised gradually from 65 to 66 years and eventually up to the future new "target age".

Encouraging employers to retain and hire older workers

> «Employers play a key role in promoting longer working lives by offering older workers good employment opportunities. However, they may be hesitant to retain and hire older workers because of actual or perceived gap between the costs of

> employing older workers and their productivity. They may also have stereotypical views about the lack of adaptability and flexibility of older workers. Public policy in OECD countries have addressed these challenges in three main ways: action to ban age-discrimination; measures to facilitate retention and hiring (….); and encouraging the use of age management practices to enhance the employability and productivity of older workers. » (OECD, 2019, chapter 4)

Most initiatives and reforms to increase the labour market participation of older workers have so far been implemented on the *supply side* of the labour market. In particular by strengthened work incentives in pension reforms and active labour market measures. There have been fewer and weaker initiatives on the *demand side* of the labour market. Namely by encouraging employers to retain and hire older workers. Employers are usually more willing to retain than to hire older workers. The retention rates of older workers are pretty high and the hiring rates pretty low in the Nordic countries (OECD, 2019, and table 2 in this article).

Age discrimination in the labour market is forbidden by law in the Nordic countries, but age stereotypical attitudes and behaviour exist (SOU 2020:69). This is most common when it comes to recruitment and hiring processes. Employers and line managers often appreciate their older employees, because of their work experience, loyalty, stability and responsibility. But they are more hesitant to hire older workers: the main reason may be actual or perceived obsolete competence and reduced productivity.

In three of the Nordic countries: Denmark, Norway and Sweden, the governments have set up national and tripartite anchored institutions to provide knowledge-based information, advice and awareness-raising about such kinds of issues and questions:

Denmark: *The Seniors Think Tank for a longer, good working life*.[1] The Think Tank was set up in 2018, with the objective to help ensure that seniors can have a better and longer working life, and to get more people to defer starting to draw their pension.

Norway: *Centre for Senior Policy (CSP).*[2] CSP is a national resource centre that aims to stimulate the integration and promotion of a senior's perspective in companies' human relations (HR) policy and management.

Sweden: *Delegation for Senior Labour.*[3] The delegation was set up by the Government in 2018 to promote older workers, counteract age discrimination, and identify opportunities to make better use of older workers' experience and competencies. The objective is to work for a more inclusive and age-neutral working life.

[1] www.seniortaenketanken.dk
[2] www.seniorpolitikk.no
[3] www.seniorarbetskraft.se

The Danish think tank and the Swedish delegation completed their work in 2019 and 2020 respectively, while the Norwegian CSP is permanent. However, the two former institutions in their final reports have recommended some kind of permanent solutions for such purposes in Denmark and Sweden, like there is in Norway.

The Danish Think Tank has published a range of analyses, and good practice examples of senior policies and how to improve the senior policy at enterprise level. Their final report contains 20 concrete recommendations to the government and the social partners about how more seniors can experience more good years in working life. The first and main recommendation is that the Government and the social partners should establish a permanent partnership for further increasing of senior employment. Developing a system for experience- and real-competence judgement and qualifications is another recommendation. Local jobcentres (PES) should be given improved opportunities and options for practical competence-judgement and further qualifications (Seniortænketanken 2020)

The Norwegian Centre for Senior Policy (CSP) is tasked with promoting, gathering and informing about scientific research as well as first-hand cases and good practical examples of senior policy in the working life. CSP initiates research and pilot projects, they arrange seminars and conferences and issues publications on senior policy questions. A *«Senior Policy Barometer»* containing systematized attitudes among employees and employers/leaders is each year being issued, presented and discussed by the social partners, policy makers, enterprises and researchers. (Norsk Seniorpolitisk barometer, 2019 and 2020). A core priority for the CSP is also to stimulate good human relations policy and -practice with a good life-long perspective. Such kinds of studies and projects are being carried out in a practical setting in specific sectors and branches of the labour market, such as industry-, trade-, education -and care sectors.

The Swedish Delegation for Senior Labour has published a number of papers and reports on different kind of issues pertaining to senior workers. The delegation also undertook study- and co-operation visits to labour market organisations and enterprises, in order to learn about- and provide information on current senior policy issues and programmes. The «delegation ambassadors» have published articles and made presentations about such issues in the mass media, and have participated actively in public debate. The Delegation`s main, final considerations are that (1) the competencies and experiences of senior workers should be better acknowledged, appreciated and used, (2) a longer working life presupposes lifelong learning, and (3) formal age limits and regulations are affecting the length of the working life. Their main recommendation is to continue and develop the knowledge and information about seniors and work, and to influence attitudes and behaviour on a permanent basis (SOU 2020:69)

Promoting employability throughout the whole working life

The OECD-report *Working Better with Age (2019)* pointed out skills development and lifelong learning as an important area for further development and improvements of the future employment of seniors and older workers:

> «The best practice for strengthening employability and job opportunities at an older is to provide equal opportunities for workers to continuously upgrade their skills, recognise skills acquired throughout their working lives and improve working conditions at all ages. This prevention strategy should be the motto of a work culture promoting longer and better working lives. » (OECD, 2019, chapter 5)

Results from the OECD Survey of Adult Skills (PIAAC) suggest that older workers across the OECD are not, on average, well equipped to deal with changes in skill requirements brought about by technological progress and globalisation. The ability to solve problems in technology-rich environments are, still on average, markedly lower than among their younger colleagues. This is to a certain extent the situation in the Nordic countries as well (OECD, 2016). Older workers with less recent vintages of skills are particularly exposed to the risk of skills obsolescence. In addition, older workers participate far less than younger workers in job-related training, (OECD, 2019). Older jobseekers have also often severe problems by getting a new job after enterprise restructuring and downsizing. A lot of them leave the labour market into (too) early retirement (Halvorsen, 2019).

Such challenges are broadly acknowledged in the Nordic countries, and highlighted in several governmental policy documents and initiatives. Some concrete policy initiatives have also been implemented, but more could be done, especially in practice and at the enterprise level.

Here are some examples of recent national initiatives and programmes in the Nordic countries: (source Halvorsen, 2020)

The Danish public employment centres (PES/Jobcentre) provide a wide range of active labour market service measures in their toolbox. Among them also several programmes for job-oriented adult training, learning and education, both for jobseekers as well as for employed workers. The programmes contain both short-time job-training courses and vocational educations, as well as supplementary educations up to bachelor-level. The duration varies from 3-4 months up to 3-4 years. Most programmes are free of charge, and the participants usually receive a wage- or financial support during their participation in training or education programmes. For academic education you usually do not receive a wage remuneration, and usually you have to pay a subsidised participant´s fee.

In Finland there are several programmes and initiatives to promote reemployment after redundancy, such as the «*New security, new skills*» programme. This is a programme that provides early intervention in the form of personal advice, guidance, support and follow-up services for workers who are laid off or made redundant; organisational restructuring, as well

as for employers and line managers, to help them carry out such restructuring processes in a best possible way. The programme is more tailored towards white-collar workers than towards blue-collar workers. Finland has also several national and local initiatives and programmes focusing on age-based and life-cycle-oriented work management and quality. A *National Working Life Development Strategy* aims at increased employment, productivity and quality in the working life, as well as employee`s wellbeing at work. A programme named «*Competence Based Qualifications»,* recognises competencies acquired during the worklife, and offers the possibility to complete a vocational upper secondary qualification, further vocational qualifications and specialist vocational qualifications.

In Iceland a new law on adult education was adopted in 2010. The goal is to raise the level of education in the adult population, and especially among people with little formal education. The principle is that everyone should have the opportunity to take education, and develop their competences during their whole lives.

In Norway there is an ongoing tripartite *National Competence-policy Strategy* (Nasjonal Kompetansepolitisk Strategi for 2017-2021). Lifelong learning and competence acquirement at work is one of the (3) main goals for the strategy. Among the more concrete initiatives are: Strengthen and develop the digital competence in the entire workforce. Strengthen and develop vocational education and career ways. Improved regional career-guidance services. More active use of training and competence-building measures in the labour market- and integration policies. Strengthen the PES`s (NAV`s) learning- and training services for jobseekers who need better qualifications to get a job. The Government in 2020 launched a White Paper for the Parliament on *Competence reform on lifelong learning* (Melding til Stortinget 14 for 2019-2020). The main goals are that nobody should be outdated because of lack of competence, and to tighten gaps between the workers' competencies and what working life needs. Three main programme-areas for action are pointed out: (1) Financial support to flexible, higher education for adults, (2) Tripartite sector-programmes for competence-development, and (3) Pilot projects for financial incentives for life-long learning.

Sweden has a good tradition of working systematically to handle and manage necessary restructuring and downsizing of enterprises and workplaces, in the best possible ways for affected employers and employees. *The Security Council (Trygghetsrådet TRR)* works as a long-term consult and partner and provides professional counseling, guidance and support to managers, employees and local trade unions during major restructuring or downsizing processes. *The Employment Transition Fund (Trygghetsfonden TSL)* is another, similar agency, more aimed at blue-collar workers than TRR. The achievements of the TRR and TSL services are pretty good: Between 7-9 out of 10 of the affected workers get a new job or a career shift through the co-operation with TRR or TSL. To facilitate the continuous restructuring in the labour market, the government have introduced opportunities for employees to develop and their competencies, or to learn new skills during their whole working lives. A paid period for personal professional development for up to one year will be provided.

In all the Nordic countries, several packages of extended financial support to job-oriented adult training, learning and further education have been launched during the last year, as elements of the Governments` «Corona-pandemic strategies».

Summary and concluding remarks

The employment of older workers is high and rising in the Nordic countries during the last 20 years. The employment rates among people 55 years old and older is highest in Iceland, followed by Sweden and Norway, but have increased most in Denmark and Finland during the last 3-5 years. The senior employment rates are relatively high both for men and women, compared to most other European countries. There are stepwise decreases in employment rates around the ages of 60, 65 and 70 years in all the countries. This is at the ages when it previously was normal (or compulsory) to retire, due to formal retirement ages. This means that there is potential for higher employment among people older than 60 years in the Nordic countries in the future.

The OECD has recommended governments to take actions for further improvements of the seniors` employment in three broad areas (OECD, 2019):

- Rewarding work at an older age
- Encouraging employers to retain and hire older workers
- Promoting employability of workers throughout their whole working lives

Most political focus and reforms have been implemented within the first of these broad areas, mainly by better work incentives, pension reforms and early retirement reforms. However, more can be done within the two other areas, say the OECD. This is relevant for the Nordic countries as well.

An important underlying factor behind the high and rising employment of older workers in the Nordic countries is the *stabilising and inclusive economic policy* that has been pursued. This has led to stable economic growth, high and stable overall employment and low unemployment rates in countries.

All the Nordic countries pursue an *active and inclusive labour market policy and working environment policy*, on the basis of good regulations and institutions. Tripartite co-operation between the governments and the social partners is essential. Most programmes and measures are *universally designed*, with mainly equal individual rights and duties for everyone, regardless of their age and gender and so on. Older workers are covered by the universal measures in the same way as everyone else. There are also some measures and programmes that are more targeted and tailored towards older employees and jobseekers.

A big challenge is the severe ongoing and future s*tructural transitions in the labour markets*. This has accelerated tremendously during the ongoing global corona pandemic crisis. We

know that older workers have great problems in getting a new job after enterprise downsizing, and many of them leave the labour market into (too) early retirement. In Sweden and to some extent also in Finland they have good programmes and results from systematic and proactive support to enterprises, employers and employees who are facing severe restructuring and downsizing. Other countries could be inspired, and learn from their experiences.

Extensive pension reforms have been and are being implemented in all the Nordic countries. The main objective is to make the pension systems more sustainable in the long term, with good intergenerational balance of benefits and costs. Central elements of the pension reforms implemented are improved incentives and mechanisms to stimulate to longer working lives, curbing early retirement schemes, and by giving more flexibility in the transition between work and retirement.

One upcoming pension policy challenge may stem from a bit too one-sided focus on work incentives to the expense of social redistribution purposes of the public pension systems(?) In some Nordic, and other European, countries they are now considering or implementing improved pension solutions for people with low income, unregulated working conditions and insecure labour market participation.

Encouraging employers to retain and hire older workers. Most initiatives and reforms to increase the labour market participation of older workers have so far been implemented on the *supply side* of the labour market. In particular by strengthened work incentives in pension reforms and active labour market measures. There have been fewer and weaker initiatives on the *demand side* of the labour market. Namely by encouraging employers to retain and hire older workers. Employers are usually more willing to retain than to hire older workers. The retention rates of older workers are quite high and the hiring rates quite low in the Nordic countries.

Age discrimination in the labour market is forbidden by law in the Nordic countries, but both age discrimination and age stereotypical attitudes and behaviour exist (SOU 2020:69). This is most common when it comes to recruitment and hiring processes. Employers and line managers often appreciate their older employees, because of their work experience, loyalty and responsibility. But they are more hesitant to hire older workers; the main reason may be actual or perceived obsolete competence and reduced productivity. In three of the Nordic countries: Denmark, Norway and Sweden, the governments have set up national and tripartite anchored institutions to provide knowledge-based information, advice and awareness-raising about such kinds of issues and questions.

Promoting employability throughout the whole working life. Results from the OECD Survey of Adult Skills (PIAAC) suggest that older workers across the OECD are not, on average, well equipped to deal with changes in skill requirements brought about by technological developments and globalisation. This is the situation in the Nordic countries as well. Older workers with less recent vintages of skills are particularly exposed to the risk of skills

obsolescence. In addition, older workers participate far less than younger workers in job-related training, (OECD, 2016).

Such challenges are quite broadly acknowledged on a national level in the Nordic countries, and highlighted in several governmental policy documents and initiatives. Some concrete policy and practice initiatives have also been implemented. But more could be done, especially in practice, on regional-, industry- and enterprise level, and last but not least on the individual level.

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SOU 2020:69 Eldre har aldrig varit yngre – allt fler kan och vill arbeta lengre

About the author

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Sustainable work for health and job longevity[1]

Maria Albin
Theo Bodin
Eskil Wadensjö

Abstract

While improved public health in groups with high or middle socioeconomic status (e.g., educational level) permits many to work for more years, the gap is widening for less advantaged groups, such as those with only compulsory level education. Within manual jobs, individual health status and the challenges of physical demands exceed the physical capacity of many middle-aged, and with a low bargaining power, constitute major threats to job longevity. Artificial intelligence and digitisation are also rapidly transforming the labour market, especially for low-mid grade (level) white-collar workers. Young workers often have insecure job contracts, while older workers may have a permanent position, but have a fear of leaving a safe position for a new one, and ultimately may be forced to leave their job when they are unable to meet the demands. Current economic incentives to prolong working life, often combined with more restrictive unemployment and disability benefits, may overall increase work participation but may also decrease sustainability in the more disadvantaged part of the labour market. Recent research suggests that unemployment is the most important factor behind lost working years among workers with less education, and that primary prevention, focused on the work environment rather than individual health promotion (lifestyle habits), will enhance sustainability together with inclusive welfare systems. Resilience, or reduced vulnerability, in the workforce on a macro- and workplace level can be achieved by well-established societal measures. This paper highlights the tension between two trends: increased expectations on career longevity, and increasing socioeconomic inequalities in health. This is further explored as a gap between job demands and individual capacity, and the risk of being "locked-in" or forced out when facing this scenario. Finally, macro- and micro-level measures to decrease the vulnerability for mainly manual and low-skilled workers are discussed, and more specifically in relation to the sustainable development goal: Decent work and economic growth (SDG 8).

Keywords: socioeconomic inequalities in health; job demands, labour market, resilience, decent work

[1] This paper is partly based on an extended abstract from a research seminar published in Socialförsäkringsrapport (Social Insurance Report) 2020:5 Förlängt arbetsliv – förutsättningar, utmaningar och konsekvenser Rapport från forskarseminariet i Umeå 15–16 januari 2020 (in Swedish).

Better health: but increasing inequalities

Better health and longer lives have increased expectations on career longevity. However, these expectations need to consider the development in different parts of the workforce. While life expectancy overall has increased in Europe since 2000, the health divide between socioeconomic groups has remained constant (Southern Europe) or increased (Western, Eastern and Northern Europe (Health Inequalities in the EU, 2013). In Sweden, the overall health status in the population has dramatically improved over the most recent decades, as reflected in, for example, life expectancy (SOU, 2017). However, the socioeconomic disparities in health have increased[2]. Using different measures of socioeconomic status (e.g., position in the income distribution, educational level) this pattern is consistent for women, and for younger men (Hartman & Sjögren, 2017). The associations between socioeconomic status and health are thought to be mediated through the individual resources in economy, social networks, and knowledge, as well as decision latitude throughout life (Health Inequalities in the EU 2013; SOU 2016): Good/sufficient resources and discretion at critical points in life enhance the likelihood of upward instead of downward trajectories in health and living conditions.

The most remarkable and challenging observation is that life expectancy at age 30 has seen significantly little improvement, or possibly even decreased slightly during the last three years amongst women with only compulsory[3] education (Figure 1). Life expectancy at age 30, was in 2018 by educational level, 57.2 years for women with post-secondary, 54.4 years with upper secondary, and for those with only compulsory education, 51.0 years. It is noteworthy that the variation in life expectancy within each educational level over time differs between levels, decreasing for the highest level, being constant in the intermediate, and increasing in the lowest one. This indicates that health status is not only stagnating but becoming increasingly heterogeneous in groups with low socioeconomic status, while more homogenously improving in the high ones.

[2] Regional differences within Sweden are small, after taking socioeconomic factors into account and tend to decrease. Based on available data the pattern is similar for those born in Sweden and abroad, with essentially the same life-expectancy at age 30 for different educational categories (SOU 2017), but the information is less complete for those born abroad (mortality as well as educational level may be somewhat underestimated).

[3] Compulsory education in Sweden is 9 years from age 7 but was previously shorter (6-8 years). A preschool year from age 6 was recently added, but is not relevant for the birth cohorts discussed in this paper.

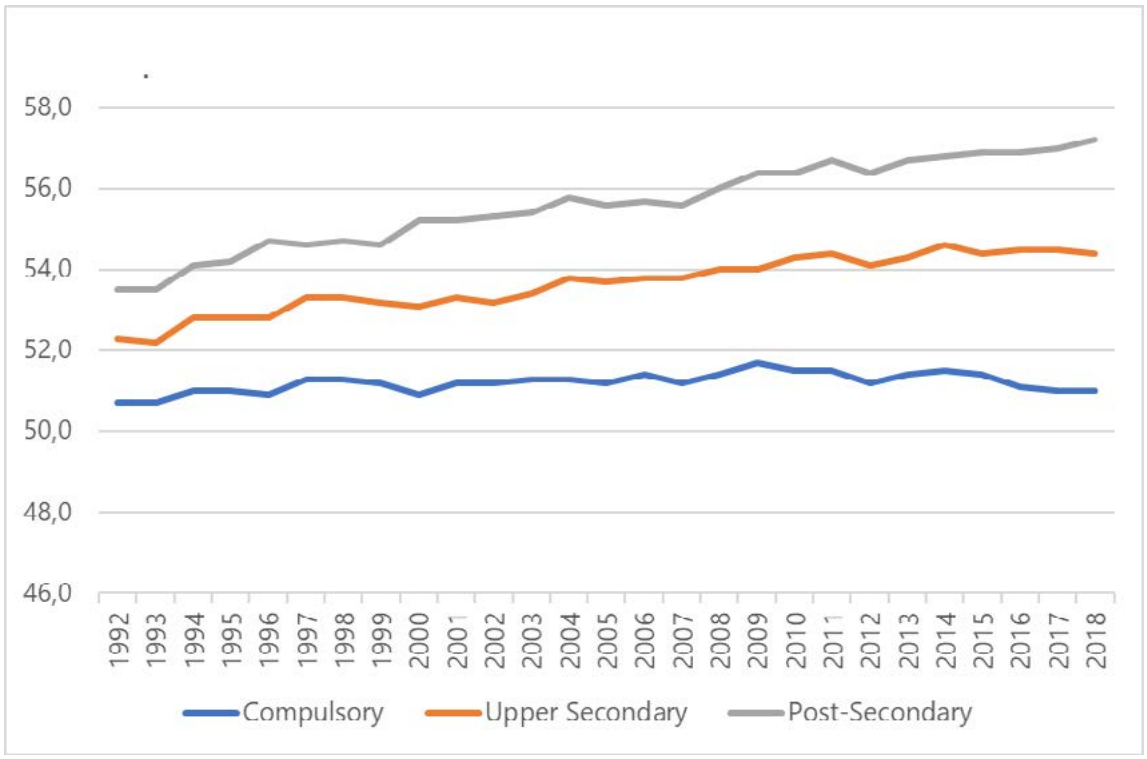

Figure 1. Remaining life expectancy at age 30 by highest attained educational level.
From: Folkhälsodata (Folkhälsomyndigheten, 2020)

In the context of a sustainable working life, healthy life expectancy or years without activity limitations[4] may be more relevant than longevity. Here we find what seems to be an even more accentuated socioeconomic gradient (Figure 2) than that for life expectancy: at age 30, women with compulsory education have on average only 39 remaining years without activity limitations due to poor health, i.e., the average age when you report such limitations is 69 years; for women with a long (3 years or more) post-secondary education the corresponding age is 80 years (SCB, 2018). As seen for life expectancy, this is a gradient, with more expected years without activity limitations for every step of attained educational level. The pattern for men is similar, but the difference between those with the lowest and highest educational level is 10 years, i.e., one year shorter than for women.

[4] Activity limitation is here defined as not being able to perform activities or tasks most other people can do, for health reasons, since at least six months. Based on Global Activity Limitation Indicator (GALI), according to SCB (2018), for details and confidence intervals c.f. ibid, diagram 6.27, and Table 10.

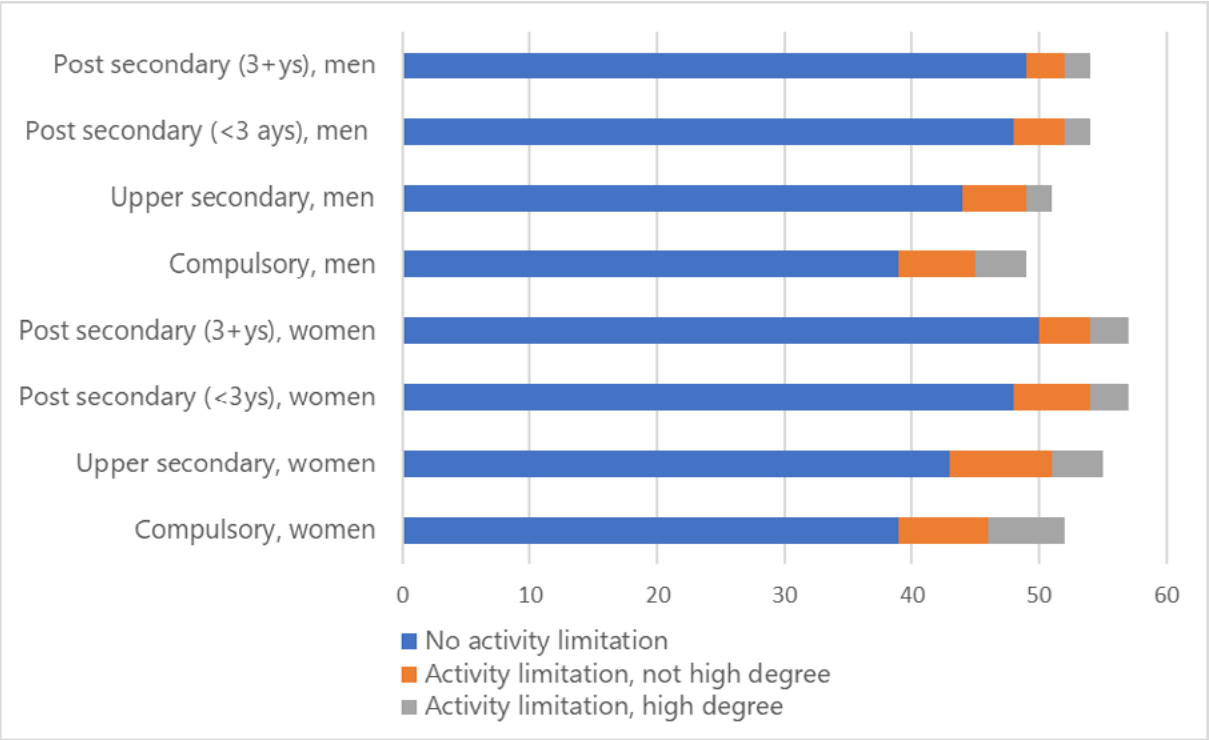

Figure 2. Remaining years with and without activity limitations at age 30, 2016-2017. From Statistics Sweden (2018)

Gaps between job demands and individual capacity

High mental and/ or physical demands characterise many jobs. Excessive demands, either mental or physical, tend to shorten working life. However, the impact will differ over the life span. Generally, excessive mental demands are especially critical at younger ages, but can be better handled by experienced workers who have a better overview and ability to sort out minor from major issues. Slower mental processing can often be compensated for by experience. A wise employer will use this shift in abilities as an advantage. Management research, linking company and employee characteristics in Germany, suggests that age-diversity in a company with age-mixed teams may be associated with higher productivity (Göbel & Zwick, 2010), although possibly mainly for non-routine tasks (complex decision-making, innovation; Backes-Gellner & Veen, 2009).

However, age discrimination in opportunities for skills upgrade and professional development at the workplace may in the long term impair older workers' performance. These practices are often based on stereotypic perceptions of older workers' learning abilities, and underestimation of the rentability of such investments (Eurofound, 2020), but may change with expectations of a higher retirement age (i.e. gradual increase in age limits for employment protection, pension schemes etc).

Normal physiological ageing up to age 75 is, in general, not a limitation in relation to mental job demands (Johansson, 2016; Vingård, 2018).

Physical work demands have a different trajectory. Excessive demands are harmful at all ages, but what is excessive changes as we age. Physical strength decreases from age 40 and on (Kenny et al., 2008), mainly in our legs and torso. Co-ordination of movements, including balance, will also decline, implying a higher risk to fall when losing balance (Torgén, 2016). Many manual jobs have high physical demands, often combined with a low decision latitude. Although jobs with high physical demands are strongly associated with a low educational level, large groups with an intermediate educational level will have physically strenuous work in the health care sector (e.g. nurses). Individual variation in physical strength and vigour is substantial and tends to increase with age, but this is especially relevant for work that requires uncomfortable or static postures or highly repetitive movements which is usually difficult at an older age (Vingård, 2018). As compared to mental demands, experience will to a lesser degree compensate for the physiological aging. Heavy physical work does, in contrast to what is often assumed, generally not enhance physical fitness. In fact, recent research suggests an accelerated cardiovascular ageing[5], also when considering relevant confounders. (Coenen et al., 2018; Holterman et al., 2018)

The prevalence of heavy work is overall decreasing, but the decline is rather slow, e.g. as indicated by Swedish data on reported lifting of heavy objects several times a day (Arbetsmiljöverket, 2016). Such work was especially common among skilled workers (30% of the men, 20% of the women), as compared to 2% and 1%, respectively, among higher white-collar workers. Also, other physically strenuous tasks (uncomfortable or static postures, repetitive movements) were much more common among blue-collar workers.

Physical demands will often exceed individual capacity at older ages, if heavy tasks are not gradually replaced over working life. Studies of physical demands in different age groups are not consistent. However, studies based on actual measurements of the physical load do not suggest such a shift in some jobs of special concern, such as in cleaning and manufacturing (Oakman et al., 2019), construction and care (Merkus et al., 2019), or find that the shift is insufficient in relation to the physical capacity of the older workers in these trades (Merkus et al., 2019).

It is well established that both excessive emotional and physical work demands will increase the risk for early exit from the labour market. An important observation is that a high physical workload interacts with age, so that it is especially harmful for older workers (Burr et al., 2017). Danish manual workers age 50 or more, when asked about opportunities to prolong working life especially highlighted reduced physical workload (Andersen et al., 2020). While poor psychosocial working conditions contribute most to gender differences in sickness absence and disability pension, social inequalities in health-related exit from the labour market seems to be more strongly associated to physical workload (Albin et al., 2017b).

[5] This is hypothesized to occur from an increase in blood pressure and heart rate during work that increases the load on the vascular endothelium and on the heart but is not sufficient to give a training effect.

