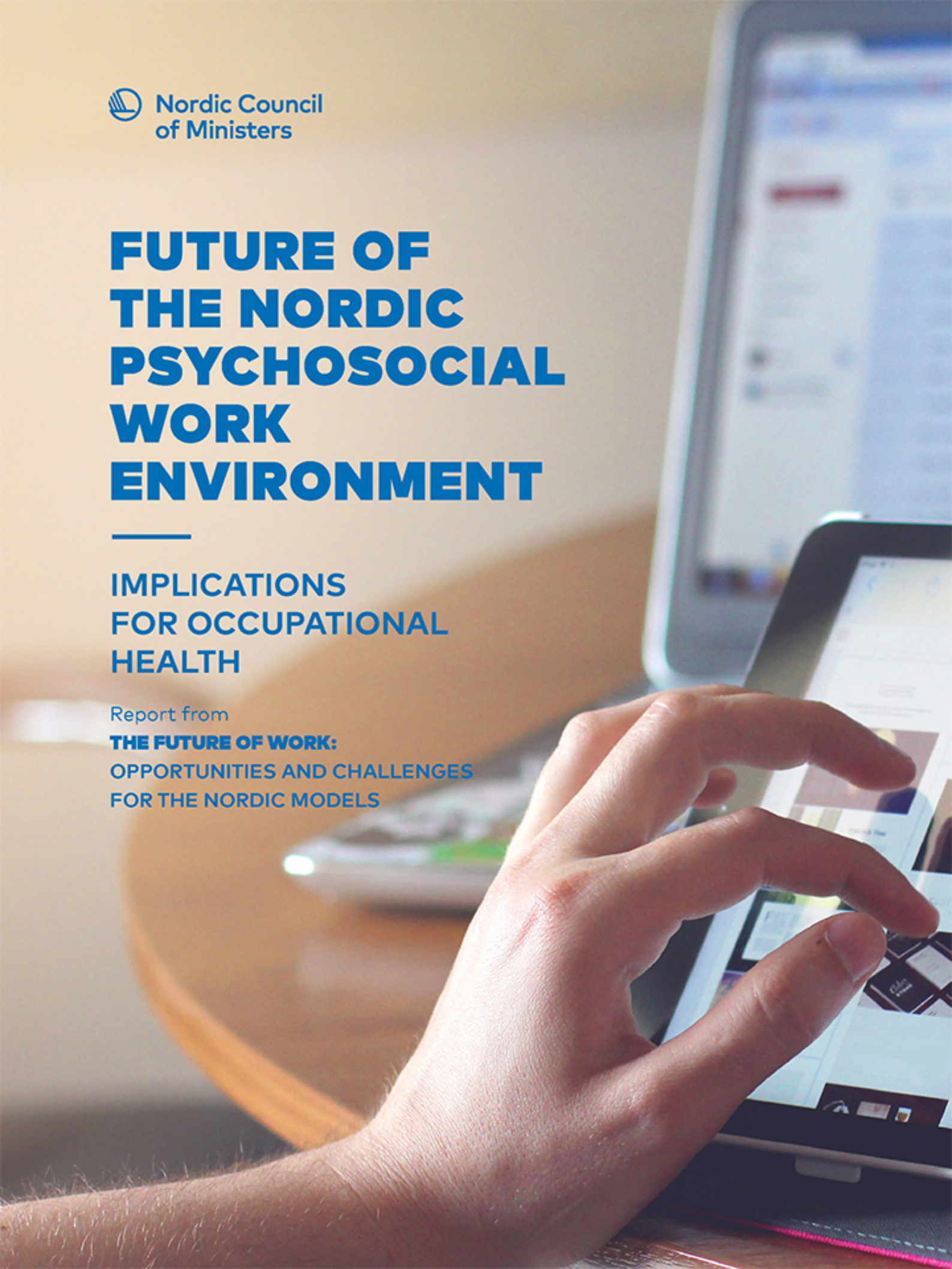
Nordic Council of Ministers

FUTURE OF THE NORDIC PSYCHOSOCIAL WORK ENVIRONMENT

IMPLICATIONS FOR OCCUPATIONAL HEALTH

Report from

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



The future of the Nordic psychosocial work environment: Implications for occupational health

Report from The future of work: *Opportunities and Challenges for the Nordic Models*

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Project managers' preface

Major changes in technology, economic contexts, workforces and the institutions of work have ebbed and flowed since well before the first industrial revolution in the 18th century. However, many argue that the changes we are currently facing are different, and that the rise of digitalized production will entirely transform our ways and views of working. In this collaborative project, funded by the Nordic Council of Ministers, researchers from the five Nordic countries have studied how the ongoing transformations of production and labour markets associated with digitalization, demographic change and new forms of employment will influence the future of work in the Nordic countries.