Another critical aspect of physically demanding work is the fact that an increasing proportion of the active workforce have a chronic disease, partly due to the ageing of the workforce, but also to medical progress. Improved treatment of e.g., cardiovascular disease and cancer means that many more can return to work although they have a serious condition (Albin et al., 2017a). Those diseases will usually limit the individual capacity more in relation to physical than mental work demands. The employment gap between workers with and without chronic disease is substantially higher for workers with a low than with a high educational level, and continues to widen (Schram et al., 2019).

A well-established instrument for predicting future long-term sick-leave, disability pension and exit from the labour market, is the work-ability index, which reflects a perception of having work demands that exceed the individual capacity. A mismatch between demands and capacity may represent work demands that are excessive to most individuals, or an individual limitation. It is rather common, especially in groups with a short education, to report work demands exceeding the physical capacity (Figure 3).

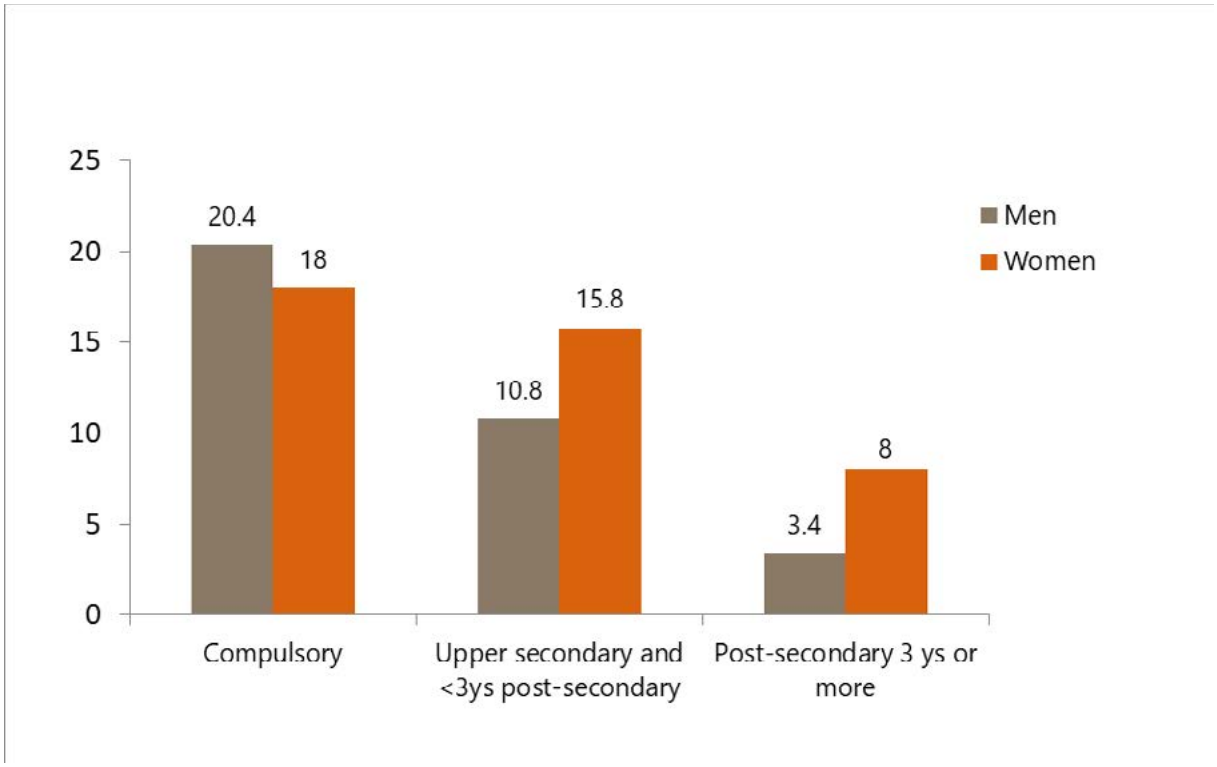

Figure 3. Proportion (%) of occupationally active men and women by educational level, who report that physical work demands exceed their capacity, Stockholm county.
From Centrum för arbets- och miljömedicin (2016).

As expected from the scenarios described above, the proportion reporting that physical work demands exceed their capacity in the population tend to increase with age (Table). On the contrary, the proportion reporting that mental demands exceed their capacity tends to decrease with age, which may at least partly be because experience can make it easier to handle mental demands. A clear concern is that one out of five women 18-34 and 50-64

years of age believe that they will not be able to remain in their present job in two years for health reasons (Albin et al., 2017a, see also Table). It is noteworthy that a decreased workability in mid-life, is predictive of old age disability severity (28 years on) as measured by e.g., self-care ability in daily life (von Bonsdorff et al., 2012).

Table. Proportion (%) of occupationally active women and men reporting that mental or physical job demands exceed their capacity, and proportion believing that they will not be able to remain in present job for health reasons in two years, County of Stockholm (from Albin et al., 2017a).

Work demands exceed capacity	Age 18-34	Age 35-49	Age 50-64	Total
Women				
Physical	12	11	16	13
Mental	19	16	15	16
Not in present job in two years	21	14	20	18
Men				
Physical	6	8	13	9
Mental	11	9	10	10
Not in present job in two years	12	10	16	12

Locked in and forced out?

An obvious solution to a mismatch between job demands and individual capacity is to find a more suitable job. Being in a non-preferred job, but at the same time perceiving poor employability, has been characterised as "locked-in" (Stengård et al., 2016). According to Aronsson and Göransson (1999) one out of four workers with a permanent contract, and every second worker with a temporary contract reported that they were in a non-preferred job. Being in such a job is predictive of developing poorer mental health (Canivet et al., 2017), especially among older workers.

As mentioned before, too high job demands are predictive of early exit from the labour market. On the other hand, older workers often face greater difficulties in getting a new job than younger ones (OECD, 2019). One could thus hypothesise that aging workers, with low employability (i.e., skills in low demand) face both a lock-in (not daring to quit for fear of unemployment) with potential effects on mental wellbeing, but also in the long-run

premature exit (forced out) because they can no longer meet the work demands[6]. In the absence of direct empirical support for such patterns, some indirect indications may be put forward.

A detailed study of lost working years between age 30 and 66 related to educational level from the Netherlands, found that men with a low educational level on average lost 2.6 years due to disability pension, 4.3 years due to unemployment, and less than 1 year due to exit with no income or death. Men with high educational level hade somewhat high losses due to early retirement schemes, studies, or emigration. The pattern among women was similar, but loss due to unemployment was higher (5.2 years) as was exit with no income (3.6 years; Robroek et al., 2020). Importantly, much of the loss already occurred between 30 and 50 years of age, suggesting that early interventions would be most effective.

Studies including the 40 most common occupations in Sweden found that in spite of changes in the old-age pension, with stronger economic incentives to prolong working life, substantial differences remained between occupational groups for loss of work-life expectancy due to disability pension, long-term sick-leave directly preceding disability pension, or death, while differences between men and women had virtually disappeared. In general, the loss of work-life expectancy was highest for unskilled manual occupations, and lowest among white collar occupations requiring a high educational level, with a difference of up to five years between high and low risk occupations (Kadefors et al., 2017).

Several European countries, including Sweden, have restricted access to disability pension, during later years. In Sweden, this seems to have increased the use of early retirement (drawing from the total retirement benefit so that the age pension at high age will be lower) especially in blue collar occupations: 9 out of 10 occupations with the highest increase were blue collar ones, while 10 out of 10 occupations with the lowest increase were white collar occupations. (Kadefors et al., 2019).

In summary, national policies aiming at prolonging working life through economic incentives have not achieved a levelling upwards to a full working life in many blue-collar occupations. An increased retrieval of early age pension in blue collar jobs, even though it will often be associated with economic hardship later in life, suggests that more restrictive policies on disability pension left groups of manual workers no longer able to do their job with no other option, and that measures offering a match between demands and capacity throughout working life are required, especially for manual occupations. It also makes the workforce more dependent on options for e.g., retraining and other benefits offered by collective agreements, thus accentuating the differences between unionised versus ununionised workers, and the high-end versus the low-end of the labour market.

[6] Reduced working hours are common towards the end of working life and may both reflect and affect health and workability.

Building resilience

Climate change highlighted the vulnerability of our societies and raised a debate on how to enhance resilience. It may be argued that some global trends (i.e. globalisation, digitisation and automation) also increase the vulnerability of significant parts of the labour force, and that strategies which enhance resilience (i.e., reduces vulnerability) are urgently needed, at the workplace as well as at the macro-level, and with a holistic approach[7].

Workplace

One aspect of building resilience throughout working life is to identify risks associated with a certain age-span or (lack of) seniority, e.g., young and unexperienced workers have higher occupational accident rates than more senior ones (Guérin et al., 2020; Meidner, 1954), workers with caring duties will be more vulnerable to work-family conflicts (e.g., like unpredictable working hours), and older workers more vulnerable to physical strain and insufficient recovery. An age-conscious approach can, as suggested by Nilsson (2020), easily be included as part of the statutory risk assessment at the workplace. However, the Joint Programming Initiative More Years Better Lives identified important knowledge gaps regarding managers' perspective on a longer working life and organisational opportunities (Hasselhorn & Apt, 2015).

It is often said that women are more vulnerable than men to psycho-social stress at the workplace, but more detailed analyses indicate that observed differences can largely be explained by differences in exposure (e.g., more job-strain in jobs with predominantly female workers; Theorell et al., 2016). Thus, resilience should build on increasing job control rather than promoting individual coping strategies in these sectors.

Non-discrimination, fairness, respect and being listened to, are all important aspects for job longevity. Apart from gender and ethnicity, old age is, as mentioned above, a common ground for discrimination and stereotyping. In this context it is noteworthy that there seems to be a socioeconomic gradient of perceiving being listened to by the closest manager, so that workers with short education or low income most often report not being listened to. In turn, this was longitudinally associated with exhaustion and depressive symptoms, most likely mediated through less job control (Theorell et al., 2012).

The importance of employment arrangements for occupational health has increasingly been seen as an additional dimension of exposure (Bodin et al., 2020; O'Connor et al., 2020). A temporary contract may or may not be associated with other disadvantages, determining whether it has negative health impacts on the individual.[8] In general, temporary workers will tend to have a weaker voice at the workplace, less familiarity with workplace routines, less

7 The European Economic and Social Committee on 'The changing world of work and the longevity/ageing population have made several specific recommendations (2020) for the development of comprehensive national strategies.

8 Another aspect of shifting employment arrangement which need further investigation with regard to working conditions and work environment are agency workers, and the self-employed outside the agricultural sector,

access to skills upgrade, be less unionised, have less insurance benefits, and more likely to lose employment in case of poor health (Schram et al., 2020), this accumulation of multiple disadvantages in the employment arrangement is usually referred to as precarious employment (Kreshpaj et al., 2020). Precarious employment arrangements can lead to negative health consequences, through several direct and indirect pathways. The COVID-19 pandemic has highlighted the association between precarious employment and workplace safety, e.g. outbreaks of disease related to adverse conditions including symptomatic workers feeling obliged to come to work (Dyal et al., 2020), caring workers working at multiple facilities (Department of Health and Social Care, 2020; Dyal et al., 2020), and mortality rates at nursing homes associated with unionisation (Dean et al., 2020), thus suggesting that employment arrangements should be considered in risk assessment, and as a means to enhance resilience.

Flexibility aiming at accommodating individual needs is seen as important for extending working life. Andersen et al (2019) found in a representative sample of the Danish workforce age 50 or more, that opportunities supporting a long working-life (i.e., possibilities for more vacation, reduction of working hours, flexible working hours, access to treatment, further education and physical exercise) at the workplace were fewer among manual workers, women, and workers with disabilities. It is obviously important to identify and act upon this type of mismatch between support and needs.

The occupational health service has a dual task, to assist in risk assessment and reduction of harmful exposures, and in adapting the job to the individual worker (ILO, 1985). Access to occupational health service is thus especially important in jobs with a high risk for ill health caused by harmful exposure at work, and in jobs where employees are more likely to have health conditions that affect their work. Due to the socioeconomic gradients in both exposures and health, the need is thus overall, especially high in blue-collar occupations. Favourable changes in physical workload among those with chronic disease was shown to clearly reduce the risk for exit from paid employment (Schram et al., 2020).

It is thus a paradox that access to occupational health service is inversely related to needs in Sweden, with good access (more than four out of five) among higher managers and in occupations requiring higher education and very low access (around one out of three) among women in the service sector and men in hunting, fishing and forestry (Arbetsmiljöverket, 2016). This clearly fails to protect those at highest risk and most in need, a gap which should urgently be acted upon by the social partners or by legislation, i.e., by action at the macrolevel when the workplace level is failing.

Macro level

While the workplace level is decisive in supporting a long working life, there is a strong interdependence with legislation and welfare systems. Longer additional education is often required for a necessary shift to a career outside the current employer, or to keep

employability during technological changes within a sector. This, however, will rarely be financed by the employer, forcing the individual worker to rely on active labour market policies and inclusive welfare systems to support the shift, and the older unexperienced worker will need the same initial mentorship as a young worker to e.g., prevent accidents. There would be less need for such leaps if life-long learning polices were widely implemented providing a gradual skills upgrade – transition possibility (see also Halvorsen, this issue).

Employment protection is also likely to contribute to resilience (decrease vulnerability), especially for older workers, workers with chronic disease, and workers with low education (Schuring et al., 2020). Low employability for those workers will, in the case of unemployment, easily trigger downwards trajectories in several aspects of working conditions. Change involving multiple adverse changes dramatically increases the risk for exit from paid employment (Schram et al., 2020), and could thus motivate a strong employment protection from a sustainability perspective.

The transfer of many caring duties from the home is key to women's work participation, this applies to childcare, meals and leisure time activities for school children, and elderly care. The Covid-19 pandemic has reminded us of this dependency. The liberation of women's potential on the labour market is still limited in many countries (e.g., unaffordable care on a low or medium income), and the quality of the services is affected by economic crises (i.e., austerity measures). It is remarkable that a high proportion woman of working age (32.7% of those age 20-64 not in the workforce in EU 28, and 5.5% to 19.7% in the Nordic countries) report not actively seeking work due to caring responsibilities, with an increasing trend (25.7% in 2007; Eurostat, 2020).

Finally, increasing health inequalities are a fundamental challenge as a driver of an increasing gap in work longevity between occupational groups, and thus calls for decisive action at a societal level.

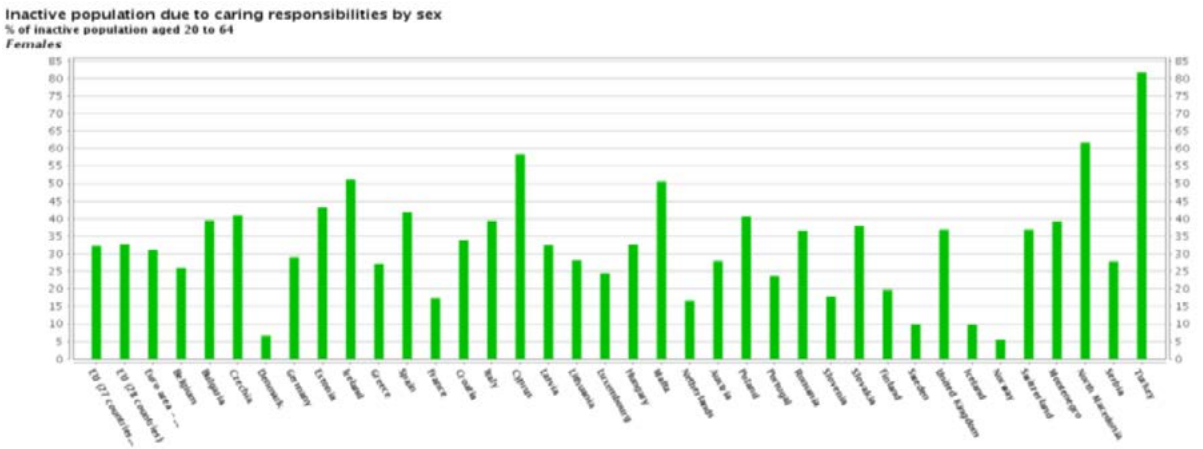

Figure 4. Proportion of inactive population aged 20 to 64 (%) not looking for employment due to caring responsibilities (children, incapacitated adults or other family or personal responsibilities). Females. Source: Eurostat, 2020

Decent work and economic growth

The sustainable development goal Decent work and economic growth (SDG 8) calls for providing opportunities for full and productive employment and decent work for all while eradicating forced labour, human trafficking and child labour, and promoting labour rights and safe and secure working environments. Many observations suggest a polarisation of working conditions with many improvements in the high end, and an accumulation of adverse conditions in the low end. This tends to make averages deceptive when discussing the need to develop new policies.

- While overall employment rates in e.g., EU 28 are moving upwards, the gap in employment by educational level is increasing, and seven percent of full-time workers are at risk of in-work poverty (Eurostat 2020).
- On average 15% of all workers in the EU report exposure to smoke, gases, powder or dust at least ¼ of their working hours, among skilled blue-collar workers the corresponding proportion is 56% and among unskilled workers 35% (Eurofound, 2015). While substantial effort is put into decreasing the cancer burden from such exposure in the EU, permissible levels still confer unacceptably high excess mortality following a full working-life (Johanson & Tinnerberg, 2019), especially when considering the total extra disease burden (e.g. cardiovascular disease, chronic obstructive pulmonary disease; Albin & Gustavsson, 2020; Sjögren et al., 2020) in conflict not only with a sustainable working life but with fundamental rights to safe and healthy working conditions (European Parliament, 2000). Similarly, lack of basic safety measures for frontline workers during the covid-19 pandemic, and the extent to which this has unproportionally affected not only health care but many basic occupations, highlight the vulnerability of broad groups of workers and the need for a strong joint commitment for occupational safety and health from the social partners, government and researchers.

The commitment to Agenda 2030 from many sectors of society may offer opportunities to develop new strategies and policies for Sustainable Work and work longevity within the SDG Decent work and economic growth (see also Levi L, this issue). As an example, universities and national and regional health services are important purchasers of goods and services, with the potential to influence the development in several sectors for the better i.e., by using a socially responsible approach (European Commission, 2020). Here social partners and researchers can assist in suggesting how these demands can be phrased to have an impact, and how compliance can be followed up.

Simultaneously, national policies need to consistently consider the impact on inequalities when e.g., changing welfare systems, labour law, and labour market policies. In the absence of such consideration, inequalities will increase, and firm action is needed to reduce them (Molander, 2017). Such actions are needed to support work longevity throughout the labour market. The means to achieve this are well known, but the changing political and economic

context calls for new ways of connecting the measures, and for researchers to actively be involved in the challenges.

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The generative relationship between job quality, innovation, and employment

Chris Mathieu
Susanne Boethius

Abstract

Recent research on the interrelationships between innovation, job quality and employment shows a strong association between job quality and product, process, and to a lesser extent organisational innovation. Increased employment and improved job quality are found to result from innovation, while specific employment dimensions are found to impact innovation and job quality. This article presents in summary form the conceptual approach and central empirical results and conclusions of the Horizon 2020 project QuInnE (Quality of Jobs and Innovation Generated Employment Outcomes), a project that specifically targeted these interrelations for analysis. The findings, based on qualitative and quantitative studies, largely support the skill-biased technical change (SBTC) thesis, leading to the conclusion that while innovation tends to improve job quality, it will exacerbate societal inequalities. Evidence is also presented from several QuInnE studies that higher innovation results from higher job quality, in line with previous research. Relationships were not found to operate in a deterministic manner, but rather the actions of management, workers and social partners play important mediating roles in determining effects.

Keywords: Job quality, innovation, employment, QuInnE, inequality

Introduction

The European Union's concern with increasing and improving employment, social inclusion, innovation, and competitiveness were core to the Europe 2020 Strategy (European Commission 2010). There is an accepted wisdom that innovation is essential to competitiveness and growth (Mazzucato & Perez, 2015), a fear that innovation may have detrimental effects on employment (Brynjolfsson & McAfee, 2011; Frey & Osborne, 2017), and not much understanding of (or interest in?) the connection between innovation and job quality (Duhautois et al., 2020). The latter is puzzling as aspects of job quality such as training and skill development are also a flagship initiative in the Europe 2020 Strategy. But no explicit connection between the two flagship initiatives in the Europe 2020 Strategy: the Innovation

Union and the Agenda for new skills and jobs, nor innovation and job quality per se, is made. Furthermore, job quality is a core aspect of another key concern of the EU, sustainable work, especially in face of an ageing population in the EU. However, in the first round of funding of the research programme linked to the Europe 2020 Strategy, Horizon 2020, the project QuInnE – Quality of Jobs and Innovation Generated Employment Outcomes (grant number 649497) received funding to investigate the recursive and generative relationship between innovation, job quality and employment.

The purpose of this paper is to present in summary form the conceptual approach and central empirical results and conclusions of the QuInnE project, on the relationships between innovation, employment and job quality. Three things are highlighted. First, that QuInnE's empirical studies generally find consistent association between product, process and, to a lesser extent, organisational innovation and job quality. The reason for tenuous results for organisational innovation is likely due to the breadth of the concept as defined in the Oslo Manual's (2005) definition, which is used as the basis for OECD and Eurostat (most significantly the Community Innovation Survey) survey items on innovation. The second is that the studies generally find that innovation improves job quality and that innovative firms tend to increase, rather than decrease employment, even when implementing process and organisational innovations. As there is an increase in high-skilled jobs, and marginal or a negative impact on the number of low-skilled jobs, inequalities between the high and low-skilled are exacerbated, not mitigated by innovation. The third is that managerial, and sometimes employee agency plays an important role in the ways in which innovations are developed, selected, implemented and adapted, which have ensuing effects on job quality and employment. The article concludes by discussing policy implications of the findings.

QuInnE's conceptual framework

Figure 1 presents QuInnE's schematic representation and analytical "exploratory map" of the linkages between innovation and job quality, and the impact of those linkages on employment outcomes. As the project name and the bi-directional arrow between Innovation and Job Quality in the figure below indicate, a generative and recursive relationship entailing both cause and effect in the interaction between these fields is posited, with an interest in the employment effects of this relationship. Interest in employment outcomes comprised both the volume of jobs: the number of jobs created, destroyed or unaffected as measured in total number increases or decreases (i.e., More Jobs); as well as the quality of the jobs created, remaining or destroyed (i.e., Better Jobs). The interest in employment outcomes is directly linked to social inclusion (via labour market participation) and inequality (via skewed distribution of high- and low-quality jobs, and their inhering advantages and detriments to different groups).

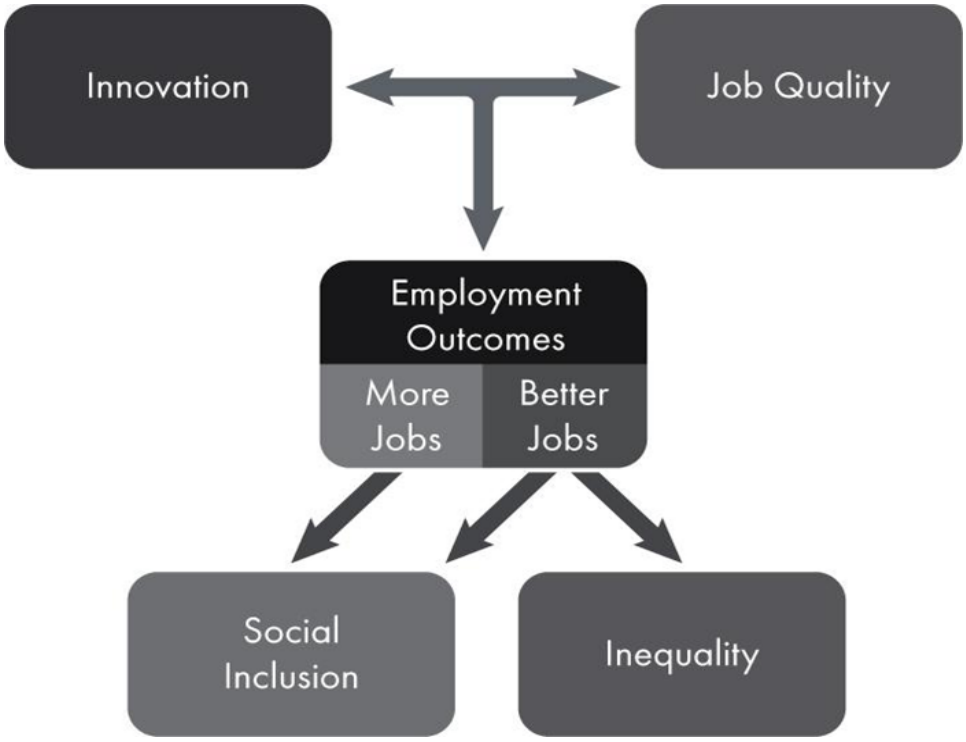

Figure 1: Schematic representation of QuInnE's conceptual framework

Innovation

The QuInnE project used the standardised terminology and definitions found in the 3rd edition of the OECD/Eurostat's Oslo Manual (2005)[1]. These definitions are also embedded in the OECD and Eurostat's surveys from the period. In the 3rd edition four types of innovation are delineated: product, process, organisational, and marketing innovations. The first two (product and process) are grouped as technological innovations, and the latter two (marketing and organisational) as non-technological innovations. This categorisation and definition of the types of innovation are shown in Figure 2. As QuInnE focused on work processes, marketing innovations were omitted from most of the studies.

[1] The QuInnE project was carried out prior to the 4th revision of the Oslo Manual in 2018, and therefore used the then-current and field-wide standardised terminology and definitions found in the 3rd edition of the OECD/Eurostat's Oslo Manual (2005).

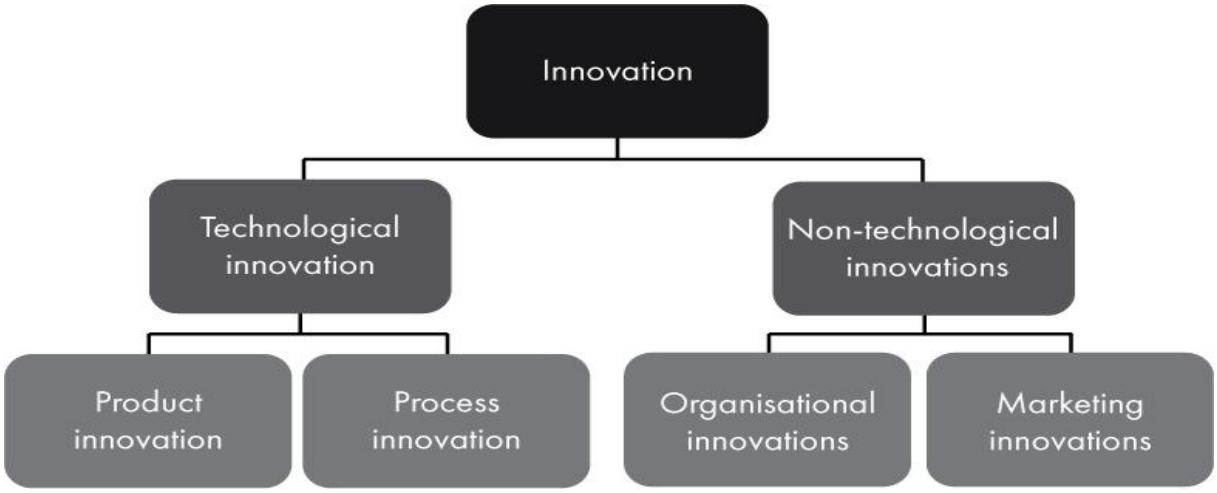

Figure 2: Types of innovation.

Product innovation: The introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. Process innovation: The implementation of a new or significantly improved production or delivery method. This definition includes significant changes in techniques, equipment and/or software. Marketing innovation: The implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing. Organisational innovation: The implementation of a new organisational method in the firm's business practices, workplace organisation or external relations. Source: Oslo Manual (OECD/Eurostat, 2005).

Job quality

In terms of job quality, QuInnE developed a multi-dimensional and cross-disciplinary approach comprising six main categories: wages, employment quality, education and training, working conditions, work life balance, and employee participation. These dimensions and their sub-dimensional indicators are presented in Table 1 below. This approach to job quality focuses on the broad range of intrinsic, extrinsic, physical, social, and material dimensions tied directly to work and employment.

Table 1: QuInnE's bespoke approach to job quality

Dimension	Indicators
Wages	Pay level relative to national minimum pay and average for required qualifications
	Pay variability
Employment Quality	Permanent/Temporary Status
	Job Security
	Internal Progression Opportunities
	Predictability of Weekly Hours (Overtime – Zero Hours)
	Presence/Absence Involuntary Long Hour Work (40 +)
	Presence/Absence Involuntary Part-Time Work (<30)
Education & Training	Learning Opportunities on the Job
	Training Incidence
	Training Quality
	Opportunities for General vs Specific Skill Acquisition (Transferability)

Working Conditions	Individual Task Discretion/ Autonomy
	Semi-Autonomous Teamwork
	Job Variety
	Work Intensity
	Health and Safety (Physical and Psychosocial)
	Supervisory Social Support
	Peer Group Social Support
Work Life Balance	Work Time Scheduling (Unsocial Hours)
	Hours of Work (Duration)
	Working Time Flexibility – Provisions for Time Off for Personal Needs
Employee Participation	Direct Participation regarding Organisational Decisions
	Consultative Committees Works Councils
	Union Presence
	Union Decision Making involvement

Employment

As noted above, in the initial conceptualisation of QuInnE, employment was of interest as an output, an effect of innovation, and the interaction of innovation and job quality. Three dimensions of employment were of interest: 1) the volume of employment and its fluctuations (total number of jobs and increases/decreases); 2) which types of jobs were created, destroyed, modified or unaltered in terms their task and qualitative content (job quality); and 3) the distribution of these jobs among various categories of social groups (i.e., inclusionary and exclusionary effects on various groups). Where data is available these categories usually include sex, age, nationality/migration status, and education/skill level.

Though initially conceptualised as an output variable, as the project progressed and firm-based qualitative case studies commenced, employment became recognised as a significant factor impacting both innovation and job quality. For example, some innovations could not be implemented or expanded due to understaffing, a lack of skilled personnel, or high personnel turnover (Gautié et al., 2018; Green et al., 2018). On the other hand, high turnover and recruitment problems directly led to innovations to either use existing scarce labour more preciously or develop new recruitment and retention innovations (Keune et al., 2018; Jaehrling et al., 2018; Green et al., 2018; Mathieu et al., 2018). Still other innovations arose not only due to the direct occupational skills of employees, which was expected, but also the personal non-occupational knowledge and abilities of current employees became the basis for sometimes even radical innovations (Martín et al., 2018; Mathieu et al., 2018). So rather than as initially conceptualised in Figure 1, a triangular interactive relation became the operational approach, i.e., not just investigating effects on employment, but also how employment, especially labour shortages, but also the composition of incumbent labour forces, impact innovation processes and job quality, see Figure 3.

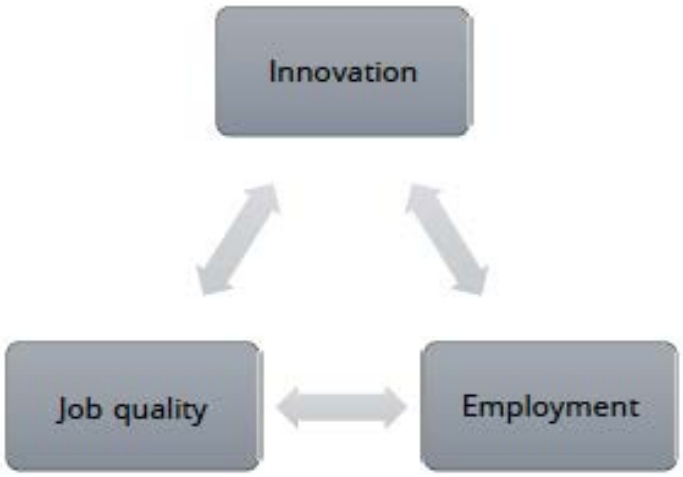

Figure 3. QuInnEs operational approach

QuInnE studies, findings and results

In a series of quantitative and qualitative studies the relationship between product, process, and organisational innovation and job quality was analysed in itself, as well as ensuing effects on employment, social inclusion and inequality. An overview of the empirical studies undertaken in the QuInnE project is found in Table 2.

Table 2: Overview of the empirical studies undertaken in the QuInnE project

Reference*	Method	Data / database	Countries	Level of analysis
Duhautois, et al 2018. *The employment and job quality effects of innovation in France, Germany and Spain: evidence from firm-level data. WP 7*	Quantitative	CIS, DADS, FARE, IAB Establishment Panel, ESEE	FR, ES, GER	Firm
Erhel C. & Guergoat-Larivière 2016. *Innovation and Job Quality Regimes: A Joint Typology for the EU. WP 3*	Quantitative	CIS, EWCS, LFS, SES, ESAW	22 EU countries	National/Firm/ Individual
Gallie, 2018. *Quality of work and innovative capacity: implications for social equality. WP 8*	Quantitative	EWCS	EU-15	Individual
Gautié, et al 2018. *Innovation, Job Quality and Employment Outcomes in the Aerospace Industry: Evidence from France, Sweden and the UK. Ch 2 WP 6*	Qualitative	Interviews Firm documents	FR, SE, UK	Firm / Organisational unit

Green, et al 2018. *Innovation, Job Quality and Employment Outcomes in Care: Evidence from Hungary, the Netherlands and the UK. Ch 8 WP 6*	Qualitative	Interviews Firm documents	HU, NL, UK	Firm / Organisational unit
Jaehrling, et al 2018. *The digitisation of warehousing work. Innovations, employment and job quality in French, German and Dutch retail logistics companies. Ch 7 WP 6*	Qualitative	Interviews Firm documents	FR, GER, NL	Firm / Organisational unit
Keune, et al 2018. *Innovation and Job Quality in the Games Industry in Germany, the Netherlands, Sweden and the UK. Ch 6 WP 6*	Qualitative	Interviews Firm documents	GER, NL SE, UK,	Firm / Organisational unit
Makó, et al 2018. *The relationship between employment, job quality and innovation in the automotive Industry: a nexus of changing dynamics along the value chain. Evidence from Hungary and Germany. Ch 3 WP 6*	Qualitative	Interviews Firm documents	GER, HU	Firm / Organisational unit
Martín et al 2018. *Innovation, Job Quality and Employment Outcomes in the Agri-food Industry: Evidence from Hungary and Spain. Ch 4 WP 6*	Qualitative	Interviews Firm documents	ES, HU	Firm / Organisational unit
Mathieu, et al 2018. *Innovation, Job Quality and Employment in Hospitals in Spain and Sweden. Ch 9 WP6*	Qualitative	Interviews Firm documents	ES, SE	Firm / Organisational unit
Muñoz-de-Bustillo, et al 2016. *Innovation and Job Quality: An Initial Exploration. WP 5*	Quantitative	EWCS	EU-15	National/ Industry/ Individual
Muñoz-de-Bustillo, et al 2017. *An approximation of job quality and Innovation using the 3rd European Company Survey. WP 4*	Quantitative	ECS	32 European countries	Firm
Perez and Martín 2018. *Digitalisation and Artificial Intelligence: the New Face of the Retail Banking Sector. Evidence from France and Spain. Ch 5 WP 6*	Qualitative	Interviews Firm documents	ES, FR	Firm / Organisational unit

***** WP denotes QuInnE Working paper number; Ch denotes chapter in QuInnE Working Paper No. 6 (Jaehrling ed., 2018). Virtuous circles between innovations, job quality and employment in Europe? Case study evidence from the manufacturing sector, private and public service sector.)

As stated above, the quantitative studies were carried out using datasets comprising individual, firm, industry and national level data, and range from analyses of three countries

(Germany, France and Spain) to the EU-28 plus Iceland, Turkey, Macedonia and Montenegro. These studies largely found correlations between "technological innovations," especially product innovation, but also process innovation, and improved job quality and increased employment. The association between organisational innovation and job quality was more ambiguous, likely due, as noted, to the heterogeneity contained in the Oslo Manual's (2005) rendering of the concept. As all but one of the studies were cross-sectional, causality could normally not be established.

The qualitative studies were undertaken in eight industries or branches across seven countries (see Table 3), in order to investigate the mechanics of the interaction between various types of innovation, job quality, and employment.

Table 3: Number of case studies and interviews per industry and country.

	UK	FR	NL	SE	ES	HU	GER	Total number of case studies	Total number of interviews
Manufacturing sector									
Aerospace	1	3		2				6	78
Automotive						3	2	5	34
Agri-food					4	3		7	59
Private Service Sector									
Computer games	2		6	3			3	14	86
Banking		3			2			5	42
Retail Logistics		2	2				3	7	52
(quasi) Public Sector									
Elderly / Home care	3		2			3		8	56
Hospitals			.	4	2			6	54
TOTAL	6	8	10	9	8	9	8	***58***	***461***

Source: Jaehrling (2018, p. 13)

When looking at aggregate data on firms in these industries across the EU[2], crossing innovation with job quality three clusters emerge: industries characterised by low innovation and low job quality (Food production and Social care); high innovation and low job quality (Retail logistics), and high innovation and high job quality (Hospitals, Aerospace, Automobile manufacturing, Computer games and Retail banking). This is presented in Table 4 below:

[2] This refers to data based on aggregate data on firms in these industries across the EU, and does not necessarily reflect the situation in the individual firms studied in the case studies.

Table 4: Relationship between job quality and technological innovation

		Innovation	
		Low	High
Job Quality	Low	Food production (A1; C10), Social Care (Q88)	Retail logistics (H52; H53)
	High		Hospitals (Q86), Aerospace (C30), Automobile manufacturing (C29), Computer games (J58), Banking (K95)

Source: EWCS (based on data provided in Erhel & Guergoat-Larivière, 2016). Nb. The numbers in brackets refer to the NACE codes for the respective industries under study.

Below, QuInnE findings are presented thematically, drawing on both the quantitative and qualitative studies, first focusing on the relationship between innovation and job quality, then presenting results on employment and labour market inclusion. Detailed methodological discussions and further findings are found in the respective publications referenced for each study.

The Innovation-Job Quality Relationship

Using microdata from the 2010 European Working Conditions Survey (EWCS) *Muñoz de Bustillo et al. (2016)* constructed a job quality index consisting of five dimensions:

- pay (gross monthly wage in Purchasing Power Parity);
- intrinsic job quality (skills, autonomy, personal support);
- employment quality (contract stability and development opportunities);
- health and safety; and
- working time and work-life balance (duration and scheduling of hours and intensity of work).

The analysis conducted on the EU-15 found a positive and statistically relevant relation between innovation and the job quality index (R2 = 0.366). Analysis of the five individual components of the job quality index found that the relation was very high for intrinsic job quality and employment quality, and lower for health and safety, and work-life balance. The

relation between pay and innovation was difficult to assess, due to difference in per capita GDP in the EU-15 countries in explaining wage differences. The findings identifying intrinsic job quality (skills, autonomy, support); and employment quality (contract stability and development opportunities) are found in other QuInnE studies, and the broader literature that identify employment stability, training and development, and support, autonomy and discretion as key aspects of the generative interaction between job quality and innovation (De Spiegelaere, 2014; 2016; Foss, 2005; Laursen & Foss, 2014; Lorenz, 2015; Lorenz & Valeyre, 2005; Lundvall & Lorenz, 2012; Asheim & Parrilli, 2012). Even in individual-level analysis controlling for variations in job quality associated with country, age, sex, education, industry, occupation, and firm size, both types of technological innovation proved significantly and positively correlated to job quality, while organisational innovation had no impact when controls were applied. The latter result can be interpreted as organisational innovation having neither a beneficial nor detrimental effect, or that organisational innovations comprise both beneficial and detrimental effects, but that on aggregate these cancel-out each other.

In another study using the 2010 ECWS, Gallie (2018) investigated the relationship between job quality and innovation by analysing what type of employees were engaged in innovation activities. Gallie constructed an "innovation-conducive job quality index," based on findings of previous research comprising three dimensions: 1) training and informal learning-based knowledge development; 2) scope for individual task discretion and use of initiative; and 3) job security. Analysing where employees were on this index from high to low, Gallie compared this against responses to the 2010 EWCS item about engagement in innovation-oriented activities, asking how much time the respondent was "involved in improving the work organisation or work process of your department or organisation." Gallie (2018) found a striking difference. Whereas 66% of those high on the index, i.e. those enjoying high degrees of training and knowledge development, discretion, and job security, were involved in innovation or improvement activities, only 14% of those low on the index were engaged in such activities. This profound polarisation witnesses to the correlation between the enjoyment of high job quality and engagement in innovation activities and poor job quality and non-engagement in innovation activities.

Muñoz de Bustillo et al. (2017)[3] carried out another cross-sectional study to probe the link between innovation and job quality on an even larger sample (EU-28, plus Iceland, Turkey, Macedonia and Montenegro) using firm-level data from the 2013 European Companies Survey (ECS). The ECS contains indicators for intrinsic job quality, employment quality, work-life balance and worker participation, but nothing on pay or health and safety. From these dimensions Muñoz de Bustillo et al. (2017), constructed a "Summary Index of Job Quality"[4] (SIJQ). A first analysis found positive relationships for all types of innovation and the SIJQ before controls were applied. When controls were applied for firm size, percentage of female

[3] An extended analysis from this study is found in Grande et al., 2020.

[4] See p.6 of Muñoz de Bustillo et al., 2017 for the items from the ECS 2013 and their weighting for the Summary Index of Job Quality applied in this study.

employees, share of employees with university education, use of outsourcing, whether the organisation was public or private, an autonomous or headquarter unit or a subsidiary, only process innovation was strongly significant in relation to job quality with product innovation being significant only at the 10% level. Organisational innovation became non-significant. This study made two uniquely important findings. The first being that, in firms with a union representative, both process and organisational innovation were significantly positively associated with job quality, while this was absent in firms without union representation. Formal worker organisation and representation was thus found to play an important moderating role especially between organisational innovation and job quality. The second is that firms that have recent experience of downsizing or workforce reductions had lower job quality. This supports the contention for seeing employment not merely as an output of the interaction of innovation and job quality, but also as a factor impacting job quality and innovation (see the discussion of qualitative findings below where understaffing in hospitals and social care reduces both job quality and innovation).

Duhautois et al. (2018) analysed the impact of innovation on job quality and employment (employment results are discussed in the next section) using large sample firm-level data from Germany (n=9 416 public and private, all industries), France (n=14 204, private sector only) and Spain (n=1 857 manufacturing only). The time period for investigation was 2009-2013 for Germany and France, and 2002-2010 for Spain for data quality reasons. Thus, the timeframe for the German and French analyses are identical and cover the period after the 2008-2009 global financial crisis. The period for Spain is longer, and covers the period before and during the GFC. The job quality variables in this study comprise pay, skill level, and contractual job security. In France and Germany product innovation led to higher wages and increased job security (measured directly in Germany via turnover and indirectly for France), and an increase in higher-skilled workers in French firms and increases in skilled and non-skilled jobs in Germany. Process innovation decreased job quality in France as measured through an index comprising contract duration, hours of work, hourly wages, and gender pay gap, while in Germany it increased pay, reduced turnover, but did not increase skilled jobs and increased the use of part-time workers. Organisational innovation was found to have negative consequences. In France it had a negative impact on wages, while in Germany it increased the number of low-paid workers. Significantly, the fact that these studies were longitudinal allows the inference that the relationship between innovation and job quality is causal. The positive impact of innovation on permanent contracts and working hours was further corroborated again using longitudinal data for France by Duhautois et al. (2020).

Erhel & Guergoat-Larivière (2016) used principal component analysis on indicators from several European datasets rendering comparable data for 22 EU states to analyse correlations between job quality indicators found in Table 1 and innovation indicators. They then identify country clusters using Hierarchical Ascending Classification (HAC). The two clusters are then crossed, rendering Table 5 below. This analysis shows that with some exceptions: most notably Estonia, which has good innovation performance, but far worse job quality than expected for its innovation performance, there is a general alignment

between job quality and innovation. The seven populated quadrants reoccur in Table 6 below when examining employment outcomes for different segments of the workforce.

Table 5: Crossing job quality clusters and innovation clusters (2012)

		Innovation			
		--	-	+	++
Job quality	++				DK FI SE
	+			AT DE IE NL UK BE LU	
	-	ES PL	EL IT PT	FR	
	--	CZ LT LV SK HU		EE	

Source: Erhel & Guergoat-Larivière (2016)

Also using national clusters to bolster number of observations and several waves of the ECWS, Gallie (2018) analysed the period 2005-2015 to investigate the impact of innovation and job quality on various segments of the workforce. Applying the same index of "innovation conducive job quality" presented above to seven national clusters[5], Gallie found that overall higher ICJQ jobs were becoming more prevalent across Europe and that a degree of convergence between clusters has taken place. A further finding was a consistent decline in ICJQ for workers on temporary contracts in the EU-15 clusters. The study also found a stable and equal distribution of ICJQ jobs between men and women, while ICJQ jobs are predominately held by workers between the ages of 35-49.

With quantitative analysis seeking to measure the strength of association between forms of innovation and dimensions of job quality, QuInnE's qualitative analyses examined how these linkages played out at the workplace level. In case studies both directions of the relationship were examined, that is, how innovations impact job quality and how job quality impacts innovation. As radical innovation is infrequent, the primary form of innovation found and investigated in the qualitative studies is incremental innovation. As the effects of organisational innovations were largely ambiguous and opaque in the quantitative studies, the qualitative analyses sought to examine consequences of organisational innovations on job quality as well as how aspects of job quality facilitated or hindered organisational innovation.

One of the organisational innovations found in several case studies was the introduction of established innovation-promoting management programmes: Lean in manufacturing and healthcare (Makó et al., 2018; Mathieu et al., 2018); the liberated firm in aerospace (Gautié et al., 2018); and agile/scrum in the computer games industry (Keune et al., 2018)). In these cases, codified knowledge management programmes derived from management science are implemented in order to promote the Doing, Using and Interacting (DUI – Jensen et al., 2007) innovation mode based on immanent, tacit and discretionary learning knowledge production

[5] Not the seven clusters found in Tables 5 and 6. Gallie's clusters are: The North West (UK and Ireland); Nordic, Continental; and Mediterranean among the EU-15 states; and the North East; Central East; and South East among the New Member States. See *Gallie 2018*, p. 11 for the list of countries in each cluster.

(Lorenz, 2015). As noted by Gallie (2018) these variants on High-Involvement or High-Performance Work Systems promote worker participation in the innovation process and job quality simultaneously. The introduction of these management programmes underlines the importance of incremental innovation (Mathieu and Warhurst 2018) in line with the DUI innovation mode, especially in mature fields where radical innovations are less likely due to an emphasis on exploitation rather than exploration (March 1991). Such conditions were reported particularly in the aerospace (Gautié, et al., 2018) and automotive industries (Makó et al., 2018). where firms in particular positions in value or supply chains are locked into an established technological configuration network.

In the qualitative studies, the linchpin in the connection between job quality and innovation centres around worker participation. As mentioned above, many of the managerial innovations introduced were aimed at promoting participation via two-way communication channels between managers and workers, and exploration and experimentation. The former often took the form of well-known mechanisms such as regular meetings between managers and workers that are part of agile, scrum, and lean processes; employee suggestion channels and competitions; and co-locating cross-occupational development groups. Regarding employee exploration and experimentation, nowhere was managerial support for this greater than in the computer games industry towards game developers. Here continuous individual and collective problem-solving was required and high degrees of discretion were accorded individuals and workgroups to accomplish their essentially creative tasks (Keune et al., 2018). Further evidence of employee participation and managerial support for employee discretion in this industry is the extensive use of firm-external knowledge networks among developers.

A significant finding in other industries where design and execution are separated (in contrast to computer games development work) was the role of two-way communication channels, allowing implementation employees to question, comment on, and make suggestions back into the design phase of the processes they were to implement. This erodes the classic linear design-implementation dichotomy and division of labour. This was found most explicitly in the aerospace industry with the introduction of 3D CAD/CAM or digital blueprints, where comments could be made directly back to design engineers via the same technology platform (Gautié et al., 2018). Similar technologies also facilitated workers at automotive OEMs to communicate with suppliers (Makó et al., 2018). Similar activities took place in services, notably in social and health care, but based on a social rather than technological channels (Green et al., 2018). Opening up technologies and social spaces for contributions from employees further along the production process turned this from a linear to a looped process. This shifts the innovation contributions, from the workers' very proximate task operations to decisions more distant and profound in their implications than the immediate realm of the given employee. Routine task performance is punctuated by creative contributions. These are situations where more durable, often incremental contributions were made. This can be contrasted with situations where creative contributions were either continuously demanded and required as in the computer games

industry (Keune et al., 2018), or in the banking industry where customer service agents continuously modified and "personalised" standard AI-generated replies to customers (Perez & Martín, 2018).

Participatory incremental innovation contributions are most likely in work processes that can be improved through familiarity, knowledge, and are malleable: i.e., those work processes not entirely scripted, rote, fixed and simplified beyond development. This is likely a major element behind Gallie's (2018) finding that only 14% of workers in low-skill jobs are engaged in innovation activities, whereas two-thirds of those in high-skilled jobs are. High-skill jobs are likely more developable contrasted with Taylorised low-skilled jobs. It is also likely that lower-skilled workers in these jobs are less frequently invited into innovation processes. Furthermore, such innovation processes require employment stability affording opportunity to acquire deeper understandings of work process, often in dialogue with known and trusted colleagues to share and develop insights and experiences another feature of workplace stability and extended tenure without constant turnover of colleagues. Such factors are more associated with high-skilled than low-skilled work, as evidenced in several of the quantitative analyses discussed above, and the relative absence of employee-driven innovation in the retail logistics cases where the participatory factors discussed above are largely absent (Jaehrling et al., 2018).

The industry where case studies displayed the greatest variation in approaches towards innovation and job quality was social care. At one end there are highly Tayloristic systems, so-called time-and-task approaches where a rigid schedule specifies particular activities to be undertaken by a caregiver in a given order and time allotment. At the other end is a Dutch example of multi-occupational self-governing teams that are given resources and responsibility for a specific geographic area, then accorded tremendous discretion in the planning and execution of care activities in consultation with the recipients. Variants of both high and low-trust/discretion systems were found in the three countries analysed, a variation which is impacted by both basic managerial choices made by firms, as well as the reporting and accounting directives imposed by the (usually municipal) bodies that fund and contract social care services (Green et al., 2018).

The Innovation - Job Quality - Employment Relationship

In the longitudinal, firm-level analysis conducted by *Duhautois et al. (2018)* presented above, technological innovation was associated with increased employment in the surveyed firms in France, Germany, and Spain. This holds for product innovation in all three countries, while process innovation increased general employment in France and Spain, while organisational innovation did the same in France and Germany. The findings on process and organisational innovation counter the common understanding of these innovation forms as oriented towards labour-saving workforce rationalisation. Looking at findings for specific categories of employment or types of jobs, skilled jobs increased as a result of product innovation in France, while skilled and unskilled work increased in Germany. In both countries, permanent

and temporary employment increased. Process innovation increased skilled jobs in France, while in Germany it only increased part-time jobs. Organisational innovation was found to increase employment in France and Germany but have no effect in Spain.

This study shows two important things. First, innovation does not decimate jobs in innovative firms. That is to say, even the innovation forms most suspected of rationalising away jobs, process and organisational innovations, are associated with increased employment in Germany and France, or had no effect (Spain). As the authors point out, this may be a matter of business stealing, where innovative firms take market share from less innovative firms and thereby expand operations and employment. It is also possible that the rate of employment growth in innovative firms might be lower than expected in comparison to the rate of business expansion, but this is difficult to establish. However, the findings show that these innovations are not job destroying. This likely plays a role in innovation promotion and acceptance in innovative firms, and this understanding should be spread. If innovation can be seen as leading to employment creation (or at least not leading to redundancies) and improved job quality, acceptance of and participation in innovation activities is more probable.

The second point is that innovation tends to change the composition of the workforce at the firm level, with technological and organisational innovation favouring high-skilled workers and jobs, while having no or negative impact on lower-skilled work. This is obviously good from a job quality perspective. However, taken together, these two points mean that with innovation more high-skilled jobs and relatively fewer low-skilled jobs are created : supporting the "skill biased technological change" thesis (Autor, Levy & Murnane 2003; Berman, Bound & Machin 1998). This increases inequality in society, increases competition for the remaining lower-skilled jobs, and intensifies the need to increase skill levels among citizens to be able to fill the higher skilled jobs created.

Though multiple factors play into national employment rates, Table 6 below showing employment rates in the seven innovation-job quality clusters produced via principal component analysis by Erhel & Guergoat-Lariviére (2016) contains notable differences. One is that countries with the highest innovation and job quality performance levels also have the highest employment rate for the low educated, while those with the worst innovation and job quality performance have the lowest rates for this educational category. Likewise, the highest innovation and job quality cluster (plus Estonia, the "Innov + JQ --" country) has the highest employment rates for older workers. Universally, the highly educated have rather uniform and high employment rates.

Table 6: Employment rates by social groups (education, gender, age and nationality) in the seven innovation-job quality clusters (2012 data)

	Innov-- JQ--	Innov-- JQ -	Innov- JQ -	Innov+ JQ--	Innov+ JQ -	Innov+ JQ+	Innov++ JQ++
Low educated	39,4	44,6	54,0	50,3	55,7	55,2	60,7
Medium educated	69,6	65,9	68,1	74,4	73,6	74,7	79,1
High educated	83,5	81,1	77,4	82,3	84,4	85,1	86,5
Women	65,3	58,5	55,3	72,2	67,5	67,8	75,6
Men	75,4	71,2	71,9	78,0	76,7	79,9	80,8
15-24	22,8	21,6	18,2	32,3	28,6	40,4	45,7
25-54	77,7	72,0	69,9	79,5	80,9	80,5	83,0
55-64	46,6	41,3	41,1	60,5	44,5	49,8	64,0
EU15-foreigners	91,0	75,2	59,9	-	70,1	74,4	76,1
Non-EU foreigners	68,3	60,6	62,6	65,6	50,6	62,2	57,8
Nationals	70,8	65,3	63,4	77,0	73,2	74,3	79,3

Source: Erhel & Guergoat-Lariviére (2016). Note: This Table corresponds to the innovation-job quality clusters presented in Table 5 above. The countries found in each of the innovation-job quality clusters can be found in that Table.

In qualitative case studies, own and colleagues' employment and job security were not surprisingly found to be an important factor in employees' actions regarding innovation. This can be seen as individual or group mediation of the innovation-employment relationship. However, innovation suggestions, even those that can lead to work efficiencies and job reductions could be maintained with the right assurances and trust between management and workers. One example of this is from an OEM automotive subsidiary in Hungary where innovation activities were assuredly not part of a cost-efficiency strategy aimed at rationalising away jobs, but a knowledge and quality improvement orientation disseminated from headquarters to move up the supply-chain. Under this approach improving work practices could lead to job transformation and relocation of employees rather than redundancies, thus assuring employee participation in the strategy (Makó et al., 2018).

Several case studies observed less outright job destruction due to innovations than job transformation. Even in retail banking in Spain and France, where workforce reductions transpired due to the shift to online banking, there was case evidence both of banks choosing alternative strategies and maintaining physical branches and tellers (and staff levels), as well as strategies where the closing of bank branches led in part to workforce reductions, but also teller jobs being converted either to pure telecommunications-based customer assistance, or hybrid jobs combining both physical teller activities with telephone or chat customer assistance work (Perez & Martín, 2018). Likewise, cases in the aerospace industry show tasks either being recombined in new ways, or novel tasks or technologies being introduced alongside existing or traditional tasks and activities after innovation (Gautié et al., 2018). These findings augment well the quantitative studies' findings above that innovative firms

tend to add (where retention and transformation plays a key role) rather than reduce jobs. As established above this is not just with product innovation, but also with process and organisational innovations, when an unambiguous result appears for the latter. This pattern of some jobs being shed, others being transformed, while new jobs and occupations arise in innovating firms (such as technicians in retail banking, Perez & Martin, 2018) was seen across industries, with the transformed and new jobs in general being of higher job quality and requiring higher qualifications (Jaehrling et al., 2018). This further supports the skill-biased technological change thesis.

Some cases also found that the retention of employment levels is not just a matter of the inevitable robotic replacement human labour having yet to arrive. Cases in the British aerospace (Gautié et al., 2018) and German automotive parts-supplier industries even show a reversion from automated production processes to "the smart use of manual labour" especially for small-batch, high-end, "craft" products (Makó et al., 2018). In these two cases investment in automation was ostensibly to lower costs and improve quality, but these case firms found overinvestment risks in automation, with return to manual production practices for cost and quality reasons. While these are examples of niche production in particular firms, it shows that, even in manufacturing, trends towards robotics and automation are not universal and inevitable. In retail logistics, the fully automated warehouse remains an unrealised goal, with partially automated or traditional warehouses where technological assisted human product-picking is the norm (Jaehrling et al., 2018). However, there are also cases, such as a Hungarian pasta producer, where automation not just led to a reduced labour force, but also a vast change it its composition, from a previously female-dominated production staff to male engineers operating the new machines (Martín et al., 2018). The new jobs at the pasta factory became more skilled, and more male, and the case study also showed an increased emphasis on work-safety, another dimension of improved job quality.