Through action- and policy-oriented studies and dialogue with stakeholders, the objective has been to enhance research-based knowledge dissemination, experience exchange and mutual learning across the Nordic borders. Results from the project have informed, and will hopefully continue to inform, Nordic debates on how to contribute to the Future of Work Agenda that was adopted at the ILO's centenary anniversary in 2019.

The project has been conducted by a team of more than 30 Nordic scholars from universities and research institutes in Denmark, Finland, Iceland, Norway and Sweden. The project started in late 2017 and will be completed with a synthethizing report in 2020.

In order to address the main aspects of change in working life, the project has been organized into seven pillars with pan-Nordic research teams:

I. Main drivers of change. Coordinator: Jon Erik Dølvik, Fafo, jed@fafo.no
II. Digitalization and robotization of traditional forms of work. Coordinator: Bertil Rolandsson, University of Gothenburg, bertil.rolandsson@socav.gu.se
III. Self-employed, independent and atypical work. Coordinator: Anna Ilsøe, University of Copenhagen/FAOS, ai@faos.dk
IV. New labour market agents: platform companies. Coordinator: Kristin Jesnes, Fafo, krj@fafo.no
V. Occupational health—consequences and challenges. Coordinator: Jan Olav Christensen, National Institute of Occupational Health, Oslo, jan.o.christensen@stami.no
VI. Renewal of labour law and regulations. Coordinator: Marianne J. Hotvedt, University of Oslo, m.j.hotvedt@jus.uio.no; and Kristin Alsos, Fafo, kal@fafo.no
VII. Final synthethizing report: the Nordic model of labour market governance. Coordinator: Jon Erik Dølvik, Fafo, jed@fafo.no

For Fafo, which has coordinated the project, the work has been both challenging and rewarding. In the final phase of the project, all the Nordic economies were hit hard by the measures taken to slow the spread of the Covid-19 virus. This effectively illustrates how predicting the future of work is a difficult exercise. As our data collection had ended before the virus brought the Nordic economies almost to a halt, we have unfortunately been unable to address the effects of the vigorous countermeasures taken by Nordic governments.

We are very grateful for all the work done by the cooperating scholars, and we would also like to thank our contact persons in the Nordic Council of Ministries, namely Tryggvi Haraldsson, Jens Oldgard and Cecilie Bekker Zober, for their enthusiastic support. Many thanks also to all the members of the NCM committees that have contributed to this work through workshops and commenting on different drafts, and to the numerous interviewees in Nordic working life organizations and companies who shared their time and insights with us.

Oslo, 2020

Kristin Alsos, Jon Erik Dølvik and Kristin Jesnes

Project managers

Pillar coordinator's preface

This report is part of Pillar V of the project "The Future of Work – Opportunities and Challenges for the Nordic Models" and elucidates potential implications of changes in the Nordic world of work for the work environment and, consequently, for occupational health. While the work environment comprises a wide range of different conditions and exposures, this report places a special emphasis on the psychosocial work environment. "Stress" is often cited as a current and increasing threat to public health. Because work is a significant contributor to this problem, it may also be a significant contributor to solving it.

The team that worked on Pillar V consisted of researchers from the National Institute of Occupational Health, Norway, STAMI (Jan Olav Christensen, Live Bakke Finne, Jolien Vleeshouwers, Morten Birkeland Nielsen) and the National Research Centre for the Working Environment, Denmark, NRCWE (Jesper Kristiansen, Kathrine Sørensen, Anne-Helene Garde, Lene Rasmussen). The current report is a synthesis and discussion of two separate studies that are presented in additional detail in reports by the two institutes.

We would like to extend our gratitude to the Nordic Council of Ministers for project funding and helpful feedback along the way. We also wish to thank Jon Erik Dølvik, Kristin Alsos and Kristin Jesnes for project management and quality assurance, as well as all the researchers of the other Pillars for doing important and timely research. Finally, a special thanks to the experts that participated in our survey, providing vast, essential and thought-provoking information on a challenging topic with many nuances.

Oslo 2020

Jan Olav Christensen

Pillar coordinator

Executive summary

Job- and work environment characteristics contribute to worker health and productivity. The Nordic work environment is characterised by high levels of democracy, trust, job satisfaction and job security, as well as high job demands and high participation in work life. This is a good starting point to ensure a sustainable future of work, providing existing strengths are promoted and emerging risks mitigated. For the current report, two studies were conducted: 1) a literature study summarising scientific knowledge about associations between new technology and psychosocial work characteristics and occupational health and 2) a Delphi study, i.e. a survey of experts on the Nordic world of work, to gather viewpoints on what opportunities and challenges will be particularly important during the coming decades. Particular attention was devoted to the psychosocial work environment, as it is relevant to all workers.

The literature study (Chapter 2) summarised 53 peer-reviewed scientific articles published since 2000, sorted under six themes: 1) introduction of novel technologies, 2) "technostress", 3) information and communication technology (ICT) demands, 4) workplace "telepressure", 5) attitudes towards technology, and 6) technology-related harassment and incivility. The studies were heterogeneous, reporting on many different types of issues associated with technology, work environment and health. Moreover, studies indicated both adverse and beneficial effects of work technologies. For instance, telework and telepressure (perceived pressure to respond to work-related messages) were associated with health complaints, but also with increased autonomy and less work exhaustion from social interaction demands. In general, employee autonomy was a factor that many studies highlighted and that can be both reduced and enhanced by work technologies. "Technostress" – psychological overload due to technological difficulties or complexity – was associated with reduced work motivation, low job satisfaction and decreased well-being. Similarly, "ICT demands" (e.g. email message load, availability expectations) were associated with reduced well-being. Studies of harassment noted that virtual harassment happened more frequently than face-to-face harassment, and the two types often co-occurred, suggesting technology-enabled harassment in virtual environments may exacerbate the overall problem.

The Delphi study (Chapter 3) gathered views from 52 experts in Norway and Denmark, representing social partners, labour inspection authorities, consultants, researchers and occupational health professionals. Findings were structured according to established drivers of change: 1) technology, 2) demography, 3) globalisation, and 4) climate change, and additionally – based on the submitted views – the themes 5) skills/competence and 6) political, social and cultural developments. An open theme of 7) "other statements" was also included. In general, the experts were in agreement and few controversial views were put forward. With regard to technology, they highlighted that automation/robotisation would be important, but were slightly less in agreement about its consequences for the work environment. Several positive and negative consequences were proposed. Regarding demography, the ageing population and increased diversity due to immigration were highlighted as important developments, but there was slightly less

agreement on the extent to which these factors will represent opportunities or challenges. Views on globalisation focused on culture and language, competition and productivity, and the borderless nature of work. These developments were considered important and potentially associated with opportunities as well as challenges. Relatively few opinions about the environment and climate change were expressed, but they reflected a general optimism about new opportunities for innovation and economic activity. Many views pertained to skills, reflecting agreement that many trends will necessitate upskilling to ensure appropriate competence, and this will present both opportunities and challenges. There seemed to be some general optimism in this regard. Views on political, social and cultural developments addressed issues surrounding diversity and legislation. Agreement was high, but there was also relatively high disagreement regarding legislation, control, gender issues and social security. Finally, the theme "other statements" addressed a variety of subjects, such as challenges associated with looser labour market attachment and increased pressure on the psychosocial work environment. There were also optimistic views, such as the belief that the psychosocial work environment would be increasingly prioritized and seen as a competitive advantage.

Chapter 4 offers some further reflections based on the empirical studies. For instance, there was no specific overall direction to the effects of contemporary developments on work environment and health – that is, no dominant pessimistic or optimistic take on the future. This in itself may be cause for optimism, however, as it implies great potential for influencing the future. Worker perceptions of job demands, autonomy, work-private life balance, empowerment, trust, security, etc. are likely to be affected, but how remains an open question. This should potentiate knowledge-based policies. Another conclusion derived from the current studies was that "traditional" work factors will continue to be important, although often in new forms. Concepts such as “telepressure” and “technostress” are specific facets of the already established concept of “job demands”. Similarly, “autonomy” is not a new concept but is nevertheless a key factor in new work environment developments. Interestingly, some issues that were frequently cited in the studies in question have become particularly relevant recently during the pandemic crisis of 2020. In particular, there has been an increase in the collective awareness of issues related to remote work. The acceleration of digitalisation and the integration of ICTs used for work and private purposes has enabled quick adaptation to novel circumstances but raises questions of how to define boundaries in a "boundaryless" world of work. While the short-term consequence of remote work from home may be increased autonomy and freedom, in the long run it could also instigate work-private life conflicts, social isolation, distrust, and impaired support from leaders and colleagues.