Some innovations can potentially open up workplaces to previously excluded groups. But countervailing trends can erode these possibilities. In the retail logistics sector assistance with heavy lifting and lower skill demands could be expected to reduce age, sex, and educational bias in warehouse work. However, intensification of work, repetitive tasks, and other types of mental and physical strain, and especially the demand for employees to work firm-friendly flexible schedules and shift-work creates problems for persons with domestic care responsibilities and sensitivity to physical and mental strain (Jaehrling et al., 2018). Thus, while some innovations may open up possibilities for more inclusive employment at workplaces, if they are coupled with innovations, changes, or even the retention of unfavourable measures and practices, the potential of the advantageous innovations can be negated, and with them any possibilities for more inclusive employment. Therefore, it is important to look beyond specific innovations, and to the configuration of practices and conditions obtaining at workplaces. For example, in social care cases in the UK, planning, scheduling, and logistics apps made time and travel management more efficient, but it was also found that more formal and sophisticated reporting systems required increased written communication skills, not to carry out the work per se, but rather to document and report

work (Green et al., 2018; Mathieu et al., 2020). The latter further restricts recruitment and employment opportunities especially for individuals with low formal education and for whom English is a second or third language in a branch already suffering from recruitment problems and labour shortages.

One way of addressing labour shortages within particular occupational categories in the healthcare sector is through task-shifting. Task-shifting entails moving tasks from an overburdened and scarce occupational group, onto other occupational groups which are easier to recruit. Examples from the Swedish hospital sector show that this can result in new occupational groups working on hospital wards (Mathieu et al., 2018; Mathieu et al., 2020). In some cases, tasks are taken from nurses, an occupational group currently in short supply in Sweden, and given to higher or equal-status occupations, or lower-skill groups. In one case, preparing medicines was shifted from nurses to a comparable-status occupation – pharmacists, while preparing milk for infants on a neonatal ward was shifted from nurses to persons without a nursing degree employed just for this task.

In other cases, recruitment to occupations suffering labour shortages became the object of innovations, often organisational innovations. Taking examples again from the hospital sector, a Swedish hospital created an "internal temporary work agency" to offer working conditions that somewhat mimic commercial temporary work agencies (slightly higher wages, more control over scheduling, moving fluidly between wards and departments without strong social ties) in order to retain employees who might be tempted to work for commercial agencies and lure agency workers over to direct employment at the hospital. The same hospital also initiated a new recruitment programme to bring low-qualified youth into jobs at the hospital that can lead to ascending an evident occupational ladder (Mathieu et al., 2018).

A further way in which employment was found to impact innovation (as well as simultaneously decreasing job quality) has to do with staff shortages inhibiting innovation. The normal mechanism for this is through work intensification, due to having to cover for absent colleagues resulting from insufficient staffing levels. Under such circumstances intensified production activities take time, and physical, mental, and emotional energy from innovation development and implementation activities. Such circumstances were reported in cases especially in social care, hospitals, and aerospace as the result of chronic understaffing (Gautié et al., 2018; Green et al., 2018; Mathieu et al., 2018). These are cases of immediate disruption of innovation by employment factors. More medium and long-term effects run through work intensification hindering both external and internal training and development activities and high employee turnover.

Discussion and policy and strategy implications

As a collective body of research, the quantitative and qualitative QuInnE studies provide evidence of the mutual generative relationship between innovation, job quality and employment. Furthermore, the in-depth case studies display how these interactions play out at the firm level.

Regarding the association between innovation and job quality, Muñoz de Bustillo et al., (2016) found a positive and significant correlation between both types of technological innovation, but not organisational innovation and job quality. In further analysis in the same study of which aspects of job quality are associated with innovation, they found very high correlation for intrinsic (skills, autonomy, personal support) and employment (contract stability and development opportunities) job quality, with moderate outcomes for health and safety and work life balance. In a subsequent study, Muñoz de Bustillo et al., (2017) found similar results, with process innovation being strongly correlated to job quality, while product innovation weaklier correlated, and organisational innovation insignificant.

Using large firm-level datasets for France, Germany and Spain, Duhautois et al. (2018) also analysed which types of innovation are associated with positive and negative effects on different aspects of job quality. Product innovation increased wages, skilled jobs, and job security in France and Germany, while also increasing non-skilled jobs in Germany. Process innovation increased pay, lowered turnover, and increased part-time jobs in Germany while having negative effects on wages and employment conditions in France. Organisational innovation had a negative impact on wages in France, while increasing low-paid jobs in Germany.

The general conclusion from these transnational studies is that technological innovation is associated with better job quality, though not obtaining for example for process innovation in France. The results for organisational innovation are largely ambiguous or negative, at least in the case of France according to Duhautois et al. (2018). Significant to the latter is Muñoz de Bustillo et al.'s (2016) finding that worker representation and organised labour tips the valence of organisational innovations towards more favourable for job quality, underscoring the opportunity for effects to be changed under specific institutional and action circumstances. Thus, outcomes are not predetermined, but swayed by the agency of differently empowered actors under specific industrial relations regimes. This was most evidently illustrated in the cases on aerospace (Gautié et al., 2018) and retail logistics (Jaehrling et al., 2018) discussed above. Employee participation is therefore not just important for increasing innovation, but also at a collective level in ensuring that innovation takes place in a more equitable manner. This two-fold dimension of participation should be recognised and promoted both in policy and strategy.

Another way in which innovation and job quality are linked is demonstrated in Gallie's (2018) finding that incumbents in jobs high in "innovation-conducive job quality" (ICJQ) elements

(training and learning; task discretion and initiative; and job security) are 4.7 times more likely to be engaged in innovation activities than those low in these job quality factors. This also displays the gravity of the gap between the inclusion of high-skill workers in innovation activities and the exclusion low-skill workers from innovation activities. Qualitative studies discerned some of the mechanisms behind this result. One is that employees in low-skilled work are not invested with the required level of training, skill-development, tenure at work, and decision latitude to develop innovation contributions. A second is disenfranchisement due to lack of employee motivation to participate in innovation activities, as a result of a feeling of lack of investment and trust in them by management as innovation actors. A third is low job quality employees being in jobs and having tasks so rigidly controlled ("Taylorised") that they are only developable through system-changes from above (Jaehrling et al., 2018). A more universal factor found across industries inhibiting innovation that may disproportionately impact workers with lower ICJQ is work intensification. The reversal of the listed conditions becomes a recipe for increasing the propensity for innovation.

While another of Gallie's (2018) findings, a longitudinal trend towards an increase in ICJQ jobs in the EU from 2005-2015, and convergence between regions, is positive, a further finding should be more worrying to policy makers and corporate leaders. This is the that temporary jobs are decreasing in ICJQ, i.e., temporary jobs were found to be continuously declining, in terms of the aspects of job quality that contribute most to innovation processes. Thus, the move to more "flexible" workforce use erodes innovation capacity, corroborating the findings of Beugelsdijk (2008; also, Zhou et al., 2011), in addition to being a general job quality problem. There appears to a trade-off between flexibility and innovative capacity, and policy makers should consider what it might take to tip the balance in favour of more secure employment forms for its associated benefits.

Regarding employment, the most significant and consistent finding of the QuInnE project is that innovative firms have been shown to add rather than reduce the number of jobs. As discussed above, these are generally higher quality, higher skill (and therefore also higher qualification) jobs. QuInnE's studies thus provide evidence for the skill-biased technical change (SBTC) thesis. The positive dimension in improving job quality and employment should be lauded, but at the same time SBTC will increase inequalities in society through a general Matthew effect on work and labour markets with more jobs for the highly skilled, leaving the less skilled further behind either in unemployment or diminished quality jobs. Policymakers and citizens must recognise that innovation will not solve inequality, it will likely exacerbate it. Thus, inequality needs to be addressed directly with concerted policies for skill upgrading and not via hopes that innovation will not just assist growth, competitiveness, and employment, but also mitigate inequality. The QuInnE results indicate that it won't.

More encouraging, especially with regard to the topic of sustainable work and employment, is the finding that innovation when coupled with high job quality does not appear to push older workers out of the labour force. Rather the opposite seems to be the case. The countries enjoying such conditions are in the Nordic region, and their rather unique labour-

relations institutions likely play a role in this outcome (see Table 6 above and Erhel & Guergoat-Lariviére, 2016). Though it may be considered either anecdotal or telling, an example from the aerospace cases illustrates two different approaches in two different labour relations regimes. Faced with a very similar transition to implementing new production technology and the need for a more technologically sophisticated workforce in tight labour markets for skilled workers, a French firm chose to grant early retirement to the impacted employees and recruit new employees with "higher" qualifications. In close consultation with unions, a Swedish firm in the same situation at the same time largely retained and retrained its workforce (Gautié et al., 2018). This is further evidence that labour relations and institutions as well as firm choice play important roles in moderating the effects of innovations and a policy lesson for how this model of investment in training and skills upgrading can benefit a potentially vulnerable segment of the workforce.

Conclusion

QuInnE's empirical results affirm two encouraging effects of innovation. The first is that innovating firms increase employment. This result is not surprising for product innovation, which can reasonably be assumed to lead to increased market share and new market opportunities. More surprising is that it also holds for process innovation, where one would job-shedding due to rationalisation. The result regarding employment is unreservedly positive, and should be publicised to counter a widely spread notion that innovation leads to rationalising away of employment opportunities.

The second effect is that innovation tends to result in better quality jobs. This is also positive in and of itself. However, in line with the skill-biased technological change thesis, it creates greater disparities in society by disproportionately creating higher-end jobs for higher-skilled workers. This means that, left to itself, without compensatory actions, innovation will increase disparities in society. In other words, innovation should not be relied upon to increase social inclusion in the labour market and provide a broad spectra of employment opportunities. A logical two-pronged policy approach would be to ensure that as many people as possible can acquire higher skill-levels that match the demands for the jobs that innovation tends to create, while at the other end, securing the existence of jobs that lower skilled workers can enter the labour market with and develop in. Firm internal competence-development and job-ladders as well as external training will be needed to ensure that labour capabilities match future job demands.

Particular job quality factors have been found in both quantitative and qualitative studies to be significant in the innovation process, especially skills, autonomy, personal support, job security/contract stability competence development opportunities experimentation and voice and participation, but also scheduling and work life balance and ergonomic factors. A key conclusion from QuInnE is that in general there is not a high-road and a low-road to innovation, but rather a road to high innovation and a road to low innovation. The former is

characterised by high job quality, and the latter by low job quality. The exception appears to be for retail logistics and similar branches, where technological and organisational innovations are developed and implemented in a top-down manner, usually with deteriorating job quality as a consequence and with little chance for innovation from below. Contrary to deterministic prognoses, especially the case study findings show that firms can choose, and be guided towards the higher job quality, higher innovation road.

Acknowledgement

This article and much of the research cited in it was made possible by a grant from the European Commission's Horizon 2020 programme to the project QuInnE – Quality of Jobs and Innovation Generated Employment Outcomes (grant number 649497). The studies and findings are a result of the entire QuInnE team of researchers. We also thank the project's advisory board members for constructive criticism and comments throughout the project.

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Digitalisation and Sustainable work: obstacles and pathways

Lena Abrahamsson
Jan Johansson

Abstract

The aim with this article is to identify obstacles and find pathways for sustainable work in a digital future. We are all concerned about how our work will be in the future; will we be able to handle the new technology or will technology control us? The development is often described in black and white, either as *God's gift to mankind* or as *the wolf is coming*. However, the question is not that simple. New technology, such as digitalisation, seldom has in itself a particular way to change our work, whether positive or negative. Future work is shaped here and now, and the development is always possible to influence and control. Based on the vision of Industry 4.0 and observations of the latest technological development that already concretely affects workplaces and people, we have, with the help of theories of sustainable work, discussed what digitalisation can mean for work of the future. We have identified four critical issues that need to be discussed further: 1) The Swedish labour market model under attack, 2) Upskilling, deskilling, or reskilling, 3) Changed gender patterns and 4) Shaping an A and B labour market. The theories of sustainable work are well known and used in working life, in Sweden as well in many other countries, but the road towards digitalisation is complex and filled with traps and pitfalls that need to be handled. To enable positive development, the technical and organisational development needs also to include knowledge of the society, the human and the working environment.

Keywords: Sustainable work; Industry 4.0; skills; digitalisation; gender; Sweden.

Introduction

In this article we will discuss some obstacles and pathways to sustainable work in the context of digitalisation. "The wolf is coming" and "God's gift to mankind" are two common positions or reactions that follow many technical innovations. This also applies to today's debate on digitalisation, automation and artificial intelligence in working life. "The wolf is coming" indicates a fear that our lives will be deprived of something we want to maintain, while we

neither can nor really want to refrain from the digitalised society. Here we can recognise the fear that the robots will take over, and that our jobs will diminish. "God's gift to mankind" emphasises the advantages and new opportunities that facilitate and enrich our lives. Here we find techno-optimistic and often technology driven ideas. Society has participated in technological development with these mixed emotions over the last 20 years, and now there are clear signs digitalisation will take a greater leap into not only our everyday lives, but also our work lives in very concrete ways. Conditions that have been considered as given may not be so sustainable in the future. In other words, future work is shaped here and now. In order to find pathways to handle the new technology and design sustainable workplaces for the future, we need to get a picture of what is happening, but we also need a vision of where we want to go and how to get there. In these times of change, we as researchers have to take on the role of the wolf and ask the uncomfortable questions, but also to go between or beyond the two positions "The wolf is coming" and "God's gift to mankind".

The role of work in a digital industrial context

The German's vision Industry 4.0 (Lasi et al., 2014), and its Swedish companion Smart Industry: a strategy for new industrialisation for Sweden (*Regeringskansliet*, 2016), paint a bright picture of future working life, where smart machines continuously exchange information with each other, as well as with human workers. The industrial worker will be an expert who makes sure that production runs smoothly. The worker may no longer be "locked" in a control room; instead, the real-time process data and status of machines follow the worker as she moves around the factory. She can solve problems on the spot by remotely interacting with other production operators, experts, suppliers, or customers in multi-competent teams, or she can interact with a humanoid robot that assists in decision-making and analyses. Production control can be done in a digital model far away from the factory. In short, the augmented worker has extended senses and extended memory through technology that takes advantage of and supports human skills, increasing situational awareness, for example, through sensors embedded in the operator's clothes, while keeping an uninterrupted operational vigilance.

An interesting, and perhaps in part a scary, vision is presented by Romero et al. (2016) who, based on the technical core of Industry 4.0, form a typology of the future operators, Operator 4.0. This typology is built on eight characteristics that can be seen as the effects or possibilities of the new technology: *Super-Strength Operator* (physical interaction) using biomechanical support for increased limb movement, increased strength, and endurance; *Augmented Operator* (cognitive interaction) using Augmented Reality (AR) for integrating information from the digital to the physical world; *Virtual Operator* (cognitive interaction) using Virtual Reality (VR) for simulation and training of real situation that might contain risks; *Healthy Operator* (physical and cognitive interaction) using wearable sensors for monitoring health-related metrics as well as GPS location; *Smarter Operator* (cognitive interaction) using Intelligent Personal Assistant (IPA) for interfacing with machines, computers, databases, and other information systems; *Collaborative Operator* (physical interaction) using Collaborative Robots

(CoBots) for performing repetitive and non-ergonomic tasks; *Social Operator* (cognitive interaction) using Enterprise Social Networking Services (E-SNS) for interaction between operators and between operators and Internet of Things; and *Analytical Operator* (cognitive interaction) using Big Data Analytics for discovering useful information and predict relevant events.

The classification points to the numerous possibilities of integrating Industry 4.0 with human labour: some good and some bad. Nevertheless, there is an urgent need to investigate not only how these technologies are designed, chosen and implemented, but also their impacts on work in industry. There are a number of questions that need to be asked, and, as academics, we have a mission to be the social prosecutor who poses the uncomfortable questions. We have identified four such critical issues to discuss further in this article:

- The Swedish labour market model under attack
- Upskilling, deskilling, or reskilling?
- Changed gender patterns
- Shaping an A and B labour market

The Swedish labour market model under attack

Over the years we have witnessed an increase in labour flexibility, the decline of standard labour contracts, sub-contracting or outsourcing of work (Taylor, 2010), increasing self-employment, and mounting insecurity (Thompson, 2013). However, it is the use of digital platforms by global enterprises to crowd-source labour to small and micro sized companies all over the world that is reshaping work and employment conditions in the most visible way so far.

The term crowdsourcing was coined by Howe in 2006, and was presented as a new level of sub-contracting. For example, rather than relying on offshore jobs at low-cost locations, companies can outsource functions, once performed by employees, to an amorphous and generally large pool of individuals, using an open call over the Internet (Howe, 2008). The most significant differences between crowdsourcing and a traditional workforce are the higher levels of flexibility, scalability, access to a broad range of skills, and experiences at significantly less cost, coupled with the lack of employment regulations. This strategy appeals to industrial firms, as they are able to access a labour force that can expand and contract on demand, without any significant transaction costs or logistical hurdles. Management control is simultaneously 'at a distance' while remaining all-powerful when directing work tasks and determining the nature of reward. Relationships are fleeting and largely anonymous, with no obligation to provide support or facilities for the workforce.

Another aspect of the new technology is related to Scandinavian industrial sociology. In this field, Lysgaard's (1961) book on the workers' collective is regarded as seminal, one of the classics of its time. Although it is well researched and documented that workers act

collectively in the workplace, the term 'workers' collective' is rarely used in current Nordic research. It is, for example, well-known that the workers' collective functions as a set of norms, controlling the workers' relations to each other as well as the extent to which deviations from these norms (e.g., a certain type of masculinity, negative attitudes to management, and technological change) are counteracted or accepted. Materialised by this normative system, the workers' collective is based on a culture of resistance that attempts to gain informal control over the work situation. It can also function as a protector of practical and hard physical work, referred to as 'embodied competence' or 'body capital'. Consequently, new technology and new management models are often resisted by the collective system. In this context, Industry 4.0, automated factories, and Internet of Things represent a new technological and managerial landscape to which several reactions are possible. There is a need to analyse the opportunities and challenges represented by the current technological and organisational development, and to create a theoretical platform for the understanding of the transformation of work and workers, based on the workers' collective.

On an aggregated level, this is about the survival of the Swedish labour market model. The Swedish labour market is one of the most harmonious in the world, based primarily on bi-lateral agreements between the parties, rather than on legislation. In a global internet-based labour market, there is hardly any space for collective agreement and the Swedish labour market model, instead the legislative path seems to be the only way possible. Here is an interesting opening where the Swedish trade unions have long been more co-operative than their European colleagues. Relationship to new technology has often been characterised by "If you can´t beat them, join them" (Johansson et al 2013).

Upskilling, deskilling, or reskilling?

The visions of fully automated factories, Industry 4.0, and Internet of Things not only change the technological landscape of industrial workplaces and organisations, but also cause a qualitative knowledge transformation: from bodily and tacit into more abstract and theoretical knowledge and skills. In the optimistic view, we can read that Industry 4.0 requires workplace learning, as well as continuous education and systems that make use of the workers' skills: i.e., a learning organisation. Using Kern and Schumann's concepts (1974), we can see a clear transformation from the craftsman-like qualification into more technical qualifications. The new demands for teamwork, responsibility, and comprehensive understanding of production flow can be seen as a movement from qualifications dependent on the process, to qualifications more independent of the process (cf. Kern & Schumann, 1974, 1987; Bright, 1958; Blauner, 1964; Johansson, 1986). What was earlier the workers' tacit knowledge (Polanyi, 1967) will be formalised into theoretical knowledge, digitalised, and used in computers and smart phones. In this transition, we can see contradictory movements of upskilling: rapidly changing skill demands and more theoretical, comprehensive, and communication tasks: and deskilling, fragmentation of individual craft knowledge and whole tasks (Abrahamsson & Johansson, 2006).

Whether it is a question of upskilling, deskilling, or reskilling, the transformation of knowledge affects workplace cultures, community of practices, and identities. Individuals and organisations will have to create and recreate qualifications, identity, and gender, when meeting new technology in a changing context. For example, the new knowledge and skills needed may be more abstract and theoretical, but still based on bodily and tacit knowledge, although in new and less physically demanding forms. A common optimistic scenario gives women and other previously underrepresented groups a chance to enter and master different types of industrial work, such as in mining and process industries. Given that this scenario is realised, it does not entail a smooth and unproblematic process. The identity and symbolic aspects of work often lag behind the developments in, for example, technology and qualification demands, resulting in restoring responses during processes of organisational changes (Abrahamsson, 2014). As the workers' collective (cf. Lysgaard, 1961; Fältholm, 1998) is built and sustained by processes of homosocial interaction and identification and on norms controlling likeness between workers, there is reason to investigate how new technology affects these processes. The seemingly robust gender and power relations will be challenged, renegotiated, and ultimately transformed.

Changed gender patterns

One of the hopes of technological development in the industry is that it will allow for changed gender patterns: a better work environment combined with higher qualification demands that will enable more women to work in the industry, creating better gender equality. But the picture is not so clear-cut. At many industrial workplaces where digitalisation is taking place, it is quite common that technology is associated with masculinity (Berner, 2003; Mellström, 2004). This masculinisation of technology is evident in the discourse of the technology, as well as in the culture of these companies. At traditional male-dominated industrial workplaces, even if the workplaces undergo digitalisation, the connection to masculinity lingers, because of the old strong symbolic links to a traditional blue-collar masculinity (Abrahamsson, 2006; Andersson, 2012; Eveline, 2001; Lahiri-Dutt, 2007, 2012, see also Collinson, 1992; Whitehead, 2002; Willis, 1979). For example, the work is often associated with explicit expressions of a special type of masculinity, "macho-masculinity", which is almost difficult to take seriously and analyse (Somerville & Abrahamsson, 2003). The fear of being seen as less masculine is a common theme in these kinds of workplaces. Here men, more than in other workplaces, find it difficult to be associated with competences, attitudes, or behaviours that have a female gender-code (Eveline, 2001, 1989; Gherardi & Nicolini, 2000; Ely & Meyerson, 2008; Somerville & Abrahamsson, 2003) or have associations with unmanliness (Connell, 1995). As a result, we can see an interesting and seemingly paradoxical tendency that workplaces and work tasks introduced as a result of automation, computerisation, and robotisation can undergo a process of "feminisation" while the men hang on to the old technology (Olofsson, 2010). One example of this is when the mining workers underground, half-jokingly give the remote-control workers sitting above ground nicknames such as "the velour workers" (Abrahamsson & Johansson, 2006; Andersson, 2012), meaning that they are of a soft unisex type of men, almost feminine, and not 'real' workers. On the one hand, this trend opens up new gender

constructions in industry; on the other hand, this trend can be seen as a symptom of a conservative organization, i.e., barriers to implementing the new technology, and therefore important to study and understand.

At workplaces with a more gender-balance, male workers may attempt to restore the existing local gender order, by telling macho-masculine stories, refusing to do 'women's work' or 'womanish work', and openly resisting women at the workplace (Abrahamsson, 2014; Eveline & Booth, 2002; Lahiri-Dutt, 2012). In these workplaces, ideas about gender: femininities and masculinities, often are so conservative they can create trouble during organisational changes and the implementation of new technology (Abrahamson, 2002; Hollway, 1996; Collinson & Hearn, 1996).

Gender is something people do and construct in social interactions (Gherardi, 1994; West & Zimmerman, 1987, 2009), embedded in work identities, work organisations, and technology (Acker, 1990), formed by complex societal processes and notions of masculinity and femininity. Many attitudes, norms, and cultural symbols at work that are learned through workplace socialisation are connected to gender and the (unequal) gender order (Hirdman, 1988, 2001). Tacit collective agreements and a continuous dramatization of gender both restore and change our ways of seeing masculinity and femininity. This play does not become really visible unless the existing masculinity and femininity are threatened (Butler, 1990, 1993), such as in the transformation towards a digital industrial context. Even if such processes often are connected to the restoration of the unequal gender order they are situated in, these processes are continuously changing, and there is a possibility to challenge and transform these processes (Abrahamsson, 2014).

Shaping an A and B labour market

In the optimistic visions smart systems, automation, and remote control will take over dangerous as well as routine work, so that production personnel can focus on learning, creating, and valuing work tasks in a safe environment (Gill, 2014). Even if the development will not be as the positive visions predict, depending on how the new technology is developed and interpreted, there will most likely be new types of industrial work, new types of work environments, and thus new work environmental problems. For example, digital technology and remote control, together with the emerging global and sometimes boundary-less work, not only results in increased freedom to decide how and where to work, but also results in higher demands of availability, perhaps 24 hours a day, seven days a week. This change may blur the boundaries between work and private life. Moreover, since the ability to control and monitor the individual increases, there will be a risk of new psychosocial stress. An increased information flow and accessibility could also lead to anxiety and job strain (Hoonakker & Korunka, 2014).

Other examples come from enhanced possibilities of production distribution, decentralisation, and outsourcing, both locally/regionally and in the global context. This

creates dynamic systems of contractors, agency staff, and other actors temporarily active in the same physical workplace or in the same virtual/digital workplace. As mentioned above, the employment form as we know today might dissolve and be replaced with crowdsourcing and what can be called liquidised employment (Holtgrewe, 2014), complicating the co-ordination of work environment interventions and responsibilities (Johansson et al., 2010).

We might also expect that old work environmental problems will appear in new contexts, and for other groups of workers. Some workers may participate in shaping the systems, while others will become machine assistants, or handle the repetitive and low qualified work tasks that could not be integrated into the automated and smart systems and the learning organisation. Maybe it is time to revive the old debate about the A and B labour market (Braverman, 1974; Kern & Schumann, 1974)?

Future work: pathways and implications

For citizens in a democratic societal context, it is a civil right to be involved in shaping their own future. For many, however, in organisational work contexts characterised less by democracy and more by hierarchical power asymmetries and (increasingly precarious) wage labour contracts, the diffusion of new technology into their working life is sometimes perceived as a rather deterministic process, where their discretion is viewed as very limited. Our ambition is to create awareness of what the new technology can mean and for whom, and at the same time generate knowledge that development is possible to influence and control. There is always room to manoeuvre, for shaping how new technologies can be useful and relevant to people and society. The social dimension must have a prominent place in this process, both in designing the technology and in analysing it from several perspectives.

However, there is no lack of knowledge about the significance of the social dimension. Based on extensive and relatively coherent international research on work environment and work organisation, it is possible to formulate a summary list of requirements, almost a utopian vision, of what constitutes sustainable work (cf. Johansson & Abrahamsson, 2009). Such a list could for example include demands that, not only are physical risks and problems eliminated, and equipment and work sites are adapted to suit people's different physical and psychological set-up, and designed to make work easier, but employees also enjoy autonomy and a sense of participation and influence in matters both large and small. These involve being able to influence the division of duties and the pace and method of working, in relation to both other people and to the technical system used. The list could also include that the work and workplace provide physical, intellectual and cultural stimulation, variety, opportunities for social interactions, context and opportunities for learning and for personal and professional development. Here, workloads, demands, and challenges (both physical and psychological) are balanced at a reasonable level. The list would also include gender equality, fairness, respect, trust, democratic leadership, and open communication and opportunities for enjoyment and social support for all employees. There should also be good opportunities

for a fair, stable and predictable income and to combine work with a rich and sustainable life outside of work.

To conclude, the vision of sustainable work is known and accepted by most people. It is rather the road that is unknown and filled with some dangers and pitfalls. The design of new technology and new work organisation must be harmonised, with both good working conditions and efficient production that can compete in a global market, but the quite optimistic scenario described in the Industry 4.0 texts is not likely to become a reality by itself. New technology has not in itself a particular way to alter the effectiveness or working conditions, whether positive or negative. To enable a positive development, the technical and organisational development needs also to include knowledge of the human, the working environment and the organisation of work, both the formal and informal organising.