The future of the work environment depends on developments that can be influenced by current practices. Hence, awareness of the issues discussed in this report should provide legislators, decision makers, authorities, employers and workers with resources to meet and manage upcoming challenges. A basic awareness of the consequences of these developments for workers' experience of demands, autonomy, empowerment, trust, and other issues raised herein will be crucial to ensuring the sustainable development and continued improvement of a Nordic work environment that is already of high quality.

Norsk sammendrag

Arbeid og arbeidsmiljø bidrar til helse og produktivitet. Det nordiske arbeidsmiljøet kjennetegnes av høye nivåer av demokrati, tillit, jobbtilfredshet og jobbsikkerhet, samtidig som jobbkravene og deltakelsen i arbeidslivet er høye. Dette er et godt utgangspunkt for å sikre et bærekraftig arbeidsliv for fremtiden, forutsatt at eksisterende styrker videreføres og fremvoksende utfordringer håndteres. Denne rapporten er basert på to studier som ble gjennomført for å belyse denne tematikken: 1) En litteraturstudie som oppsummerer eksisterende kunnskap om sammenhenger mellom nye teknologier, psykososiale arbeidsfaktorer og arbeidshelse, og 2) en Delfistudie, det vil i denne sammenhengen si en spørreundersøkelse der eksperter på nordisk arbeidsliv uttrykker sine synspunkter på hva som kommer til å være sentrale utfordringer og muligheter de neste tiårene. Spesiell oppmerksomhet ble viet til det psykososiale arbeidsmiljøet, siden det er relevant for alle arbeidstakere.

Litteraturstudien (Kapittel 2) oppsummerte 53 fagfellevurderte vitenskapelige artikler publisert siden år 2000, organisert under seks temaer: 1) Innføring av nye teknologier, 2) "technostress", 3) informasjons- og kommunikasjonsteknologi (IKT)-krav, 4) arbeidsrelatert "telepress", 5) holdninger til teknologi, 6) teknologirelatert trakassering/mobbing. Studiene var heterogene og omhandlet mange forskjellige forhold forbundet med teknologi, arbeidsmiljø og helse. De rapporterte dessuten om både positive og negative effekter av arbeidsrelatert teknologi. For eksempel var fjernarbeid og "telepress" (oppfattet press om å respondere på arbeidsrelaterte henvendelser) forbundet med helseplager, men også økt autonomi og mindre utmattelse grunnet sosiale interaksjoner. Generelt var autonomi en faktor som mange studier fremhevet, og som nye teknologier ser ut til å både kunne svekke og styrke. "Technostress" - psykologisk belastning på grunn av teknologiske vanskeligheter eller kompleksitet - var forbundet med redusert arbeidsmotivasjon, lav jobbtilfredshet og redusert velvære. Den liknende faktoren "IKT-krav" (for eksempel det å måtte håndtere et stort antall eposter, eller opplevelsen av å måtte være tilgjengelig) var forbundet med redusert velvære. Studier av trakassering pekte på at virtuell trakassering forekom oftere enn trakassering ansikt-til-ansikt, og de to typene forekom ofte samtidig. Dette kan tyde på at teknologisk assistert trakassering i virtuelle miljøer bidrar til å øke forekomsten av slik utilbørlig atferd.

Delfistudien (Kapittel 3) samlet synspunkter fra 53 eksperter i Norge og Danmark, med representanter fra partene i arbeidslivet, arbeidstilsynene, konsulenter, forskere og bedriftshelsetjenester. Funnene ble strukturert etter etablerte drivere av endring i arbeidslivet; 1) Teknologi, 2) demografi, 3) globalisering og 4) klimaendringer. To temaer ble lagt til dette, basert på de innsamlete synspunktene; 5) ferdigheter og kompetanse og 6) politiske, sosiale og kulturelle utviklinger. En åpen kategori, 7) "andre utsagn", ble også opprettet. Generelt var det en stor grad av enighet blant ekspertene og få kontroversielle utsagn ble sendt inn. Når det gjaldt teknologi understreket ekspertene at automatisering og robotisering kommer til å være viktig, men det var mindre enighet angående konsekvenser for arbeidsmiljøet. En rekke positive og negative konsekvenser ble foreslått. Med hensyn til demografi ble den aldrende befolkningen og økt mangfold på grunn av immigrasjon holdt frem som viktige utviklinger, men det var noe mindre enighet om i hvilken grad disse utviklingene vil representere muligheter eller utfordringer. Utsagn om globalisering