Industry 4.0, essentially a technology-driven vision, generally refers to a technological revolution with a strong focus on production rationalisation, but we can also see that the organisational recommendations set up for the implementation of Industry 4.0 (e.g., production flow, connected processes and systems, horizontal integrated and flexible organisation, learning and production standardisation, and diagnosis) (see Kagerman et al. 2013) have clear similarities with BPR, The Boundaryless Organisation, Learning Organisation, TBM, TQM, Six Sigma, and Lean. Therefore, there is a need for critical organisational analyses, discourse analyses, analyses of embedded conflicts in Industry 4.0, power shifts, and invisibility of power. In addition, there is a need for analyses related to other current organisational trends (e.g., centralisation, monitoring, requirements for voluntary, storytelling, and corporate branding) and wider social changes.

In general, the technical development is positive, but there are many questions that must be clarified, and we have discussed four of them. The development cannot and should not be stopped, but it requires reflections and considerations, so we do not create more problems than we solve. Research has an important role to play, when new technology should be valued and introduced, but that role is not pre-given to us; we have to mark our position by highlighting issues that are perceived as important and relevant. We cannot let the Industry 4.0's advocates set the discourse, alternative questions must be asked, other type of experts, such as academics, must be engaged, and alternative issues must be communicated and discussed by a wider audience. In the title of the article, we ask the question: *The wolf is coming or God's gift to mankind*? In order to experience sustainable work, we as researchers sometimes have to take on the role of the wolf, and ask uncomfortable questions.

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Stakeholder collaboration inspired by the Nordic model: Towards sustainable work and competitiveness during an industrial start-up

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Abstract

External stakeholder collaboration is vital for new industrial projects and establishments. The aim of this paper is to explore why and how new firms can create relations and stakeholder collaboration with trade unions during industrial start-ups. A case study was carried out in the early phases of a new firm´s major greenfield project aimed at establishing a new industrial domain in a Nordic context. The results showed that early co-operation between a new firm and trade unions has the potential to proactively address prerequisites for sustainable work in design phases of new factories, but also to strengthen the attention to other dimensions of social sustainability that are crucial for an industrial start-up's long-term possibilities for success. However, specifically in a rapidly growing new firm, there needs to be a systematic approach that incorporates continuous anchoring activities both within and between the stakeholders. Practical implications are how new firms can initiate and establish co-operation with trade unions and other social partners in fast-moving work environments and change processes. Hence, the study identifies advantages and approaches for new firms to build relations with trade unions in a stakeholder collaboration chain inspired by the Nordic model. Further, to proactively pay attention to dimensions of social sustainability in a new firm´s early development phases and change processes, such as industrial start-ups, seems beneficial from an individual, business, and a societal perspective.

Keywords: Entrepreneurship, high-growth, social sustainability, trade union co-operation, production system development

Introduction

Research emphasises that collaboration and establishing relationships with external stakeholders are vital in development phases of a business, because they create an innovative environment, with a collective ability to take proactive action and to respond to opportunities (Akerhurst et al., 2009; Tripathi et al., 2019). Stakeholders collaborating in an industrial start-up context can also be regarded as regional intermediaries, with an important role of forming shared innovation strategies between the actors, and attracting anchor tenants to the region (Smedlund, 2006). Thus there is potential for fruitful synergies and successful realisation of plans, by way of collaborations between interdependent actors and stakeholders in entrepreneurial communities, such as new firms and industrial start-ups (Audretsch et al., 2011).

Crucial elements for achieving sustainable change processes are three-party collaboration between the government, companies, and unions, as identified in a Scandinavian context (Brulin & Svensson, 2016). However, there is a gap in the literature on stakeholder collaboration that is focussed on sustainable work during industrial start-ups (Harlin & Berglund, 2020). Some obstacles for operationalisation of sustainable work dimensions (as part of social sustainability) during industrial development phases are that these dimensions are fuzzy and not clearly defined (Vallance et al., 2011). Other obstacles are that there might initially be a lack of internal knowledge to design and realise future plans in young companies with a high density of entrepreneurs (Davila et al., 2010). Previous research describes how collaboration with external stakeholders such as trade unions may fill this gap, and contribute to jointly identifying potential problems, finding solutions, making decisions better rooted among employees and enabling organisations to implement challenging decisions (Levinson & Wallenberg, 2006; Levinson 2008). Other advantages of trade union co-operation in early development phases are possibilities of increased knowledge and understanding of "what really works" and early anchoring amongst a wider workforce (Totterdill et al., 2016). In a Swedish context, specifically the co-operation between industrial organisations and social partners is beneficial (Zellman & Kemp, 2004). Several researchers have taken an interest in the Nordic model related to work, which is characterised by a comprehensive collective agreement system, employee participation in development phases, systems for improving the working environment, and collaboration between organisations and social partners (Nielsen et al., 2012). Additionally, early trade union collaboration in decision processes are found valuable by management and has the potential to increase employee participation in change processes (Kjellberg, 2011). However, previous research on industrial trade union collaboration focusses mostly on daily operations in established organisations, and less on collaboration during radical changes (Rydell, 2015). In an increasing industrial pace of change, it is increasingly important to consider this from a work perspective, where Johansson & Abrahamsson (2009) stress that new industrial contexts create new prerequisites and new opportunities for development. Thus, a question raised in this paper is the potential and conditions for new firms during industrial start-ups to establish relations and collaborations with trade unions in very early phases. By studying an industrial start-up (a new firm´s greenfield project in its early development phases), the aim of this paper is to explore why

and how new firms can create relations and stakeholder collaboration with trade unions during industrial start-ups.

Literature overview

Stakeholder collaboration in an industrial start-up ecosystem

In the context of "start-up ecosystems", e.g., organisations that collaborate to support a start-up in a region (Tripathi et al., 2019), the early establishment of relationships between stakeholders is found to be crucial. Entrepreneurship literature further emphasises the importance and the advantages of nascent firms´ collaboration with stakeholders, and of building relationships that enable synergies (Audretsch et al., 2011; Bank et al., 2017; Volkmann et al., 2019). Research also emphasises the potential in learning from different sources, where collaboration and building long-term relationships between stakeholders, such as enterprises, social partners, researchers, policymakers, and consultants, may create "joint intelligence" (Totterdill, 2015). This is also supported by studies of stakeholder collaboration in entrepreneurial contexts, where there is the potential to create win-wins for participating stakeholders and a positive learning process for all involved (Klofsten & Lundmark, 2014).

External stakeholders may co-operate for different purposes during start-up, with potential to support acceleration of the start-up, and of the new firm´s overall business and innovation strategy (Kohler, 2016). For example, stakeholder collaboration may enable the preconditions for innovation capability, the ability to jointly identify and respond to opportunities (Akehurst et al., 2009), and successful workplace innovation (Totterdill, 2015). Hence, depending on the jointly focussed development area related to a firm´s change process and desired outcome, this collaboration needs to be carried out at different levels such as local, regional, and national levels (DiVito & Ingen-Housz, 2019).

To achieve the desired outcomes of stakeholder collaboration, research emphasises approaches and prerequisites that need to be considered. Influencing factors are the composition of actors in the network and their interrelationships (Elfring & Hulsink, 2003). The maturity of an organisation also needs to be considered where there may be different prerequisites for parties who co-operate regarding structures, dynamics, and experience (Kohler, 2016). Studies carried out in entrepreneurial programmes also pinpoint that an aspect that needs to be taken into consideration is that it may take time for new entrepreneurial businesses to build and establish a collaboration system (Klofsten & Lundmark, 2014). They also identify that the roll-out and replicability, e.g., the transfer from the initiating organisation, is efficient once there is a receiving stakeholder with assigned tasks and resources. Furthermore, enabling success factors are that the process is supported by a programme manager, coach or workshop leader with practical experience within the domain, and that it is important that the intended process is supported in three ways: internally within the organisation, externally among stakeholders, and also from participants joining the

process (Klofsten & Lundmark, 2014). Hence, a systematic approach in a collaboration programme is required, with consideration of design parameters such as: proposition (i.e., the purpose and what the collaboration offers); the process (i.e., how it is run); people (i.e., who needs to be involved); and place (i.e., where the collaboration is carried out) (Kohler, 2016).

As a new firm´s stakeholder collaborations during change processes such as industrial start-ups are influenced by several factors, it is also vital to consider key elements and to gain understanding of mechanisms that affect sustainable change.

Approaches for sustainable change processes

The notion of sustainable change can be characterised by two interrelated perspectives of content and process, and studies of change need to be related to the specific context (Pettigrew, 2012). A content perspective entails a view of sustainable change characterised by a balance between a result orientation (in terms of effectiveness, economic growth or innovation) and good working conditions (in terms of health, gender equality, learning and development) (Elg et al., 2015). Its focus is in line with the idea that efforts striving toward sustainable development must handle and balance different, sometimes conflicting needs that may be associated with a change process. In practice, at the point of departure, enablers for realising a change process "from visions to action" need to consider ethics and values, consensus of the aim, the stakeholders' roles as well as the management system for the mission (Svensson & Brulin, 2014; Svensson et al., 2013). In a process perspective, sustainability is about the mechanisms that lead to long-term effects of development efforts in organisations. The way that change is carried out thus has immediate and direct consequences for the probability of successful change. Static and programmatic ways of organising for sustainable change often lead to failures. Instead, change is viewed as an open process of learning, and mutual adaptation between different actors and perspectives (March, 1981; Beer et al., 1990; Brulin & Svensson, 2016).

Furthermore, Svensson and Brulin (2014) have identified three elements promoting sustainable change processes: i) active ownership; ii) broad collaboration in partnerships; and iii) developmental learning, as illustrated in Figure 1.

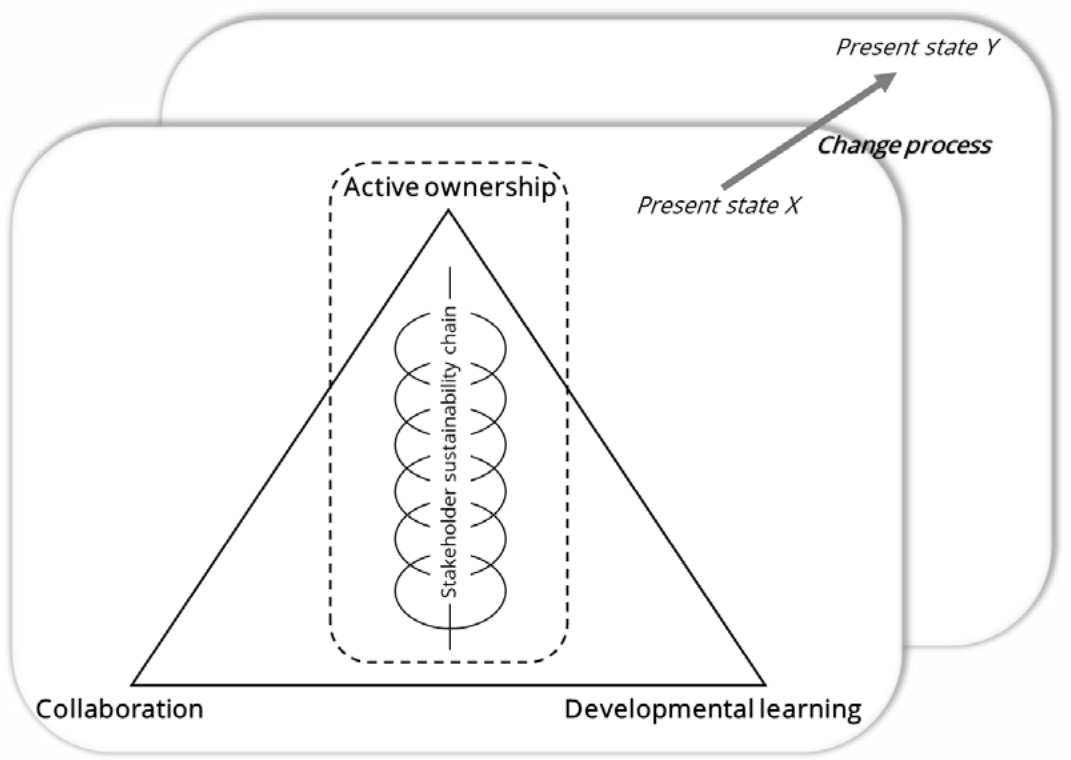

Figure 1. Mechanisms for sustainable development of stakeholder collaboration and long-term effects of change processes.
The "stakeholder sustainability chain", a part of active ownership, illustrates interconnections between stakeholders in change processes (modified from Svensson and Brulin (2014).

There is broad consensus that change efforts often fail due to lack of ownership. The mechanism that knits this together is the first element, active ownership. It directs attention to the various roles and engagements that owners of projects and programmes as well as stakeholders. must pursue, as illustrated in the "stakeholder sustainability chain", Figure 1. For example, a project organisation that considers and balances perspectives of different stakeholders may lead to more sustainable development in different types of change processes over time, e.g., improvement and development work (from a present state X to a new present state Y). Thus, if a part of the chain breaks, the prerequisites for sustainable development may also fail. Furthermore, the second element, collaboration, enables broad inclusion of actors in partnerships, where the robustness and anchoring of change are secured. The third element, developmental learning, is the ability to utilise learnings initiated from disruptions or new challenges requiring new approaches or rethinking (Ellström, 2010; Svensson & Brulin, 2014).

Characteristics of the Nordic model related to work

The basic idea of the Nordic model related to work is trade union collaboration at workplaces and that a firm´s stakeholders share a common vision that it will create a "win-win" situation, i.e., lead to positive effects for both employees and employers (Huzzard & Nilsson, 2004).

Previous studies witness that employee participation in early phases of radical change processes enable prerequisites for an offensive and solution-oriented collaboration in a long-term perspective that considers interests from both employees and employers (Garmann-Johnsen et al., 2018). Furthermore, trade union collaborations related to competence and workplace-related issues may contribute to competitive advantages, as it may counteract employees´ contradictions and instead create drivers for engagement both in daily work and during change processes (Kjellberg, 2011). Thus, Nordic approaches for workplace-based developments with a high degree of employee participation in development efforts (Sarfati, 2014) deserve reflection by new firms and industrial start-ups. This also applies to the process of achieving collective agreements between employers and employees, which is at the core of this arrangement (Nielsen et al., 2012). There are challenges, however, and the literature tells of both perceived negative and positive impacts of trade union collaboration at workplaces based on the Nordic model. Experiences of trade union collaboration from other countries or organisations found it pessimistic and conflict-oriented, and created limitations (Geary & Trif, 2011). On the other hand, other literature highlights improved possibilities to implement difficult decisions, perceived working climate, increased productivity, increased flexibility, improved job security and increased employee influence (Geary & Trif, 2011; Glover et al., 2014). Furthermore, the increasing speed of change increases the need of innovative activities in stakeholders' collaborations that promote both development of sustainable work, as well as flexibility and efficiency (Hasle, 2014).

Research methodology

A case study with an interactive research process approach was carried out at a new firm during the start-up firm´s trade union collaboration process in early development phases of planned production facilities. The study ran for 26 months. In frequent collaboration, the assigned researcher, practitioners from the start-up firm and external stakeholders, i.e., members representing three trade union organisations in the firm´s working councils, interacted throughout the whole research process. All had the opportunity to contribute to an interpretation of the research object, and common conceptualisation, based on the model for "interactive research approach" (Nielsen & Svensson, 2006; Svensson et al., 2007). This approach is characterised by "recurrent interactions and joint learning activities between researchers and practitioners, in commonly agreed efforts to study change and innovation in organisations" (Ellström et al., 2020). It has similarities to the Norwegian tradition of action research with the specific aim of developing workplaces in a healthy, participatory and productive way (Hilsen & Kværne, 2020). However, it differs in that the role of the researcher is to focus on joint learning and knowledge creation, rather than having a driving role in the practical development work (Ellström et al., 2020).

In this case, the start-up firm took the initiative for the research collaboration, and participated in initial phases to jointly formulate the scope and research approach. A steering group for the research project was formed consisting of a representative from the new firm,

the funding organisation and the researcher. Due to the high degree of confidentiality, there was an agreement on how to document, store and manage data.

The case study

The case in this paper was part of a research project with an overall objective to contribute to knowledge about establishment of a new industrial domain, i.e., a new firm´s start-up with a mission of development and large-scale production of products and sustainable solutions for energy storage in Europe, with start in Sweden. It was regarded as a unique greenfield project carried out at a fast and demanding pace, and considered one of the most important industrial investments, with high ambitions to accelerate the pace of transition towards electrification, thus contributing to European climate goals and a fossil-free society. The firm had a strategic sustainability approach, initially focusing on dimensions of economic and environmental sustainability. However, insights grew during the first year in the high-growth firm of also paying attention to sustainable work dimensions, a part of social sustainability. Consequently, as reflected on in this paper, they initiated a stakeholder collaboration process with three relevant trade union parties (i.e., social partners) in the early phases of the start-up, where the overall purpose was to proactively create conditions for development of a world-class concept for working conditions and work organisation in future production facilities, and to become a member in an employer association that supported the initial collective agreement process.

The main purpose of the part of the case study reported in this paper was on key learnings from the new firm´s collaboration with social partners such as trade unions. The unit of analysis in this study was the new firm´s stakeholder collaboration process with trade unions during the industrial start-up, i.e., during the early development phases and emerging growth of the new firm. The new firm is referred to as the co-operation unit.

Data collection and analysis

The case study focussing on the new firm´s stakeholder collaboration with trade unions started one year and three months after the official launch of the new firm, and was carried out during the following 26 months. Data collection was mainly conducted through observations at the start-up firm´s trade union meetings. Data was also collected through open interviews with representatives from three trade unions, and documentation studies from the meetings. The researcher observed 21 working council meetings with opportunities to interact by way of presentations and dialogue regarding sub-results from the case study, and documentation of the trade union collaboration process, see Table 1.

Table 1. Data collection – meetings

Working council meetings Participants: Representatives from the new firm and trade unions	**No. of meetings**
Central Working Council (Company group)	8
Regional Working Council (Factory A)	6
Regional Working Council (Factory B)	5
Overall stakeholder meeting (all working councils represented)	2
Total	**21**

The formal trade union collaboration was carried out in the new firm´s working council meetings. The external stakeholders represented three trade union organisations at a central level of the firm (Central Working Council), and as the firm approached construction and industrialisation phases of the two factories in two different regions, two Regional Working Councils (Factory A and Factory B) were also initiated and established. The process leader and the manager of "growth and culture" in the new firm were drivers of the process, and links between stakeholders in the different working councils. During all the trade union meetings, the process leader was the chairman, and the researcher of the case study the secretary, documenting the minutes of the meeting. After each meeting, the meeting minutes were verified and validated in two steps, first by the firm´s manager of the union collaboration process and the process leader, and then by those in attendance at the meetings. This was the first point on each union meeting agenda. Additionally, data was collected by observations at 24 internal preparation and follow-up meetings in the new firm, and regularly from open interviews with the process leader. Data collection also included five open interviews carried out with the union stakeholders, as well as studies of firm documents, primarily PowerPoint presentations and internal meeting minutes. This case study was part of a larger research project with a mission to follow-up learnings from a start-up in early phases, hence, a new firm´s major greenfield project within a new industrial domain, as reported in Harlin and Berglund (2020).

The identified elements which constituted mechanisms for sustainable development of change processes, as described by Svensson and Brulin (2014), were regarded as relevant to consider in a change process such as an industrial start-up carried out by a new firm, i.e., where collaborations between a new firm and external stakeholders are vital to create conditions to support scale-up and growth at a fast pace, and thus used in a thematic analysis in this paper.

Findings

The context: Point of departure and drivers for the collaboration process between the new firm and trade unions

In an early dialogue between top management and an expert in industrial and stakeholder relations, the new firm learned of the importance of strengthening the approaches regarding the social dimensions of sustainability related to sustainable work, in parallel with economic and ecological dimensions, which was on the new firm´s strategic agenda. A trigger for starting a co-operation with trade unions was a reflection from an external stakeholder that the new firm "was strategic and clear about sustainability from an external perspective, but not as clear on how to address sustainability and sustainable development within the firm, that is from a human perspective". Consequently, to strengthen competences related to sustainable work, and create strategic relations and processes to support establishment of the new firm and its major start-up within a new industrial domain, an expert, also a former executive chairman of a large trade union organisation, was assigned as an internal process leader. This was the starting point for the new firm´s process of establishing a collaboration with social partners, e.g., relevant employee organisations (trade unions) and one employer association.

As described before, the point of departure of the case study was one year and three months after the official launch of the new firm. During this time period, the new firm´s project organisation initially planned for two factory establishments: *Factory A*, a test and industrialisation factory requiring 200 to 300 employees in one region, and *Factory B*, a large-scale factory (requiring approximately 2500 employees) in another region. Factory A was crucial as a model for the first large-scale factory, but also for potential forthcoming factories in other regions and countries. Hence, the new firm planned for extensive growth during the coming years, and at the start of this case study there were 110 employees and over 20 nationalities, with new employees hired by the firm every week. After 26 months (at the end of the case study), the firm had grown to over 700 employees from over 70 nationalities, representing a wide range of countries and fields, with experience from several branches worldwide.

An executive entrepreneur, who also was part of the top management team, was appointed to develop the new firm´s growth, and to build a strong company culture in parallel with managing daily operations in the fast-growing firm. This included developing a conceptual model of a forthcoming production work organisation, enabling rapid decision-making, efficient onboarding, learning and competence development in an evolving organisation beyond national borders. The two founders of the firm had previous experience of rapid, large-scale industrial start-ups, and expressed that they wanted to merge experienced advantages in practice with strengths of European models for culture and work organisation. Specifically, the study showed that reasons for the new firm's initiating relations and

collaboration with stakeholders such as trade unions were their efforts to learn from the Nordic approach related to industrial work, as expressed by one of the founders:

> «Our ambition is to build on the European model of utilising success factors from other industrial working cultures. »

> «The relationship between companies and unions is unique in Sweden. It is a unique advantage. Both how the unions are genuinely interested in the company doing well, and for employment conditions. »

Furthermore, the new firm´s drivers for initiating collaboration with trade unions in its early development were to create prerequisites "to build right from scratch", to gain support to proactively manage potential obstacles related to work and culture during the fast pace of the firm´s growth, and to develop a replicable conceptual model for industrial workplaces and future factories.

On the other hand, reasons for trade unions to initiate relations in an early co-operation process with the new firm already during start-up were illustrated in the following quotes:

> «This firm is unique because it's a huge business ambition that doesn't really exist yet. It is particularly interesting because you have to grow big and need capability to handle many things quickly. It´s not every day that we are involved in creating a new industrial domain with new factories in Sweden. »

> «Being involved in building companies from scratch can create many different values, it can work right from the start. »

> «As a trade union representative, it's about being a mediator in solution-oriented problem-solving. We want to be involved in creating this industrial journey – with great participation. »

> «If you build good relationships with trade unions, it will be easier when complexity increases. »

Both the new firm and the trade unions expressed that the aim for collaboration was to jointly contribute to the success and competitiveness of the new firm, and to strengthen the firm's possibilities for a successful start-up and establishment of factories within a new industrial domain in a Swedish context.

These drivers were commonly agreed upon and initially described in a "Declaration of Purpose for Collaboration" (DoP) with the three relevant trade unions:

> «The purpose of the co-operation (as described with this Declaration of Purpose), is to contribute long-term to the success and competitiveness of the start-up firm as well as to develop a world-class concept for future manufacturing sites. »

More specifically, the aim was to create prerequisites to design "the best future industrial workplaces", demonstrating flexibility, power of innovation and excellent manufacturing results.

The process: Building collaboration with social partners during the new firm´s industrial start-up

The new firm built up the collaboration with social partners, e.g., three relevant trade union organisations, and became a member of an employer association. As described previously, the firm recruited the expert within industrial relations as a process leader, with the mission to create relationships with trade unions and furthermore to structure and develop fruitful co-operation striving for outcomes enabling sustainable work and competitive advantages for the new firm. The new firm´s very early stakeholder collaboration approach with social partners was considered unique and innovative by all involved parties. Table 2 summarises the parties and representatives who were involved in stakeholder collaboration in the early phases of the new firm development and industrial start-up.

Table 2. Stakeholders in collaboration

Stakeholders		**Central Working Council**	**Two Regional Working Councils: Factory A and B**
co-operation unit	The new firm	Representatives from the company group. (Top management, human resource management, process leader)	Representatives from the company group and the production organisations: Factory A and B. (Production management, regional human resource management, and eventually team members)
Social partners	Employers association representatives	Representatives from national level	Representatives from national level
	Employees organisation representatives	Three trade unions with representatives from national level	Three trade unions with representatives from regional level

The first step was an "initiation and anchoring" phase, where mutual insights and agreements for starting a co-operation were founded at top management level at the new firm as well as

at relevant trade union organisations. The strategy was to anchor the process on a strategic level nationally, by creating a Central Working Council (at company level and trade union national level). Based on the commonly agreed Declaration of Purpose (DoP) for trade union collaboration, as described previously, the DoP was used when new people joined the collaboration process. It was also found appropriate to use in the extended process, when they proceeded further with expanding the stakeholder collaboration chain in regions for future factories, in alignment with the industrial start-up phases. When the new firm approached industrialisation phases, two Regional Working Councils were initiated on regional levels for the planned factories in different municipalities, in this case Factory A and Factory B.

As the new firm further approached commissioning and industrialisation phases in the production plants, initiatives were taken to create local trade union working councils (within the new firm). In the expanding stakeholder collaboration process, the different levels of working councils worked in parallel, both vertically and horizontally, with the aim that the local working councils became drivers for realisation and further development of the trade union collaboration process and co-operated within relevant topics for the two factories.

The meeting structures were developed over time, and started with monthly meetings in the Central Working Council, which also combined them with benchmarking visits at two global companies. Gradually, when the Regional Working Councils were formed, they formalised the meeting structure with quarterly meetings for each Working Council and opportunities for transparency and joint large meetings in between. A challenge was the fast pace and complexity of the emerging new firm, and parallel work processes requiring attention, and representatives in the Working Councils developing roles and changing positions, both within the co-operation unit as well as among the trade union representatives.

Furthermore, initiatives were taken as the new firm´s business proceeded with planned extended industrial establishment of factories in Europe. Additionally, the process leader organised several informal meetings where the purpose was to identify the new firm´s needs and requirements as well as key actors among social partners with whom it was relevant to partner and to harmonise strategic approaches.

The content: Approaches, co-operation topics and outcomes

In general, at a central level, strategic topics were addressed, and as the new firm further developed and proceeded, operational topics were managed at the regional levels. The Regional Working Council for Factory A addressed topics regarding the test and industrialisation factory in one municipality, while the Regional Working Council for Factory B addressed issues regarding the forthcoming large-scale factory. However, these two factories were planned to be complementary; there were common topics for both working councils regarding design for production work organisation, roles, leadership, etc. An overview of co-

operation topics during the Working Council meetings is categorised and exemplified according to the elements vital for sustainable development and long-term effects identified by Svensson and Brulin (2014), see Table 3.

Table 3. Extract of the new firm´s approaches and topics in collaboration process with the trade union.

Thematic summary based on Svensson and Brulin (2014).

Elements for sustainable development		**Extract of the new firm´s approaches and topics in collaboration process with the trade union**
Active ownership	Prerequisites for the creation of the process: Resources, governance, and attention	*Strategic sustainability focus* - Increased top management attention to dimensions of sustainable work, part of social sustainability, in early start-up phases
		Project creation for the stakeholder collaboration process with social partners - Assigned process leader with a clear mission to create relationships and fruitful co-operation with social partners, i.e., employer associations and relevant employee
	How results were taken care of and become part of the regular business	*Forming flexible Collective Agreements (CA)* - Integration of prerequisites in a CA for the first factory, suitable for the start-up firm's demands and prerequisites, where high flexibility was needed
		Structured working council process with common aim to rapidly achieve drivers within the firm - Regular meetings and follow-ups both in-between and at forthcoming meetings - Rapid roll-out also striving to create broad participation at local workplaces - Leadership requirements defined, serving as a base when recruiting leadership positions
Collaboration	Collaboration between strategic organisations for development and joint knowledge creation	*Strategic anchoring at top management level and key functions* - Decision to start a process with intention to establish fruitful collaboration with social partners, i.e., both employee and employer organisations at national level - Constantly anchoring activities carried out by the process leader due to changes in the new firm´s work organisation with people changing positions
		Invitation to relevant stakeholders - Selection of representatives in the working councils who preferably had experience of solution-oriented industrial trade union collaborations
	Levels of collaboration, within and between processes	*Agreement upon a "Declaration of Purpose for Collaboration (DoP)* - A common agreement on purpose and aim for the new firm´s collaboration process with trade unions was

		conducted and after review rounds clarified with work environment topics - The DoP was utilised as a platform in the process and used during introductions when new members entered the working councils
		A clear purpose, aim and priorities, and a systematic approach - The process leader prepared and followed up each meeting individually with each stakeholder
		Continuous regional and local anchoring both within the new fast-growing firm as well as with stakeholders in regions for factory establishment - Preparation and further local anchoring activities and refining collaboration structures for forthcoming Local Working Councils within each factory and "headquarters" - Invitation to start-up firm´s employees to participate in the trade union collaboration process
Developmental learning	Transparency and communication	*Constant dialogue and information of actual state and obstacles* - Creating mutual understanding among all stakeholders of employee work situation, prerequisites, and needs
		Shared meeting minutes - All working council meetings were documented and shared
		Open dialogue regarding new firm´s and stakeholders' issues - Examples: Dialogues of the reasons for membership in an employer organisation, and if collective agreements for the labour work was relevant
	Adaption to changing conditions	*Flexibility in collective agreements* - Decision to proceed with a flexible collective agreement related to Factory B and the company group, based on learnings from Factory A
	Learning opportunities	*Benchmarking* - Benchmarking activities in strong global companies in the region, and nationally
		Solution orientation in the major greenfield project in a new industrial domain - A steep learning curve with opportunities for individual, team and organisational learning - Cross-border collaborations with broad employee participation
		Self-assessment of the collaboration process - Assessment of the collaboration process in two "big meetings" where all stakeholders participated

One main co-operation topic was collective agreements where the new firm had requirements to create and adapt agreements to the specific needs and requirements of a fast-growing industrial start-up. This was expressed by the CEO as:

> «To succeed with our business mission, we need to create an agile work organisation, enabling fast decisions, innovative solutions, and an attractive

> workplace with teams that can develop and deliver our products and solutions to customers worldwide. Thus, we need to develop collective agreements in co-operation with trade unions. »

There were discussions of the benefits and issues regarding collective agreements resulting in a common view that "collective agreements are designed to strengthen competitiveness and enable flexibility". For example, there were discussions on how collective agreements could be adapted, according to a new fast-growing firm´s specific needs during its major industrial start-up (in comparison with established firms), with needs such as flexibility in working hours, work across organisational and functional borders, etc. It was also put forward that early development of collective agreements had the potential to reduce the risk of having a variety of agreements later on in an expanding organisation. This would require co-operation with many trade unions representing different professions, which would increase complexity and complicate decision-making. Furthermore, the new firm´s branding opportunities were discussed, as it was assumed to strengthen the firm´s attractiveness to talented employees. Also, as the multinational new firm had various experiences with trade union collaborations, anchoring approaches were needed in order to broaden the understanding of the national culture for the planned industrial establishment including the Nordic model related to work.

Other main co-operation topics were:

- *Forthcoming production work organisation and work environment*: Roles, shift structure, leadership criteria and support, work environment, individual´s possibilities of role and career development. Specifically, roles and collaboration of direct (i.e., blue-collar), and indirect (white-collar) workers were discussed where the new firm had a need for strong co-operation and flexibility between functions, roles, and teams.
- *Work environment*: Working methods when everything is not in place, collaboration with subcontractors in construction and commissioning phases, how to speed up slow processes, employee mobility, managing workload peaks and demands, health and safety work, collaboration with external partners for occupational healthcare, security.
- *Social sustainability in working life and private life*: Approaches related to cultural differences and opportunities, equity, gender and age balance, the start-up firm´s impact on society, social issues related to employees moving to a new country/city, housing, bureaucracy, regulations, work permits, etc.
- *Skills and competences:* Talent acquisition, recruitment, training of staff, competence development, competence validation systems, how to utilise learning opportunities within the new domain and the rapid learning curve.
- *Structures*: Leadership, communication strategy and support, policies related to drugs and alcohol, work permits, onboarding, and introduction programmes.

- *The new firm´s trade union collaboration process itself*: Roles, anchoring, how to efficiently and rapidly gain active local ownership aligned with the new firm´s emerging development.

An outcome from the new firm´s establishment of a "stakeholder collaboration chain" was also that the work served as a platform for the initial dialogue with trade unions in other countries, where a new council (the European working council) was planned to be created to focus on forthcoming establishment in other European countries. In the latter phase of the case study, there were early initiatives for an additional large-scale factory in a joint partnership in Europe, as well as additional assembly factories, and pilot plants for recycling.

Discussion

The aim of this paper was to explore why and how new firms can create relations and stakeholder collaboration with trade unions during industrial start-ups. The identified elements vital for sustainable development of change processes (i.e., active ownership, collaboration and developmental learning), as described by Svensson and Brulin (2014), are used as a lens for a thematic analysis and discussion in this paper, see Figure 1.

The case demonstrates a new firm´s early phase of an industrial start-up, and is in this context viewed as a "change process" where the new firm initiated a collaboration process with external stakeholders, in particular trade unions. The new firm already had from the very first a clear sustainability strategy, initially focusing on economic and ecological dimensions of sustainability. Over time they also integrated social dimensions of sustainability related to work, and realised the potential to co-operate with social partners, in this case trade unions. They had a common vision of the collaboration in terms of both striving to achieve results (successful start-up), and to provide a good working environment (health, equality, competence development), a balance crucial for sustainable change processes (Elg et al., 2015). Moreover, to realise plans and go from "vision to action" it was crucial that this was part of the new firm´s strategy, anchored at top management level, which was observed in the case. The international multicultural firm had employees with various experiences of trade union co-operation, which made it even more important that top management was clear and communicated the strategy and the motive for developing their own culture inspired by the Nordic model related to work (Garmann-Johnsen et al., 2018; Huzzard & Nilsson, 2004).

Element of active ownership: One challenge to achieving active ownership in the collaboration process was the rapid development pace of the new firm, with impact on changes on the work organisation with people changing positions within the evolving organisation. Another challenge was that the fast-growing multinational firm had varied experiences with trade union collaborations. Lessons from the case were the role and actions of the experienced process leader with strong relations with social partners and industrial experience, as a driver and link between different levels and with all stakeholder representatives. However, there

might be a risk of not gaining active ownership for a change process in a stakeholder chain if a process leadership role is not gradually integrated into the line organisation.

The regular and structured working council meetings were a way to identify prioritised co-operation areas, but the trust and relations created by way of the working council meetings were important for operationalisation in terms of joint activities and finding solutions together. The main outcome of jointly creating a collective agreement was designed according to the new firm´s specific flexibility needs during the start-up, which was regarded as a unique approach, neither found in practice nor reported in literature.

This example illustrates how desired ambitions were transformed and integrated into practice, and became part of longer-term agreements considering stakeholders' needs, which eventually can be part of the firm´s regular business and are crucial for sustainable change processes.

Element of collaboration: As the case context was an emerging fast-growing firm, there was a need to initiate collaboration at different levels and regions. There was also a need for a pace that aligned with the firm´s industrial establishment process for new factories, and to constantly anchor and introduce new stakeholder representatives at different levels with complementary practitioner's knowledge, as stressed by (Totterdill et al., 2016). A useful platform for achieving consensus in the very early collaborative phases was the "Declaration of Purpose for Collaboration (DoP), but this was gradually replaced by increasingly structured descriptions of desired work processes. By addressing the need for work flexibility, rapid decision-making and working across borders, the initial collective agreements developed during the start-up phase have a potential to form a foundation for a co-operative culture in subsequent production organisations and to be adapted in future collective agreements when production is running. This also opens up opportunities to mitigate traditional boundaries between blue-collar and white-collar workers which in turn can contribute to increased flexibility and capability for solution-oriented work.

Element of developmental learning: The new firm was characterised by a high degree of uncertainty with challenges of developing structures due to its fast growth rate, as is commonly recognised in new ventures such as start-up environments (McKelvie et al., 2018). Another challenge is that a young entrepreneurial firm may initially lack internal competences to design and realise future plans, requiring co-operation with external stakeholders (Davila et al., 2010). In a multinational workplace, which was the makeup of the case company, another challenge in the new firm was various experiences with, and concepts of, trade union collaboration, as in literature described as both conflict- and solution-oriented (Geary & Trif, 2011). On the other hand, the entrepreneurial mindset in the new firm was a driver for creation of innovative solutions. This mindset was also observed in the early trade union co-operation where new challenges and topics were raised with joint ambition to find new approaches and solutions, both in a short-term and long-term perspective. From a collaboration process perspective, it was also observed that these reflections at the working

council meetings were means for individual and participating stakeholders developmental learning (Ellström, 2010; Svensson & Brulin, 2014), with potential of further application in other change processes.

The stakeholder sustainability chain: As observed in the case study, a mutual understanding of stakeholders' prerequisites in an industrial start-up ecosystem were increasingly vital, when complexity increases during an industrial start-up over time. Neither of the participating trade union organisations had been part of such an industrial start-up process from scratch before. The normal procedure was to establish trade union co-operation first during operation phases in the factories when local trade union communities were in place, as stated in this case. However, they saw a great potential both for the start-up firm´s mission as well as for job opportunities in the society and possibilities to contribute to concepts for future industrial workplaces, as well as job opportunities and society development.

From the new firm´s perspective, as described above, the key business reasons and main arguments for creating relations and a structured collaboration process with trade unions in early development phases were opportunities:

- to "strategically build right from scratch" by co-operating with complementary competences enabling utilisation of learnings of success factors from other industrial development processes and start-ups,
- to proactively manage potential obstacles, as complexity with influencing factors and costly countermeasures increases over time,
- to create an agile work organisation enabling fast decisions, innovative solutions with healthy and attractive industrial work and workplaces, enablers for competitive advantages of the new firm and industrial start-up, and
- to develop a desired leadership culture and develop structures and prerequisites for employer and employee participation in improvement and development work with the Nordic model as a role model for the company group´s culture.

From a trade union perspective on the other hand, the main arguments for early co-operation with a new start-up firm were:

- the unique possibility to be involved in a new firm's development within a new industrial domain,
- to jointly support the possibilities for successful establishment of new factories, and
- to contribute to development of concepts for future manufacturing sites, as well as achieving useful learnings for other industrial development processes and start-ups.

Learnings from the case were also that early co-operation in a stakeholder chain with trade unions based on the Nordic model related to work, has potential to contribute to identification of prerequisites needed to consider during a planned industrial establishment

in a region, both regarding forthcoming employees' working conditions in the firm as well as conditions outside work (housing, schools, culture, etc.).

Furthermore, if the stakeholder community is characterised by trust, (Levinson, 2008), it has the potential for development of proactive and reactive approaches in a dynamic, fast-changing work environment. Hence a balance between flexibility and stability in an increasingly uncertain world is needed, as proposed by Kjellberg (2011), where this study highlights a potential for new firms to develop collaboration with trade unions during industrial start-ups and the new firm´s early development phases.

Conclusion

This case study shows potential for new firms to create relations and co-operation at an early stage with social partners such as trade unions, as it enables proactive approaches on social dimensions of sustainability related to work. New firms and industrial start-up phases represent a constantly moving work environment with fast changes and uncertainties, which requires co-operation in a stakeholder chain characterised by a clear purpose for collaboration, trust, mutual understanding of specific prerequisites, and solution-oriented approaches. Collaboration processes need to meet both a new emerging firm´s development demands and future employees´ individual prerequisites and needs. Through a new firm´s early stakeholder co-operation with trade unions, the case also shows that it has potential for positive outcomes on flexibility, which is important for the success of a new firm´s establishment, growth, and industrial start-up, as well as social sustainability both related to work and for society. However, a systematic approach is needed with anchoring activities, both within and between the new firm and external stakeholders such as trade unions at national, regional and local levels. This includes a common vision with a clear purpose for the collaboration, regular meetings to enable trustful relations, thorough understanding, and flexible conditions during the fast development of a new firm, with employees' work roles changing quickly.

A theoretical contribution of this paper is the elaboration of elements, which constitute mechanisms for sustainable development, as described by Svensson and Brulin (2014), in a context of change processes such as industrial start-ups carried out in new firms. Practical implications are how new firms can initiate and establish co-operation with trade unions and other social partners in fast-moving work environments and change processes. This provides opportunities to proactively integrate dimensions of sustainability work, as well as other social sustainability factors vital for new firms in early development phases and industrial start-ups, hence avoiding potential future obstacles and instead creating opportunities for benefits both from an individual and business perspective.

Serendipity from the findings includes co-operation processes related to competence acquisition, and societal development needed to meet both a new emerging firm´s and future employees´ individual prerequisites and needs. Hence, a new firm building a

stakeholder collaboration chain with trade unions inspired by the Nordic model enables increased attention to dimensions of social sustainability that need to be aligned and integrated with parallel work processes in early development phases of a new firm, which is also beneficial from a societal perspective.

Acknowledgements

We thank the participating company, the funding organisation Vinnova, the Swedish Governmental Agency for Innovation Systems, RISE Research Institutes of Sweden, and HELIX Competence Centre at Linköping University for enabling this research. Additional funding provided by the XPRES (Initiative for Excellence in Production Research) and valuable reviewer comments are also gratefully acknowledged.

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The shifting role of unions in the social dialogue

Anders Kjellberg

Abstract

The industrial relations models among the EU/EES countries vary widely. The Nordic model of self-regulation contrasts sharply to French state extension of collective agreements and minimum wage set by the state. While social dialogue often refers to tripartite negotiations, bipartite collective bargaining is characteristic of self-regulation. Swedish self-regulation is the most far-reaching among the Nordic countries, as state intervention is less common than in Denmark, Finland and Norway. In most EU/EES countries, in particular the new Central and Eastern European member states and Greece, union power is undermined by declining union density and shrinking coverage of collective agreements. In many cases, international organisations pushed through "structural reforms" weakening trade unions. The result is decreased bargaining capacity at industry level and difficulties in avoiding downwards derogations at company level. Even in some core eurozone countries governments have carried through "internal devaluation" to restore competitiveness. High union density (Finland) or high union mobilisation capacity (France) could not prevent this development. The economic performance of a country and degree of globalisation, including the absence of a national currency, appear more important. Swedish union density is still among the highest in the world but has declined considerably in the last twenty years. As a strongly export-dependent country dominated by large transnational groups, is Sweden very exposed to globalisation. This has shifted the balance of power to the advantage of transnational companies, and by that circumscribed the unions' efforts to achieve developing jobs and improved working environment.

Keywords: social dialogue, union density, collective bargaining, self-regulation, state regulation, globalisation

Introduction

A sustainable social dialogue presupposes a relatively even balance of power between trade unions and employers. In several European countries the actions of employers, states and international institutions have weakened unions so much that the social dialogue is close to collapse. With a wide definition of social dialogue collective bargaining is included. To examine the differences between the EU/EES countries (including the UK), we will use two indicators of associational and institutional union power of great importance for creating sustainable workplaces: union density and the coverage of collective bargaining. Combining these, Nordic unions are the most powerful in the world, in particular when taking account of the wide right to strike in these countries. This right is absent in the social dialogue as this term is commonly used. In the Central and Eastern European members states (the CEE states)[1], which were part of the former Eastern bloc, social dialogue was often introduced in the form of tripartite talks as a substitute for collective bargaining.

The social dialogue at EU level does not include wages and industrial action, as they are considered national issues. This has not prevented the EU court from restricting the right to strike in for example the Laval case. Nor has it hindered the European Commission and the European Central Bank from putting pressure on governments to enforce opening clauses in collective agreements.

The bargaining parties in the Nordic countries prefer collective bargaining without the involvement of the state, in other words self-regulation under the auspices of unions and employers' associations. To protect this model, an intense social dialogue at both the national and the EU level has taken place regarding the Laval case and the introduction of a European minimum wage. In a common letter to the European Commission 22 October 2020, the Nordic ministers of employment stress the importance of fighting social dumping and strengthening the social dialogue, which includes "encouraging higher union density and promoting the possibility for the social partners to find solutions to labour market challenges, many of which require nationally tailored measures." According to the ministers, that means "respect for systems based on collective bargaining" and that future initiatives on minimum wage would "not interfere with labour market models where wages are regulated by collective agreements", that is the Nordic models of self-regulation.

Apart from the industrial relations model of the CEE states, and that of the Nordic countries, the EU/EES also includes the Continental European model, the Southern European and the Anglo-Saxon. The Anglo-Saxon model (United Kingdom and Ireland) is, like the Nordic model, characterised by "voluntarism" (UK), but unions are much weaker. In the British private sector industry agreements are almost absent. Industrial action in the UK is circumscribed by legislated voting rules and bans on sympathy strikes.

[1] Bulgaria, Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

The Continental European model comprises Germany, Austria, Belgium, the Netherlands and Switzerland. Tripartite solutions (social partnership) are common. The German IG Metall, recruiting both blue-collar and white-collar workers, concludes pattern-setting industry agreements. At workplace level employees are represented by works councils. Only Belgium, the birth country of the Ghent system, has a high union density. The density of employers' associations is usually high.

In contrast to the Nordic countries, the employment rate of women is low in both the Continental European model and the Southern European model, in which the union movement is divided along political and religious lines. Apart from Italy union density is low, but this is partly compensated by a high mobilisation capacity aimed at influencing political decisions. Due to state extension, have France and Spain a very high coverage of collective agreements. French state regulation is the opposite to Nordic self-regulation.

In the Central and Eastern European model (the CEE states), the coverage of collective agreements is low or very low, despite EU efforts to introduce social dialogue. The employers, including foreign multinational companies, are reluctant to bargain industry agreements. Where collective bargaining exists, it is usually decentralised to company level. The governments' neoliberal economic and social policy has further weakened already weak union movements.

This typology of five European industrial relations models should not be taken as absolute. Changes may occur by time and the emphasis can be on different aspects. Eurofound (2020) places Germany in the Nordic model, due to the higher autonomy of collective bargaining and less extensive state intervention than in other Continental European countries.

Considering the degree of self-regulation and bargaining power of unions and employers, the Nordic and Continental models surpass the CEE model, the Southern European model and the Anglo-Saxon model (Eurofound, 2020, p. 40). The same applies to the degree of co-ordination and centralisation of collective bargaining.

The Nordic model stands out compared to all the others, by the strength of unions at both industry and workplace level. Consequently, the capacity to deal with economic and other challenges, and to maintain their position vis-à-vis the employers can be expected to be greater than in other European countries. We will see whether this has been true in the last twenty years.

The Nordic model of industrial relations

Nordic industrial relations are distinguished by a high degree of self-regulation, which means that collective agreements concluded by well-organised labour market parties have a prominent position in regulating wages and other employment conditions. None of the Nordic countries have legislated minimum wages, which does not mean that the state is

without influence. The Nordic model includes "social democratic" welfare states strengthening the position of workers vis-à-vis employers. The Ghent systems in Denmark, Finland and Sweden represent a mix of state regulation (state-subsidized unemployment funds regulated by law) and self-regulation (almost all funds are union-led). The government is also responsible for an active labour market policy.

The Swedish model of industrial relations is the closest to a Nordic ideal type, as regards degree of self-regulation. The government is much less involved in wage formation than in Denmark (mediation proposals not seldom transformed into law), Finland (a tradition of tripartite bargaining) and Norway (compulsory arbitration). In contrast to Finland and Norway, Sweden has no state extension mechanisms of collective agreements. Furthermore, Sweden is in a class of itself by its extremely low frequency of labour market conflicts. The socially segregated Nordic model of separate unions and union confederations for blue-collar workers ("the LOs"), academic professionals and other white-collar workers is most evident in Sweden, in particular since LO-Denmark merged with the largest white-collar confederation. In addition, the Swedish white-collar unions are considerably stronger than their Nordic equivalents. The Danish private sector employer confederation even refuses to conclude collective agreements with the academic confederation Akademikerne and its affiliates.

Sweden is also the only Nordic country in which blue-collar and white-collar unions across confederations set the "mark" (the industry norm) for wage increases throughout the labour market. In the autumn 2020, the former bargaining cartel PTK, representing the large majority of private sector white-collar union members, concluded a basic agreement with the Confederation of Swedish Enterprise. After some adjustments, the two largest blue-collar LO unions, IF Metall and the Municipal Workers' Unions, joined the agreement, but LO-Sweden was itself not among the signatories. That marks a substantial power shift within the union movement since 1938, when LO alone signed the basic agreement, the Saltsjöbaden Agreement. Both these basic agreements were negotiated after pressure from social democratic governments. As the government this time was dependent upon two neoliberal parties, the employers had a very strong negotiating position. Although the agreement will be implemented through a social dialogue between the signatories and the government, it is considered a victory for the Swedish model of self-regulation. There will be tripartite deliberations about changes of the Law on employment protection, the implementation of the new transition agreement and a collectively agreed unemployment insurance, in which the current unemployment funds will remain. The revised law will increase the employers' freedom to select individuals in case of layoffs. In the two other issues, the participation of the government is necessary for financial reasons.

Despite their outstanding strength, Nordic unions are also facing a multitude of challenges. Sweden is chosen as an illustration, as the Swedish variant of the Nordic model includes the most far-reaching self-regulation, together with Denmark the highest union density, the highest density of employers' associations, and the longest record of social democratic government influence on the welfare state and labour market: 1932-76, 1982-91, 1994-2006

and since 2014. As in Denmark and Finland, union density has declined considerably since the mid-1990s. Swedish unions are also challenged by a shift of power to large transnational companies expanding their share of employees abroad, a rapid growth of non-unionised posted workers and the most extensive privatisations of welfare services.

Swedish unions facing challenges

The 1997 Industry Agreement assigns the role of setting the wage "mark" for the whole labour market to unions and employers' associations within the export-dominated manufacturing industry (Kjellberg, 2019b). An important aim is preventing wage increases jeopardising Swedish competitiveness. The Industry Agreement for more than twenty years has been compatible with rising real wages and a very low frequency of labour conflicts. The "wage mark" or "industry norm" is set through negotiations between the employers' associations and unions in manufacturing industry, among them IF Metall (affiliated to the blue-collar Swedish Trade Union Confederation, LO), Unionen (affiliated to the white-collar Swedish Confederation of Professional Employees, TCO) and the Association of Graduate Engineers (affiliated to white-collar Swedish Confederation of Professional Associations, Saco). Unionen is the largest Swedish union, the Association of Graduate Engineers the largest Saco union and IF Metall the largest private sector LO union. The alternative to this model of self-regulation would have been increased state intervention into wage formation. The new, reinforced Swedish Mediation Office, founded in 2000, instead have a supplementary role of facilitating the implementation of the mark set by the parties behind the Industry Agreement. In the early 1990s the strongest state involvement ever in Swedish wage formation took place by a social dialogue, in which a government commission under pressure persuaded the unions to conclude "stabilisation agreements".

Declining Swedish union density

Swedish union density has declined considerably since 2000, in particular since 2007, creating growing divisions between different categories of employees (Table 1):

- In 2006 union density was 77% among both blue-collar and white-collar workers. In 2019 only 60% of blue-collar workers were union members compared to 72% of white-collar workers. The Swedish definition of blue-collar workers is very wide, and includes most sales personnel and restaurant employees. Especially the latter had to pay very high contributions to their unemployment fund, since the centre-right government raised them considerably in 2007 (Kjellberg, 2011). From mid-2008, the contributions were linked more closely to the unemployment among the members of each fund. As unemployment in general is highest among blue-collar workers the total union and fund fee could be very high for this category of workers. That is the main explanation to the increasing divergence between blue-collar and white-collar

union density during the period 2007-2013, when fund contributions were considerably raised.

- Likewise, in 2006 77% of both domestic-born and native-born blue-collar workers were affiliated to a union. In 2019 64% of domestic-born and only 51% of foreign-born blue-collar workers were union members.
- Union density has declined most among employees with fixed-term jobs and among young people.

Table 1. Union density in Sweden among blue-collar and white-collar workers by country of birth, 2006-2019 (% and percentage points)

	2006	2013	2019	2006-2019	2013-2019
Blue-collar union density					
Foreign-born	77	60	51	-26	-9
Domestic-born	77	67	64	-13	-3
All blue-collar workers	77	66	60	-17	-6
Share of blue-collar workers born abroad	16	21	29	+13	+8
White-collar union density					
Foreign-born	70	67	65	-5	-2
Domestic-born	77	74	74	-3	0
All white-collar workers	77	73	72	-5	-1
Share of white-collar workers born abroad	10	13	16	+6	+3

Remark. Employees aged 16-64 years, excluding full-time students working alongside the studies.
Source: Labour force surveys.

Since 2006, union density among foreign-born blue-collar workers has declined twice as much as among native-born, and three times more if only taking account the period 2013-2019 when refugees in very large numbers arrived in Sweden. In contrast to most other countries, asylum seekers have the right to work during the asylum application process. Contributory to their low rate of unionisation is that most refugees arriving during the past ten-fifteen years are from non-European countries, and therefore with limited knowledge of trade unions and collective agreements. Furthermore, foreign-born blue-collar workers are overrepresented in private services with a low union density, like restaurants and cleaning.

Growing share of foreign-born workers

Sweden received more refugees per capita than almost all other EU countries, and has one of the most liberal regulations in OECD regarding third country labour migrants. In some industries, there are signs of ethnic segmentation and exploitation of low-skilled foreign-born workers. In restaurants, they often have employers with a foreign background (Frödin &

Kjellberg, 2018, 2020). A large share of these, often small, companies have no collective agreements. Foreign-born employees to a much higher degree than native Swedes risk falling outside the Swedish labour market model, also because of much higher unemployment (15% in 2019) compared to native-born employees (4%).

Sweden is among the European countries with the highest shares of foreign-born in the population. This share has increased rapidly among blue-collar workers: from 16% in 2006 to 29% in 2019. In the public sector and private services excluding commerce every third worker is foreign-born.

Few workers posted to Sweden are union members. There are plenty of evidence suggesting a high prevalence of bad working conditions at many sites with posted workers. The government failed in 2020 to give the regional safety representatives access to workplaces with collective agreements but without union members. The parliamentary majority of liberal and conservative parties rejected the proposal, but the Building Workers' Union succeeded, after a strike notice, in obtaining this right. The Swedish Confederation of Enterprise wishes to replace regional safety representatives with non-union representatives assisted by officers from the Work Environment Authority. Obviously, the employers wish to get rid of representatives who with some authority can demand improved working environment in companies without local union safety representatives. Non-union safety representatives at such workplaces would hardly be able to effectively represent the workers vis-à-vis the employer, in particular as they often are afraid of being sent home if they contact a union. This is a problem for Swedish unions trying to organise posted workers in construction, where most of them are from Poland and far from always formally employees. In construction the growing "grey area" of false self-employed dependent upon a single employer is closely related to "the frequent use of long subcontracting chains in which self-employed migrant workers are often to be found at the end-point of these supply-chains" (Thörnquist, 2015, p. 419).

The Swedish model of self-regulation was for many years curtailed by the EU directive on posted workers, as industrial action for terms of employment in accordance with Swedish collective agreements became illegal after the 2007 Laval sentence. Consequently, the closest Swedish equivalent to extension mechanisms, the right to take action to get a collective agreement, by EU institutions was partly eliminated. When Sweden in 1995 joined the EU, it was promised that the Swedish model of industrial relations would be left intact, but the Laval sentence showed that the principle of free movement of services had priority over the principles of subsidiarity and non-discrimination by nationality.

A shift of power to globalised companies

Another challenge facing Swedish unions is that globalised companies easily can move production across borders. In the 80 largest Swedish-owned manufacturing groups, the share of employees abroad was doubled between 1980 and 2018 (Table 2). The number of

employees in low-wage countries employed by these groups grow by more than four times, and made up 2018 more than twice as many as those in Sweden. Remaining in Sweden was less than every fifth employee in the 80 largest manufacturing groups. In 2018 the expansion abroad seems to have ceased, and a small increase taken place in Sweden.

Table 2. Number of employees in Sweden and abroad in the 80 largest Swedish-owned manufacturing groups, 1980–2018.

Year	Total number of employees	Employed in Sweden	Employed abroad	Of which in low wage countries*
1980	773 100	447 000 (58%)	326 100 (42%)	74 300 (23%)
2000	706 500	220 200 (31%)	486 200 (69%)	133 200 (27%)
2010	672 000	137 100 (20%)	534 900 (80%)	237 500 (44%)
2015:1	870 800	146 000 (17%)	724 800 (83%)	349 600 (48%)
2015:2**	757 800	129 700 (17%)	628 100 (83%)	288 000 (46%)
2017	819 500	131 100 (15%)	688 400 (85%)	321 400 (47%)
2018	819 800	133 400 (16%)	686 400 (84%)	319 300 (47%)
1980–2015:1	+97 700 (+13%)	–301 000 (−67%)	+398.700 (+122%)	+275.300 (+371%)
2015:2–2018	+62 000 (+8%)	+3 700 (+3%)	+58 300 (+9%)	+31 300 (+11%)

* Share of employes abroad (%).
** Some large groups changed code from manufacturing to services.
Source: Swedish Agency for Growth Policy Analysis.

Above all, the number of *blue-collar* workers in Sweden decreased. In manufacturing, a largescale *migration of jobs* has taken place, many of which were unskilled assembly jobs. The dominant employer response to the intensified international competition is increased flexibility, for example through outsourcing and hiring of personnel. In manufacturing industry, it is easier to hire personnel or move production abroad if the work is standardised and cycle times short. The introduction of lean production promotes such a development. Today the strategy of IF Metall is to cooperate with the companies in order to design lean production in a way that prevent impoverishment of work while raising productivity. Given the change of the balance of power to the advantage to the employers due to the globalisation process, the union found no other choice.

According to surveys among the IF Metall workplace clubs, the cycle times have successively been shortened (Kjellberg, 2019a). The most negative development occurred along assembly lines and in the largest companies. A dual picture emerged. In some workplaces, all blue-collar workers were covered by development at work. In others, primarily skilled workers got the opportunity to develop in their work, while other workers were not included at all, or experienced a negative development. Much higher unemployment than in the 1970s and 1980s, and the hiring of personnel, restrain the companies' interest in creating developing jobs. The contrast is sharp to the 1980s, when the Metalworkers' Union launched the concept

of "good work" and some large manufacturing companies showed great interest for this, in order to solve problems of quality and high labour turnover. In the 1990s, rapidly rising unemployment and the introduction of new production concepts fundamentally changed this. As a result, "simple jobs" have far from disappeared in manufacturing industry. Ericsson and Electrolux have moved almost all production abroad, but the vehicle manufacturers Scania, AB Volvo and Volvo Cars have still a significant production in Sweden, primarily based on assembly lines.

The main reason for IF Metall joining the new 2020 basic agreement was gaining access to the transition scheme. This includes very generous opportunities to competence development for those losing their jobs at a time when many jobs are threatened in connection with the introduction of new technology such as digitalisation and the replacement of internal combustion engines with electric motors in the large Swedish automotive industry.

As we have seen, the globalisation of jobs comprises a twofold process: a migration of jobs from Sweden and a migration of workers to Sweden. Of course, far from all jobs created abroad by Swedish transnationals have moved from Sweden. Conversely, some jobs are created or retained in Sweden due to the expansion abroad. Anyhow, several Swedish manufacturing jobs have moved to other countries, or disappeared because of raised productivity.

A similar employment shift appears also when we look at all Swedish-owned international groups including the services. In 1993, every second employee is these groups worked outside Sweden and in 2018 seven of ten (Table 3).

Table 3. Number of employees in Sweden and abroad in all Swedish-owned international groups, 1993–2018.

	Groups	Number of employees			
Year	Number	In all	Sweden	Abroad	Of which in low wage countries*
1993	750	1 146 400	611 300 (53%)	535 100 (47%)	88 700 (17%)
2000	913	1 499 900	589 900 (40%)	910 000 (60%)	212 700 (23%)
2010	2 288	1 619 300	488 200 (30%)	1 131 100 (70%)	408 800 (36%)
2015	3 132	1 957 200	560 800 (29%)	1 396 400 (71%)	586 300 (42%)
2017	3 199	2 044 800	588 800 (29%)	1 456 000 (71%)	605 300 (42%)
2018	3 103	2 165 800	659 400 (30%)	1 506 400 (70%)	613 000 (41%)

* Share of employes abroad (%).
Source: Swedish Agency for Growth Policy Analysis.

Another indicator of increasing globalisation is that the number of employees in foreign companies between 1980 and 2018 increased from 114 000 to 680 400, or from 5% to 21% of private sector employees. In manufacturing industry, 39% worked in foreign-owned

companies in 2018, and in private services 20% (Tillväxtanalys, 2019). Being large, former Swedish-owned companies with headquarters in Sweden Volvo Cars and Scania are well-integrated into the Swedish model. That is far from always the case with recently established American IT or gig giants as Facebook, Google, Amazon Web Services and Uber, with Microsoft as an exception.

Many Swedish-owned IT companies, like Spotify, also prefer not signing collective agreements. At the end of 2018 nine out of ten startup tech companies founded in Sweden had no agreements. In the private sector, Swedish collective bargaining coverage is about 82-83% of the employees. Anyhow, about a half million employees work in companies without collective agreements. To these should be added several self-employed persons, freelancers, gig-workers etc., who in reality are dependent on a single or a few companies providing them with jobs.

Flexibility for employers: not always sustainable for health care and health care workers

The terms of employment, however, might be worse for some blue-collar workers *with* collective agreements than for white-collar workers in some large IT companies *without* agreements. In the women-dominated health and care sector, there exist large qualification and education gaps between different categories of employees. In health care, the educational level was raised by the replacement of health care assistants (*sjukvårdsbiträden*) by practical nurses (*undersköterskor*), in turn partly replaced by nurses (*sjuksköterskor*). The remaining health care assistants (*vårdbiträden*) are above all found in elderly care and home care, where also the majority of practical nurses are employed. A substantial and growing proportion of the health care assistants have the most insecure forms of temporary work such as employment on time or call basis. In 2010 37% of the health care assistants were hourly employed and in 2019 50%.[2] During the corona pandemic, it became obvious that their lack of education and insecure employment facilitated the spread of the disease. Those employed per hour without guaranties for additional work are in reality self-employed day laborers. Would they, because of sickness, stay at home, they risk not being called in more times. Nor do they have the right to sickness benefits. In the first half of 2020, the number of registered work-related diseases increased dramatically (by 60%), and most in health and elderly care, where the increase was no less than 219% (Swedish Work Environment Authority 2020-10-13).

Employer demands on increased flexibility, which the centre-right government met by the introduction of "general fixed-term employment" in 2007, explains the growing share of health care assistants with the most insecure forms of employment. Temporary employment is common in public sector and private sector elderly care, but most frequent in the latter

[2] Since 2010 the health care assistants' share of the employees in health and long-term care, however, has declined somewhat, while the share of practical nurses has increased. In 2019 the latter was almost twice as many as the former. Email 2020-06-25 from the Swedish Association of Local Authorities and Regions.

(Kommunal, 2016). The Municipal Workers' Union, which recruits members in both the public and the private sector, signed the 2020 basic agreement after negotiations, resulting in improved terms of employment for the most insecure forms of fix-term employees.

Both practical nurses and health care assistants are in Sweden classified as blue-collar workers (*arbetare*) and are organised by the Municipal Workers' Union (LO), nurses by the Swedish Association of Health Professionals (TCO) and doctors by the Swedish Medical Association (Saco). The rate of unionisation varies strongly between these categories of personnel: from circa 50% among health care assistants to almost 80% among practical nurses and nurses, and just above 80% among doctors (Kjellberg, 2020a). Private sector health care assistants have a lower union density (about 40%) than those in the public sector (about 50-55%). In the years 2001-2003, about 80% of health care assistants at public employers were union members, consequently a remarkable drop in union density. To sum up: low union density, low wages, a growing share on insecure jobs and insufficient education motivates to label many health care assistants in elderly care and home care as precarious workers – despite a very high coverage of collective agreements.

That does not prevent the general level of education in the health care sector from increasing considerably, especially in the hospitals, as the health care assistants there have almost disappeared. Many of them studied as practical nurses in municipal upper secondary level courses (Komvux).[3] The number of skilled workers in health care and other services has increased to such a degree that the job polarisation thesis for Sweden has been rejected (Tåhlin, 2019). There might be a polarisation of wages, but this has to be distinguished from job polarisation. Low-paid workers is not always the same as unskilled workers, particularly not in woman-dominated sectors like health care. Women wages are lagging behind those of male workers with comparable qualifications in other sectors. According to Tåhlin (2019), the growth of women-dominated skilled jobs in for example health care has compensated for the decrease of men-dominated manufacturing jobs.

In Sweden, a relatively large proportion of the employees in welfare occupations today work in the private sector.[4] This share is highest in elderly and home care, and not without consequences for the balance of power between unions and employers. As we have seen, union density is considerably lower among health care assistants in the private compared to the public sector. The same applies to primary school teachers, nurses and practical nurses. Deregulations of railways, telecom, taxi etc., like outsourcing of IT, cleaning etc. from manufacturing companies, have similar effects. Today only 40% of taxi drivers are union members (lower among foreign-born).

[3] In 2018 the number of nurses in Sweden was 106 100, practical nurses 183 100 and health care assistants 76 700 (Swedish Occupational Register).
[4] In 2018 12% of teachers, 13% of practical nurses, 15% of nurses and 25% of health care assistants (Swedish Occupational Register).

How to check terms of employment in companies without collective agreements

Municipal procurements usually go to companies offering the lowest prices, and often without collective agreements. Companies affiliated to employers' associations often abstain from participation in procurements, as they consider the chances as too small and the terms of competition as distorted (Kjellberg, 2020a). Also, state-subsidised jobs for long-term unemployed, recently arrived immigrants and disabled persons tend to have such effects. From June 2017 the law on public procurements requires that wage, working-time and vacation must not be below the minimum level of the collective agreement, but insurances were not included and without a collective agreement unions are not able to sue employers for breach of contract.

EU plans to introduce legislated minimum wages in all member states. One of several questions is who should control that these wages are implemented also at workplaces without collective agreements. If legislated wages are introduced, the interests of joining unions might decline, together with the capacity of unions to enforce agreements at workplaces without agreements. In Sweden the Nordic model of collective agreements is widely considered as superior to legislation, as it allows greater flexibility, for example when implementing the EU directive on working-time. Minimum wages set by the state will not be adapted to the concrete circumstances in each industry. Above all, they will deprive the labour market parties from influencing an essential aspect of wage formation. Furthermore, according to the EU proposal, the minimum wage will be 60 per cent of the median wage in each country. That would, if applied, for almost all Swedish employees result in considerably reduced minimum wages. (Hällberg and Kjellström 2020) Legislated minimum wages will prevent the labour market parties from influencing an essential aspect of wage formation, and will be dependent upon the colour of the government in office.

Declining union density, but not converging except in CEE states

Since the year 2000, union density has declined considerably in almost all EU/EES countries, particularly in the new member states in Central and Eastern Europe (the CEE states). In three of these (Slovenia, Romania and Croatia), the share of workers affiliated to trade unions decreased from a relatively high level (40-44%) to 20%, which means a halved union density (Table 4). The CEE states already having a low density also experienced considerable drops measured in *percentage points* and far more in relative terms, that is in *per cent*. In Estonia, for example, union density declined by 10 percentage points (from 14% to 4%), which means a fall by more than 70% and of course a hard blow against unionism in that country.

Among the old EU states, the Nordic countries Sweden, Finland and Denmark are distinguished by the largest declines in percentage points. In all these three cases, a substantial part of the massive membership losses was a result of the remodeling of the

Ghent systems (state-subsidised union unemployment funds) by centre-right governments (Kjellberg & Ibsen, 2016). In Sweden, the contributions to the unemployment funds were considerably raised in the period 2007-2013. Union density declined from 77% in 2006 to 71% in 2008. A decline of six percentage points in the course of two years is remarkable also from an international perspective. In Finland an independent unemployment fund, which attracted large numbers of employees, came about in the 1990s.

In Denmark, cross-occupational unemployment funds in 2002 were introduced as an alternative to the traditional union-run funds. Many of them stand close to so-called alternative, "yellow" unions with low membership fees, and which are not involved in collective bargaining. If these unions are excluded from the calculation, the Danish union density declined from 72% in 2000 to 52% in 2019, that is a drop by no less than 20 percentage points. Excepting the three CEE states Slovenia, Romania and Croatia this is the largest fall registered in Table 4.

The Nordic high-density countries Sweden, Finland and Denmark were exposed to considerable declines in percentage points (about 10-15 points), but compared to the Czech Republic, Hungary, Poland, Bulgaria, Latvia, Hungary, Lithuania and Estonia there was a much smaller decline in *relative* terms, and therefore not so serious consequences. In Slovakia, union density declined considerably both in percentage points (minus 21), and in per cent (minus 66%). As a result, only 11% of the Slovakian employees today are union members. In the latest available year, no more than every fifth worker belonged to a union in three CEE states (Slovenia, Romania and Croatia), in five density was down to 11-13% (Slovakia, Czechia, Poland, Bulgaria and Latvia) and in another three just 4-8% (Hungary, Lithuania and Estonia).

To illustrate the significance of different ways of measuring union decline it could be mentioned that the Swedish union density since 2000 has decreased more in percentage points (minus thirteen points) than the Estonian one (minus ten points). While the Estonian relative decline, however, was as large as 71% (or almost three quarters of the 2000 density!), the Swedish decline was limited to 16%.

In a few countries, the fall in union density was modest or absent. Italy had 34% unionised workers in both 2000 and 2018. Norway showed a small decline (from 53% to 50%) like Switzerland (from 20% to 17%) and France (from 10% to 9%).

Like twenty years ago, the share of workers affiliated to unions differs greatly between countries and country groups. Among the old EU member states, varies union density considerably between South and North: from 9% in France and 14-15% in Spain and Portugal to 60% in Finland and 68% in Sweden, with Italy in a middle position on 34%. It is remarkable that only every sixth worker in a Continental European country like Germany is a union member, a country known for strong unions like IG Metall, but now adhering to the large group of member states with a statutory minimum wage, introduced on the initiative of the weakened German union movement.

Table 4. Union density in 27 EU/EES countries, 2000–2019 (%)

	2000	2005	2006	2010	2013	2014	2016	2017	2018	2019	2000-*	%**
Nordic												
Sweden	81	78	77	71	70	70	69	69	68	68	-13	-16
Finland	76	71	71	70	68	68	65	62	60		-16	-21
Denmark (1)	75	72	69	69	/69	68	63	63	64	63	-12	-16
Denmark (2)	72	68	65	62	/ 60	58	53	53	53	52	-20	-28
Norway	53	51	51	51	50	50	50	50	50	50	-3	-6
Conti-nental												
Belgium	56	54	55	54	55	54	53	52	50		-6	-11
Austria	37	34	32	29	28	28	27	27	26		-11	-30
Germany	25	22	21	19	18	18	17	17	17		-8	-32
Nether-lands	23	21	20	19	18	18	17	17	16		-7	-30
Switzer-land	20	19	19	17	17	16	15	17			-3	-15
Anglo-Saxon												
Ireland	36	33	32	34	31		26	25			-11	-31
UK	30	29	28	27	26	25	24	23	23	24	-6	-20
Southern												
Italy	34	33	33	36	37	36	34	34	34		0	0
Greece	25			22	22		20				-5	-20
Portugal	21		21	20			15				-6	-29
Spain	17	16	16	18	18	17	15	14	14		-3	-18
France	10	9	9	9	9	9	9	9	9		-1	-10
CEE												
Slovakia	32	23	21	15	13	13	11				-21	-66
Czechia	27	19	18	16	14	13	12	12	12		-15	-56
Poland	25	26	19	18			13				-12	-48
Slovenia	44	38	32	30	23	26	20				-24	-55
Romania	44		32				20				-24	-55
Croatia	40				29	25	22	21	20		-20	-50
Bulgaria	23	19		15	14	14	14	13			-10	-43

	2000	2005	2006	2010	2013	2014	2016	2017	2018	2019	2000-*	%**
Latvia	21		18	15	13	13	12	12	12		-9	-43
Hungary	20	17				10	9	8	8		-12	-60
Lithuania	17		10	10	8	8	8	8	7		-10	-59
Estonia	14	9	9	8	6	6	4	4	4		-10	-71

Remark. United Kingdom (UK) included in the table as it was EU member most of the period. Three small EU states (Cyprus, Luxembourg and Malta) excluded. Denmark including unemployed. Denmark (2) excluding "alternative" or "yellow" unions.
* Change in percentage points between 2000 and latest available year.
** Change %.
Source: Kjellberg, 2020b.

Despite declining union density in almost all EU/EES states, there are no clear signs of convergence between East and West or between North and South. The same applies *within* the group of *old* member states. The only clear convergence appears among the new CEE member states, none of whom today has a union density exceeding 20%. In 2000 there was a span of 30 percentage points in this group (from 14% in Estonia to 44% in Slovenia and Romania) compared to 16 points in recent years (from 4% in Estonia to 20% in Slovenia, Romania and Croatia).

Declining coverage of collective bargaining

Another development also tending to undermine the social dialogue, likewise manifested strongest in the CEE states, is the declining coverage of collective bargaining. This is particularly evident in Bulgaria, Estonia, Latvia, Romania, Lithuania and Slovakia. In all these countries, the coverage rate has since 2000 been halved or reduced even more (Table 5). Greece is another example of a massive decline. The 82% collective bargaining coverage in 2000 dwindled to 10% in 2015.

Two contrasting models of industrial relations are associated with a high or very high coverage of collective agreements. One of them is distinguished by a strong tradition of collective bargaining, the other by state extension mechanisms to secure a high coverage of collective agreements. In the first model, the Nordic model, well-organised labour market parties by themselves regulate the terms of employment for most workers. In contrast to this model of "self-regulation" (Kjellberg, 2017), the other is a model of "state regulation", most common in Southern Europe, whereby the state ensures that the agreements do not just cover a small minority of the workers, but sometimes even almost all of them.

Table 5. Coverage of collective agreements in the EU/EES countries, 2000–2018

Eurozone states in italics	2000	2005	2015	2016	2017	2018	2000 –	2000 - %	Extension mechanism by law	Statutory minimum wages	Dominant bargaining level
Nordic											
Sweden	88	89	90	90	89	90	+2	+2			Industry
Finland	85	88	89				+4	+5	X		Industry
Denmark	85	85	84				-1	-1			Industry
Norway	77	73	72	70	69		-8	-10	X		
Conti-nental											
Austria	98	98	98	98	98		0	0			Industry
Belgium	96	-	96	96	96		0	0	X	X	Industry
Nether-lands	82	87	79	79	79	78	-4	-5	X	X	Industry
Germany	68	65	57	56			-12	-18	(X)	X	Industry
Switzer-land	45	45		58			+13	+29	X		Industry
Anglo-Saxon											
Ireland	44	42	34				-10	-23		X	Ind/comp
UK	36	35	28	26	26		-10	-28		X	Ind/comp
Southern											
France	94	98	98	98			+4	+4	X	X	Industry
Spain	83	76	77	73			-10	-12	X	X	Industry
Greece	82	82	10				-72	-88	-2011	X	Company
Italy	80	80	80	80			0	0			Industry
Portugal	78	83	74	74			-4	-5	X	X	Industry
CEE											
Slovenia	100	100	68	71			-29	-29	X	X	Industry
Romania		85	35				-50	-59	-2011	X	Ind/comp
Croatia	71	63	57	54			-17	-24	X	X	Ind/comp
Bulgaria	56	35	14	12			-44	-79	(X)	X	Ind/comp
Slovakia	51	40	24	25			-26	-51	(X)	X	Industry
Hungary	37	25	23				-14	-38	(X)	X	Company
Czechia	35	27	32	30			-5	-14	(X)	X	Company
Estonia	28	25	19				-9	-68	(X)	X	Company
Poland	25		17				-8	-32		X	Company
Latvia	18	11	7				-11	-61	(X)	X	Company
Lithuania	15	11	7				-8	-53		X	Company

* Greece 2000 refers to 2002; Romania 2015 refers to 2013; Norway 2000 refers to 1998, and 2015 to 2014; Bulgaria 2000 refers to 2002 and 2005 to 2006; Slovakia 2005 refers to 2006; Switzerland 2000 refers to 1999; Ireland 2015 refers to 2014; Hungary 2000 refers to 2001 and 2015 to 2014; Estonia 2000 refers to 2001;

Latvia 2000 refers to 2002 and 2005 to 2006; Lithuania 2000 refers to 2002 and 2005 to 2006.
Change from 2000 to the latest available year: percentage points.
Change from 2000 to the latest available year: %.
Extension mechanism: X = common or very common
Dominant bargaining level refers to both public and private sector.
Sources:
Coverage of collective bargaining and extension mechanism by law: Müller et al. 2019 Volume IV; Greece 2015 Katsaroumpas & Koukiadaki 2019; Sweden Kjellberg 2020b; Norway Nergaard 2020; Czechia, Poland, Portugal and Switzerland OECD.stat.
Dominant bargaining level: Müller et al 2019. Volume III, table 30.1.

French state regulation contra Swedish self-regulation

Among the old EU member states, Sweden and France form the extremes, representing the Nordic and the Southern European model respectively (Table 6). Despite a very low union density, French collective agreements cover 98% of the employees, due to the very frequent use of extension by the Ministry of Labour. Sweden has an almost equally high coverage rate *without* extension mechanisms, and exclusively by negotiations between unions and employers' associations, each of which covers the large majority of employees.

French state regulation, however, does not stop at extending collective agreements to almost all employees. It has also a direct impact on wages by the statutory minimum wage, which more or less sets the pace for wage agreements at industry level (Vincent, 2019). In Sweden, minimum wages are exclusively a matter for collective bargaining. Common for both countries is that industry is the dominant bargaining level, a prerequisite for the high coverage rate in these countries.

Table 6. France and Sweden compared

	France	Sweden
Union density	9%	68%
Density of employers' associations	75%	90%
Coverage of collective agreements	98%	90%
Extension mechanism	Yes	No
Statutory minimum wage	Yes	No
Dominant bargaining level	Industry	Industry

Remark. Density of employers' associations refers to the share of workers in firms and public authorities affiliated to employers' associations.

The relatively large decline in Swedish union density since 2006 has not yet become a threat to the Swedish model of collective bargaining as the continuously high share of workers covered by employers' associations compensate for the fall in unionisation. The German development is quite different, as many firms has abandoned their organisations, union density decreased from 25% to 17% and the coverage of collective agreements from 68% to 56%. These fissures in the German industrial relations model ended in increased state regulation by the introduction of statutory minimum wages. The German union movement changed its attitude from a negative stance to a driving force for such a reform.

As appears from Table 5, an overwhelming majority of the countries (20 out of 27) have statutory minimum wages. Sixteen countries more or less frequently extend collective agreements to enterprises not affiliated to employers' associations. Only Austria, Sweden, Denmark and Italy practice none of these two forms of state regulation. In Austria collective bargaining is, however, de facto extended to almost all employees as membership in the national employers' association (the Chamber of the Economy) is compulsory. Until 2006, Slovenia had a similar chamber system with compulsory membership for employers. Although Italy has no formal extension mechanism, there is a constitutional obligation to pay "a fair wage", which by juridical practice is the same as the minimum wage in the relevant collective agreement. Consequently, only Sweden and Denmark in reality remain in the group of countries with neither statutory minimum wages, nor extension mechanisms.

In Sweden, the unions' right to take actions against unorganised employers is the closest Swedish equivalent to extension mechanisms, and is of central importance for maintaining the model of self-regulation. Although very few conflicts to force employers concluding collective agreements take place per year, the right to sympathy conflicts (strikes, blockades etc.) is here of central importance. The right to sympathy conflicts, of course, is important also at industry level in the regular bargaining rounds, but also in this respect Sweden has a very low frequency of strikes and lockouts. In the UK, sympathy actions are illegal (restricted from 1980 and outlawed entirely since 1990). The leading Swedish private sector employer organisation, Confederation of Swedish Enterprise, demands a ban on sympathy conflicts.

In two countries: Greece and Romania, extension of collective agreements was very common before 2011, but since then not in use. As a result, the coverage rates have fallen dramatically: in Greece from 82% to 10% cent and in Romania from 85% to 35%. Beginning in May 2010 the Greek government signed loan agreements with the EU/IMF institutions, which required far-reaching decentralisation, individualisation and deregulation of industrial relations (Katsaroumpas & Koukiadaki, 2019, pp. 269, 272-274). Minimum wages set by collective bargaining were replaced by statutory minimum wages, which later were cut down. All these measures discouraged the employers to continue with industry-level bargaining and resulted in a collapse of bargaining coverage.

Company bargaining dominates in the CEE states

Greece is the only Western European country among the seven in which company level bargaining dominates. Considering only the *private* sector, company bargaining dominates also in the UK and Croatia, although not so clear in Croatia as in the UK. Consequently, company bargaining dominates in every third of the 27 countries in Table 5 if only the private sector is considered. Still the CEE states make up a clear center of gravity in decentralised bargaining: seven out of the nine countries in question (seven out of the eleven CEE states). As the coverage of collective agreements in most of these countries is very low, *unilateral* employer wage setting and not company bargaining involving unions characterises these

countries, excepting Croatia in which collective bargaining coverage due to extension was 54% in 2016.

Similarly, the 2008 financial crisis caused the Romanian centre-right government to take a series of actions to liberalise the labour market: prohibit cross-industry bargaining (important in Romania until then), de facto abolish extension of collective agreements, restrict union rights and make it easier to dismiss employees. The result was a massive decline in bargaining coverage and union density (Trif & Paolucci, 2019).

In several of new CEE member states, the low coverage rates of collective agreements, hardly by accident, coincide with company being the dominant bargaining level. Furthermore, these countries are distinguished not only by a low union density, but in some cases also by a low density of employers' associations. These cover 14% of employees in Lithuania, 20% in Poland and 25% in Estonia (Müller et al., 2019 vol IV, p. 676). Considering all countries in Tables 4-5, the density of employers' associations on the whole, however, appears more important than union density for determining bargaining coverage (Müller, Vandaele & Waddington, 2019, p. 646). Their weakness, fragmentation and negative attitude negotiating industry agreements in many CEE members states play an important role for the low coverage of collective agreements. In Germany and other Western European countries, the employers' preference for local flexibility has weakened the significance of industry agreements and contributed to their declining coverage. The UK is an extreme example of this tendency.

Without support from industry agreements, it is hard for unions at company/workplace level to conclude advantageous local agreements or any agreements at all. Among the six CEE states listed in Table 5 where the company is the dominant bargaining level, the coverage rate varies from 7% in Latvia and Lithuania to 30% in Czechia with Poland, Estonia and Hungary in between. In none of these states does union density exceed 13%. With union density and collective bargaining coverage in decline, the prospects for a developed social dialogue appear problematic.

Similarly, in the former member state UK industry agreements are today almost absent in the *private sector*, in which collective bargaining coverage in 2011 was as low as 16% of the employees. In the UK private sector, "unilateral management pay setting has largely replaced collective bargaining" (ibid, p. 611), a situation reminding us of the state of affairs in several of the new members states. The far-reaching legislation introduced in the UK 1980-1993 did not accept "the legitimacy of collective labour power" (ibid, p. 605) and played a crucial role for the dismantling of the industry agreements and by that promoting the overall decline of collective bargaining coverage. Neoliberal ideas introduced under the Thatcher governments in this way had a major impact in transforming the British labour market.

Trade unions viewed as sources of rigidity

Many employers and governments view trade unions and collective bargaining as sources of rigidity obstructing economic growth. In the Southern EU member states Greece and Portugal, as in Ireland did the governments after pressure from "the Troika" (the European Commission, the European Central Bank and the International Monetary Fund) introduce "structural reforms" aimed to promote labour market flexibility. In Greece, it became more difficult for national unions to strike, and non-union "associations of persons" got larger rights concluding company agreements. During the Troika period in Portugal, opening clauses in collective agreements were introduced and collective bargaining blocked in the public sector. Also, in Romania, measures to increase labour market flexibility were among the conditions for getting financial assistance from the Troika (Trif & Paolucci, 2019, pp. 507, 519).

In Hungary, the successive changes of the Labour Code, motivated as flexibility reforms, had the effect to weaken unions in favour of unilateral management (Borbély & Naumann, 2019). Collective agreements are mainly concluded at company level. Industry agreements cover just every tenth employee. Also, in Poland, company/workplace agreements dominate, but the low union density and employer hostility hamper collective bargaining at this level.

In a growing number of countries in which the industry level still dominates, the *favourability principle*, according to which agreements at lower levels must not be less favourable than those at industry level, has been undermined by new legislation. In some cases: Greece, Portugal, Spain and partly Romania, this occurred under strong pressure from European and international institutions as a condition for financial support (Müller et al., 2019, pp. 633-634). The French government's efforts to give company agreements a leading role have in small and middle-sized companies led to a removal of the favourability principle and facilitated collective bargaining without unions (Vincent, 2019).

Increased state intervention, not seldom under international pressure

To conclude, the dominant tendency in the 27 EU/EES countries listed in Tables 4-5 is declining union density, shrinking coverage of collective agreements, increased decentralisation of bargaining and growing state regulation in the form of statutory minimum wages (Germany from 2015). Other forms of state intervention were carried out from a neoliberal agenda, not seldom under pressure from international organisations and financiers. In several cases, the absence of national currencies pressed for "internal devaluation" to restore international competitiveness and public finances, for example in Greece, Ireland, Portugal and Spain. As in other countries special attention was given to, what was labeled as labour market "rigidities".

Although many of these processes characterise most countries, the pace and forms of the changes indicate divergence rather than convergence among the studied 27 countries. In the CEE states the industrial relations systems, however, appear to become more and more similar, as the weakening of collective bargaining and social dialogue progress.

As we have seen, also the Nordic Ghent countries were subject to state intervention into industrial relations, in this case by the remodeling of unemployment funds, in a way that caused large losses of union members. Among the Nordic countries, the deep economic crisis in Finland and Sweden in the 1990s resulted in a much higher share of employees with fix-termed contracts than in Denmark and Norway (Rasmussen et al., 2019). In addition, Sweden is the only Nordic country with gradually weakened employment protection, for example by legislation in 2007 promoting fix-term employment. Under the threat of further legislative changes, Swedish unions and employers' associations in 2020 concluded a new basic agreement to satisfy the political demands on increased labour market flexibility. It will be followed up by changed legislation.

"Internal devaluation": an option also for Eurozone core countries

The pressure for "internal devaluation", that is downwards adjustments of wages and increased labour market flexibility, is not concentrated to "peripheral" Eurozone states or to the years of financial crises and sovereign debt crisis. Already in the early 2000s, the red-green Schröder government introduced a series of reforms to improve German competitiveness relative to other Eurozone countries, and fight high unemployment as well as preventing further jobs moving abroad. For several years, German real wages either declined (2002, 2004-2008) or were unchanged (2001, 2009): see Müller, Vandaele & Waddington 2019, p. 672. Due to rising employment and regained German competitiveness, the unions strengthened their position vis-a-vis the employers and the government, despite continued decreasing union density and falling collective bargaining coverage. The conservative-led grand coalition from 2013 reregulated temporary agency work, introduced a statutory minimum wage, and made other concessions to unions (Rathgeb & Tassinari, 2020). The degree of union influence stood in inverse relation to the competitive pressure on German economy. Already before that, however tripartite consultation experienced a revival during the crisis years 2008-2009 when short-time work to fight unemployment was introduced (in Sweden the same measure was taken during the 2020 corona crisis).

Another Eurozone core country, Finland, also fits into a pattern of union influence varying with the competitive pressure on the economy. Despite a very high union density and a tradition of tripartite centralised wage formation the Finnish unions after a general strike had to accept a "Competitiveness Pact" including a wage freeze for 2017, reduced public sector wages, and increased social security contributions paid by the employees (Rathgeb & Tassinari, 2020). Furthermore, this tripartite pact also meant that collective bargaining at peak (confederal) level was abolished and opening clauses introduced. The unions received no concessions by the centre-right government, which had threatened with unilateral intervention. Against union protests the government in 2018 continued with liberalising labour market reforms. As currency devaluation was no option, Finland resorted to "internal devaluation" to restore its strongly impaired competitiveness after other Eurozone countries

had taken such steps. Furthermore, the important Finnish forestry industry had, and has, a severe disadvantage by its Swedish competitor being outside the Eurozone.

Also, in the second-largest Eurozone core country, France, which since the 2010s has experienced a gradually deteriorating competitiveness vis-à-vis Germany, trade unions are facing governments prioritising reduced labour costs and "rigidities". The result of the dialogue between the socialist Hollande government and some union confederations by the employers and the EU Commission were considered insufficient. The government in 2015 and 2016 therefore embarked on a strategy of unilateral liberalisation. This was implemented against joint union opposition laws on reduced employment protection and increased scope for company agreements to derogate downwards from sectoral agreements and labour law (Rathgeb & Tassinari, 2020). The centrist Macron government from 2017 further undermined the favourability principle by encouraging *non-union* company agreements with even stronger derogations downwards.

Conclusion

The declining share of employees covered by collective agreements reflects the erosion of collective bargaining in Europe. In several countries are sectoral (industry) agreements undermined by downwards derogations at workplace level. This is possible by the abolishment of the "favourability principle", which still prevents such practices in for example Sweden, but not in Germany with its "opening clauses". In six CEE states and Greece are sectoral agreements rare and collective bargaining more or less concentrated to company level (Table 5). For the large majority of employees in these countries, unilateral (employer) wage setting is the rule. The same applies to the UK private sector. Consequently, the social dialogue has a modest role in these eight countries, particularly in the private sector.

Variations between countries are large in almost all respects: union density, density of employers' associations, coverage of collective bargaining, degree of centralisation/decentralisation of industrial relations, co-operative versus hostile relations between trade unions and employers' associations, and macro-economic indicators (competitiveness, unemployment, national debt, etc.). Another dimension is self-regulation versus state regulation. Here Sweden stands in sharp contrast to France, but also to other countries with state extension of collective agreements, statutory minimum wages, etc. Sweden and France represent the most far-reaching variants of the Nordic and Southern European models respectively.

There are also large variations *over time*. Particularly in the CEE group of new member states, the share of employees covered by unions and collective agreements has declined considerably in the last few decades. In the UK, the decisive change occurred much earlier with legislation introduced by conservative governments depriving the British unions of their

former impressive workplace strength. The German Schröder reforms in the early 2000s illustrates that also a social democratic government radically can liberalise the labour market.

The Swedish case illustrates that the Swedish model is also exposed to pressure by considerably declining union density and increasing power of transnational companies that do not attach much importance to developing work. As in Denmark and Finland, centre-right governments' change of the Ghent system caused large losses of union members. In Sweden the result was also a rapidly growing divergence between white-collar and blue-collar union density (72% and 60% respectively in 2019) causing a power shift within the union movement, clearly manifested in the 2020 basic agreement signed by the white-collar private sector cartel PTK, and not the blue-collar confederation LO, which was weakened by internal conflicts. The two largest LO unions soon, however, joined the agreement, labelled a victory for the Swedish model of self-regulation, although it will be followed up by tripartite social dialogue including the social democratic government. The agreement can be interpreted as a step towards Swedish flexicurity as it contains both increased space for employers to make derogations from the rule last in, first out in case of layoffs, and improved transition arrangements for employees whose skills need to be developed when new technology is introduced.

The Swedish model shows a great capacity for renewal manifested in the 2020 basic agreement and the 1997 Industry agreement. For Swedish wage formation, the 1997 Industry Agreement played a decisive role. This institutional innovation, reminding of the classical 1938 Saltsjöbaden Agreement, came about by the labour market parties themselves although under pressure from the social democratic government. Ahead of the planned accession to the EMU there was a great consensus about the wage leading role of the manufacturing sector in a small, heavily export-dependent country like Sweden. Besides limiting the role of the state, an important union motive was restoring the centralised component of the Swedish model. Since then, different types of co-ordinated bargaining, supported by the new National Mediation Office, is a prerequisite for the implementation of the "industry norm". Some white-collar unions, particularly in the public sector, have "figureless agreements", but the employers in general make sure that they do not result in wage increases exceeding the norm too much, although such deviations sometimes enable changed wages relative to other groups. With this renewed version of the Swedish model, the position outside the Eurozone, the floating krona and the up to the corona crisis declining sovereign debt, there has been no international pressure for internal devaluation.

In contrast, internal devaluation in many countries became the main instrument for restoring competitiveness during the financial and sovereign debt crisis, and in the post-crisis period even in core Eurozone countries like Finland and France. Neither high union density (Finland) nor high mobilisation capacity (France) could prevent governments from forcing through such a policy. Conversely, German trade unions in the same period had a much better dialogue with the government. That clearly demonstrates that the balance of power on the labour market is closely dependent upon the economic performance of a country. Not even in Sweden did the unions succeed in convincing employers to continue investing in "developing

work", when unemployment reached quite other levels than in the 1980s and new international production concepts such as lean were adopted by the increasingly globalized companies. During the corona crisis similar work organisations in Swedish elderly care proved to be highly inappropriate.

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Our Common Futures of Sustainable Work: Concluding Reflections

Kenneth Abrahamsson

> «Beyond continued efforts to tackle the health dimension, the EU must prioritise the social dimension of Sustainable Work, notably by implementing the European Pillar of Social Rights. We must invest in protecting and creating jobs, and in driving our competitive sustainability by building a fairer, greener and more digital Europe. We must repair the short-term damage from the current crisis, in a way that also invests in our long-term future. To achieve this, the EU must now show clarity of purpose and certainty of direction through its policies. »[1]

Promotion of sustainable work: points of departure

This double issue of *European Journal of Workplace Innovation* reflects different journeys and time horizons, with respect to decent and sustainable working conditions and innovative and productive workplaces. The first and the shortest journey, through the scientific and policy-related landscape of the European workplace, is the composition and participating in these two parts by scholars and policy specialists from Sweden and European environments. It started from a somewhat longer journey, when Maria Albin, professor at Karolinska Institute Stockholm, in 2013 took the initiative to create a platform, on Sustainable Work in EU Horizon 2020 financed by support from the Swedish Innovation Agency, Vinnova. Its purpose was to promote Sustainable Work as a core mission in the European framework programme, Horizon 2020, and later Horizon Europe.

One crucial aspect of Sustainable Work is the life course perspective, and job longevity. This mission is also reflected in the composition of contributors including two senior professors still vitally active well past retirement age from Sweden. Professor emeritus and former member of Swedish Parliament, Lennart Levi, born 1930, has a truly eminent scientific career in the field of work environment, health, and stress. He has a genuine global mind, and concern for good and decent work in all countries and continents. Professor Allan Larsson, born in 1938, has had an outstanding career in Sweden and Europe as former Minister of Finance, Director General for DG Employment in the European Commission, and recently adviser to the former EU President Jean-Claude Juncker on the European Pillar of Social Rights.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0456&from=EN. Europe's moment: Repair and Prepare for the Next Generation. COM (2020) 456 final. Downloaded 2021-02-09.

The other contributors to this special double issue range in ages from 40 plus to 70 plus, and are both scholars and policy experts in working life science, focussing various aspects of sustainable work, such as work, health, and worker longevity; work, innovation, and technology; digitalisation and jobs; the social dialogue and social partners; green energy and new factories; and job longevity, pensions, and social insurances, in a Nordic perspective. The European perspectives are also well covered by contributions from EU-OSHA, Eurofound and Perosh, the network of European Work Environment Institutes.

From social sustainability to green and sustainable workplaces

Another longer journey and policy formation needs to be mentioned. It first started in 1988 with the Report of the World Commission on Environment and Development: "Our Common Future" by the World Commission on Environment and Development, a mission given by the General Assembly of the United Nations.[2]

The concept of Sustainable Development implies limits: not absolute limits but limitations imposed by the present state of technology and social organisation on environmental resources, and by the ability of the biosphere to absorb the effects of human activities. But technology and social organisation can be both managed and improved to make way for a new era of economic growth.

Sustainable Development was also a priority policy for the European Union at the European Councils Gothenburg meeting in 2001, when *A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development* was launched.

The concept of Sustainable Work has over the years encountered difficulties in being included in the broader Sustainable Development family. This lack of family attention is, however, fundamentally solved in the UN Sustainable Development Goals with DG 8 Decent work and economic growth, with the aim of *promoting sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all*. The next challenge is to promote greener and more sustainable jobs.[3] Another major challenge in the global policy of Sustainable Development mission is to integrate ecological, economic, and social goals, with the role of decent and sustainable work, productive labour market regimes, and jobs for all. These challenges need to operate at national, regional, and global levels.

As has been presented elsewhere in this double issue of EJWI (Abrahamsson, K. ,2021), one of the inspiring minds of the concept and policies of Sustainable Work was Peter Docherty (Docherty et.al., 2009), previously employed at the Swedish National Institute for Working Life.

[2] UN (1988) Report of the World Commission on Environment and Development. Our Common Future., § 3.p. 27.
[3] https://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-8-decent-work-and-economic-growth.html. Downloaded 2021-02-09.

Good working conditions and the regeneration of resources and environmental considerations were part of the concept. Over the years, various approaches to quality of work have been designed in the European policy community and on the research frontiers. Quality of work, decent work, and flexicurity have been signalled in the policy development. The Lisbon Strategy focussed on economic growth, job creation and more and, better jobs, while the Europe 2020 Strategy had the basic goals to stimulate *smart, sustainable, and inclusive growth*. The new strategy also contained convergence policies, macroeconomic stability, and sound public budgets as prerequisites for growth. Future working life strategies cannot only be built on sustainable work. It is now becoming more and more crucial to focus on sustainable employment and forms of job transitions, as well as sustainable welfare.

At present, the European Union is facing new crises, in addition to ongoing transformations such as demographic change, including ageing and migration, technological disruption, industry 4.0 and new job creation initiatives. Furthermore, new pressures follow from the impact of Brexit on trade and other forms of exchange, and the new political uncertainty created by examples of political populism, nationalism and protectionism in different countries, regions, and continents. The global public health shock, and the various waves of the Covid pandemic, have almost taken the form of virus war, with hidden, dangerously, and unexpected agendas. On top of numerous policies and measures to limit the impact of the pandemic, digitalisation and climate change expand the policy pressure on the formation of Sustainable Work.

There is no doubt that Covid-19 will have a significant and enduring impact on workplace innovation, far beyond what we could have imagined at the end of 2019 and the first weeks of 2020. A diversified flow of job destruction, job retention and job creation has intervened in the European labour market, industrial structure and working conditions for most employees. Within a few months, most projections, and scenarios of the future of work must be rewritten. The ongoing redefinition of standard employment has been speeded up, and new forms of employment and new ways to work are becoming “the new normal” of the European workplace. Rising unemployment, more temporary work and increasing numbers of precarious work conditions will follow.

The two parts of this special issue have not sufficiently covered the new context for the future of work due to the pandemic shock. The adaptation of working life to Covid-19 comprises several policy challenges, and will be major field of future work life research. The new challenges do not only have to consider various forms of remote work (work environment, leadership, social communication, stress, and work-life balance), but also new risk panoramas, for employees in hospitals and health care, elderly care and in service and transport, where the infection risk is high. In the long run, and in a post-pandemic society, climate change and more sustainable forms of production, just transition, work and living conditions, and social services are fundamental challenges, having impacts not only on all sectors of human life, but also on nature and organic life in a broader context.

Covid-19, Green Deal and Digitalisation: towards new policy frontiers

The launching of the consultation of European Pillar of Social Rights in 2017 highlights the importance of future of work and welfare systems in Europe. The challenges of global competition, digitalisation and demographic change demonstrate the need for new research and innovation in sustainable work systems and innovative workplaces. Longer and healthier working lives are a key issue for Europe's future prosperity. The new triple challenges, Covid-19, Green Deal, and digitalisation open the way for new European research programmes.

Sustainable welfare, social protection and good living conditions are crucial supportive mechanisms for sustainable workplaces. Rapid labour market changes following the need to adapt to climate change, lower carbon omissions, electrification, and new forms of employment, call for an increasing focus to job shifts, career development and workplace learning. As shown in the introductory text in the first part by Allan Larsson and Kenneth Abrahamsson, research on institutional models to support job transition is another highly relevant policy field.

New technology, innovation, and skills development[4]

New technology can be perceived as scary, but the alternative can be even more scary. The Swedish trade union IF Metall describes it this way: "We are not afraid of the new technology, but of the old". The effort to protect old jobs and old technology, can in the long run mean a loss of new jobs. The processes of job retention, job destruction and job creation are an ongoing transformation that has been well documented over centuries by economic historians, economists, and sociologists. Studies of influence and control of technology from a human factor point of view is a recurrent challenge. The social dimension must have a prominent place in designing the technology. The design of the interface between man and machine is a delicate task, that requires reflection and consideration, so that we do not create more problems than we solve. Research has an important role to play, when new technology should be evaluated and introduced, but that role is not being pregiven; we must mark our position by highlighting issues that are perceived as important and relevant (Abrahamsson & Johansson, 2021).[5]

Another field is skill development and technology change. There is an urgent need to deal proactively through skill-development, and especially in-work training, to deal with the

[4] The descriptions of future work challenges are based on contributors of some authors in the double issue of EJWI, which are refered to in the text.
[5] Abrahamsson, L.& Johansson, J. (2021) Digitalisation and Sustainable Work: Obstacles and Pathways. Human Works Science, Luleå university of technology. This issue EJWI.

inequalities and labour market dislocation that innovation tends to generate. This means targeting innovation support to firms and organisations that seek to boost innovations by experimenting with improving innovation capacity by improving job quality, rather than solely targeting support to specific innovations or areas of application.

Figure 1. Circles of change shaping the context for the social dialogue on sustainable and greener jobs.

It is also important to encourage firms to undertake "innovation impact assessments" to analyse the impacts that larger innovations are expected to have (prospective) and have resulted in (retrospective) to improve firms' abilities to increase the beneficial and minimise the detrimental effects of innovations. We should promote the use of qualitative case-study research to understand the complexity of and mechanisms behind the interaction of innovation and job quality across industries, especially in the services, is also important (Mathieu & Boethius, 2021).[6]

Social dialogue and social partners need to be driving forces for green transition. Early co-operation between a new firm and trade unions has the potential to proactively address prerequisites for sustainable work in design phases of new factories, but also to strengthen attention to other dimensions of social sustainability that are vital for start-ups. Building a stakeholder chain, inspired by the Nordic model, emphasises the dimensions of social sustainability needed in work processes in the early development phases, which is also beneficial from a society perspective. However, a systematic approach with anchoring

[6] Mathieu, C. & Boethius, S. (2021) The generative relationship between job quality, innovation and employment. Sociology department, Lund University. This issue EJWI.

activities, both within and between the stakeholders at different levels, is needed. These findings are reflected upon in the case study carried out in early phases of a major greenfield project aiming at establishing a new industrial domain in a Nordic context (Harlin et.al. 2021).[7]

Equality, sustainable work, and economic growth

The opposite to sustainable work is the lack of good job qualities, such as an unhealthy work environment, lack of influence and co-determination, low work dignity and job enjoyment, and weak employment relations or none. Inequalities, gender gaps and discrimination of migrants are other signs of the bad side of the coin. To combat inequalities in working life is not just an issue of social justice and respect. Equality is a goal that also has a productive mission, and is beneficial for economic development and growth. In this context, it is worrying that inequalities of income, social standard and living conditions are increasing in many countries; Sweden is not an exception (OECD 2015).[8]

Sustainable work over the life-course and job longevity are not goals in themselves, but missions for good living and working conditions. In Sweden and other countries, the number of post retirement age or senior workers is increasing, and is more noticeable for white-collar workers than blue-collar workers. However, job-longevity and postponed retirement could also create new gaps, between employees not being able or healthy enough to work until retirement, and those who continue into their seventies. At the end of the day, Sustainable Work also interacts with institutions supporting sustainable welfare, security, and wellness for all citizens, and not only those who have a strong employment position or contract.

The pandemic has brought a renaissance for occupational health and safety measures, i.e., protective masks being the most visible sign. The interface between occupational health and public health has never been so significant, relevant, and crucial as in the pandemic period. The breadth and depth of the changes that are already affecting the world of work demand a response from the OSH community. Policy makers need to ensure that the regulatory framework is fit for purpose, and that tools and resources are in place to ensure adequate protection is afforded to all workers, while not stifling innovation, or acting as a brake on business.

Whether it is climate change, globalisation or digitalisation, there is no holding back the impact of the megatrends described. As a society, we must adapt while preserving the values and standards we hold dear. Technological advances, such as the use of artificial intelligence in human resource tools, or in 'intelligent cobots', are not necessarily a threat to OSH. However, it is essential that the design, implementation and roll-out of new technology follows established principles, such as worker participation, or 'prevention through design' and

7 Harlin, U., Skagert, K., Elg, M. & Berglund, M. (2021) Stakeholder collaboration inspired by the Nordic model – Towards sustainable work and competitiveness during an industrial start-up. RISE& Helix, Linköping University. This issue EJWI.
8 OECD (2015), In It Together: Why Less Inequality Benefits All, OECD Publishing, Paris, https://doi.org/10.1787/9789264235120-en.Downloaded 2021-02-09.

others yet to be consolidated, such as an ethical framework for digitalisation, codes of conduct and proper governance. Digitalisation will bring challenges, but also opportunities.

Automation allows the design of better jobs; data analytics can improve risk assessment, and access to data can help inspection and enforcement. Fortunately, these challenges and opportunities are not country specific and there is much to be gained from sharing knowledge and experience of different approaches. EU-OSHA is a networking organisation that aims to act as a catalyst and facilitator for exchange among the EU 27 member states, and initiatives such as the ILO led Global Coalition are essential to exchange knowledge and experience at a global level.[9]

The Swedish Working Life Research Journey in Retrospect

The ongoing transformation of the Swedish labour market and working life can be seen as a journey over centuries, while the modern development goes back half a century, comprising new institutions, new labour laws and a renewal of working life research. The early focus on jobs at risk and occupational health and safety has over the years been broadened to studies of work organisation, employment relations and the functions and structure of the labour market. It is a misunderstanding that Swedish research on working life has mainly been performed at the National Institute of Work Environment and the Work Life Centre which merged into the National Institute of Working life, NIWL, abolished in 2007. The main part of the research is taking place at various research departments, centres of excellence and some institutes. The closing down of NIWL, however, had an enduring impact on the international dialogue between Swedish scholars and the European research community.

Over the years, there have been various patterns of international exchange for working life development and working life research in Sweden. During the 1980s and 1990s the Swedish Work Environment Fund supported various forms of international exchange. One significant initiative from the Swedish National Institute of Working Life, was to launch a programme of more than 60 international workshops under the heading of Work Life 2000: Quality in Work programme, preparing for the Work Life 2000 Conference in Malmö, January 2001, as part of the Swedish Presidency of the European Union.[10] A majority of the workshops were hosted by the Swedish Trade Unions Office in Brussels, and others were hosted by the European Foundation for the Improvement of Living and Working Conditions in Dublin, and to the European Agency for Safety and Health at Work in Bilbao. Taken together, the workshops and the final EU conference were a peak performance event for the international exchange between Sweden and other European countries on work life research and development. It is interesting to note that one of the workshops focussed on Sustainable Work.

[9] Cockburn, W. (2021) OSH in the future – where next? EU OSHA, European Agency for Safety&Health at Work. EJWI.
[10] These workshops have been documented in three volumes, rich in content, by Richard Ennals (1999,2000 and 2001).

Another initiative organised by the National Institute for Working Life was the SALTSA-programme. SALTSA stands for the joint programme for working life research in Europe. SALTSA was a joint undertaking by the three Swedish confederations of employees (trade unions): LO, TCO, SACO, and the National Institute for Working Life, which was based in Stockholm. The purpose of the programme was to facilitate problem-oriented research collaboration on working life related issues in Europe. The SALTSA approach aimed to initiate Europe-wide collaborative research projects by mobilising relevant researchers. The SALTSA programme was subdivided into three branches: Work Environment & Health, Labour Market, and Work Organisation. Due to the closure of the NIWL, the SALTSA-programme was ended

Sweden also joined two ERA-Nets, which were a collaborative exchange between research funders in Europe within the EU framework programme of research. The Consortium OSH-ERA included 12 leading public agencies, ministries and research organisations funding or managing OSH research in close collaboration with stakeholders from science, economics, and civil society and was is operation between 2006 and 2010. The Work-in-Net consortium consisted of senior programme managers of 12 leading public funding agencies and ministries from 7 countries. The objective of Work-in-Net was to create an internal research market on work-oriented innovations, by a systematic exchange and stepwise integration of research objectives, development programmes and workplace innovations, placing the focus on human resource management for improving the quality of working life, innovative human potential, and labour productivity.

Swedish scholars have also participated in the EUWIN network initiated and co-ordinated by Steven Dhondt, Frank Pot and Peter Totterdill and associates. More generally, however, there has been a shortage of wider platforms for international exchange driven by Swedish institutions and funders. One exception, however, is the Vinnova-supported platform for sustainable work in EU Horizon 2020 and Horizon Europe, which is described in this special double issue (Lagerlöf & Albin, 2021) and aims to strengthen the capacity of Swedish scholars to participate in the European research programmes more actively. SWOSH targets researchers in the broad area of Sustainable Work, including occupational health, work organisation, employment conditions, digitalisation and new forms of work, green jobs etc. Looking back, international collaboration by Swedish working life research has had its ups and downs. Parallel to making Swedish working life research more visible in a European context, there are several discipline-oriented networks, conferences and association built on academic subjects such as sociology, economics, labour law, business administration, psychology, pedagogy, political science, technology, and occupational medicine etc. In addition, there are hidden curricula and agendas of international journals for scientific exchange in respective fields. [11]

[11] The Swedish Forum for Working life Research – FALF - started for more than ten years ago and organises annual conferences, publishing and networks for junior and senior scholars in the field. A new network on practice-oriented studies on sustainable work brings together researchers from several universities in Sweden.

Finally, one should mention recurrent Nordic conferences and platforms in the field of working life research. One current, policy relevant and scientifically significant endeavour is the project "The Future of Work: Opportunities and Challenges for the Nordic Models" 2017–2020, funded by the Nordic Council of Ministers, and organised by the Fafo Institute for Labour and Social Research, in Oslo. This project was inspired by the Global Future of Work project organised by the International Labour Organisation (ILO) in the context of its 100th Anniversary in 2019.

This research programme consists of seven pillars, covering various aspects of Nordic working life, labour market transformation and quality of work (Dølvik & Røed Steen, 2018, p. 13).[12]

> «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. »

The seven pillars or thematic approaches are: 1) The main drivers of change demographic change: ageing and migration, climate change, and economic and political changes associated with globalisation, European integration, and rising income gaps. 2) The digitalisation of work, new technology, robotics automatisation, industrialisation 4.0, and new platforms. 3) The self-employed, independent, and atypical work and non-standard work, marginal part-time, temporary agency work, fixed-term contracts and self-employed without employees. 4) The new labour market agents as various platforms. 5) The occupational health-consequences and challenges, and new and unforeseen work environment challenges. 6) The labour law and regulations, 7) The core of the Nordic model of labour market governance.

It is important to underline that while this programme was launched before the pandemic, the final report, to be published during spring 2021, will also focus on the Covid-19 shock to the Nordic labour market and workplace. The triple challenge of Covid-19, digitalisation, and the Green Deal, will comprise fundamental challenges to working life and sustainable work in Sweden, the Nordic countries, Europa at large and all continents, they will also challenge and place pressure on the Nordic labour market model in the choice between basic income and the collective bargaining model. These challenges are also reflected in Horizon Europe, the new period of the European Social Fund and national and EU policies. The policies, practices and research on sustainable work need to gain stronger political attention. One positive

[12] http://norden.diva-portal.org/smash/get/diva2:1265618/FULLTEXT01.pdf

example from Sweden, is that the Government recently launched a new work environment strategy highlighting the purpose and missions of sustainable work, summarised in these four points.[13]

- A sustainable working life: everyone should be able, strong, and willing to work a whole working life.
- A healthy working life: working life must contribute to development and well-being.
- A safe working life: no one should risk life or health because of worked.
- A labour market without crime and cheating: a deficient work environment must never be a means of competition.

Sustainable Work is today a policy and mission shared by the Swedish government, the social partners, and the research funders, and is also reflected in the research community. The next challenge is to transform and implement these policies into good, healthy, innovative and productive ways of organising work for the future.

Never before, there has been such a significant need to integrate policy solutions and active measures on national and European levels. The current pandemic illuminates the crossroads between labour market and work life policies, welfare policies and health policies. It is too early to anticipate the visions of a post pandemic life in Europe and other continents. New lifestyles, new ways of work and new forms of social protection as well as new forms of inequalities might appear when this global trauma is over. The pandemic has created a renaissance of the need for workers protection and healthy and safe work environments, and in our words, more sustainable and healthy workplaces and new workplace innovations.

> «We cannot wait for the end of the pandemic to repair and prepare for the future. We will build the foundations of a stronger European Health Union in which 27 countries work together to detect, prepare and respond collectively. »
>
> Ursula von der Leyen, President of the European Commission, speaking at the World Health Summit (25 October 2020).

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[13] https://www.regeringen.se/rattsliga-dokument/skrivelse/2021/02/skr.-20202192/

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