fokuserte på kultur og språk, konkurranse og produktivitet, og arbeidets "grenseløshet". Disse utviklingene ble ansett som viktige og potensielt forbundet med muligheter såvel som utfordringer. Det var relativt få synspunkt om miljø og klimaendringer, men disse reflekterte en generell optimisme angående nye muligheter for innovasjon og nye økonomiske aktiviterer. Mange synspunkter omhandlet kompetanse og ferdigheter. Disse reflekterte enighet om at mange utviklingstrender vil kreve oppgradering av ferdigheter for å sikre nødvendig kompetanse, og dette vil innebære både muligheter og utfordringer. Det så ut til å være en viss generell optimisme på dette punktet. Synspunkter om politiske, sosiale og kulturelle utviklingstrekk adresserte problemstillinger angående mangfold og lovverk. Det var en høy grad av enighet, men relativt mye uenighet ble observert angående lovverk, kontroll, kjønnsproblematikk og problemstillinger assosiert med velferd. Det åpne temaet "andre utsagn" omhandlet en rekke forskjellige temaer, som eksempelvis utfordringer forbundet med løsere arbeidsmarkedstilknytning og økt press på det psykososiale arbeidsmiljøet. Optimistiske synspunkt ble også uttrykt, som for eksempel at det psykososiale arbeidsmiljøet i økende grad kommer til å bli prioritert og sett på som et konkurransefortrinn.

I Kapittel 4 presenteres refleksjoner og diskusjoner basert på de to studiene. Blant annet påpekes det at ingen generell, dominerende fremtidsoptimisme eller -pessimisme ble observert. På den andre siden kan man hevde at dette gir grunn til optimisme, ettersom det tyder på et betydelig potensiale for å påvirke framtiden. Arbeidstakeres opplevelse av jobbkrav, autonomi, arbeid-privatliv-balanse, bemyndigelse, tillit, trygghet, og så videre, vil sannsynligvis påvirkes av utviklingen, men i hvilken retning er fortsatt et åpent spørsmål. Dette kan gi handlingsrom og kraft til kunnskapsbaserte retningslinjer. En annen konklusjon som trekkes er at "tradisjonelle" arbeidsfaktorer vil fortsette å være viktige, men ofte i nye former. Konsepter som "telepress" og "technostress" kan for eksempel ses som spesifikke fasetter av det allerede etablerte konseptet "jobbkrav". "Autonomi" er heller ikke noe nytt konsept, men ser ikke desto mindre ut til å være en særdeles viktig faktor i det nye arbeidslivet. Til slutt er det også interessant å observere at flere faktorer som ble ofte omtalt i de foreliggende studiene har blitt enda mer relevant i løpet av 2020, på grunn av den verdensomspennende pandemien. Problemstillinger assosiert med fjernarbeid/hjemmekontor har spesielt fått økt oppmerksomhet. Økende digitalisering og kombinering av IKTer som brukes både til jobb og fritid har gjort det mulig å tilpasse arbeidsformer raskt til nye omstendigheter. Men dette aktualiserer spørsmål om hvordan man skal definere grenser i et "grenseløst" arbeidsliv. Den kortsiktige konsekvensen av fjernarbeid hjemmefra kan muligens være økt autonomi og frihet for mange, men på lang sikt kan man også tenke seg at det fører til problemer med skillet mellom arbeid og privatliv, sosial isolasjon, manglende tillit og forringet støtte fra ledere og kolleger.

Arbeidsmiljøets fremtid avhenger av utviklinger som kan påvirkes av nåværende praksis. Oppmerksomhet og bevissthet på problemstillingene som diskuteres i denne rapporten kan derfor gi lovgivere, beslutningstakere, myndigheter, arbeidsgivere og arbeidstakere et bedre grunnlag for å håndtere kommende utfordringer i praksis. For å sikre en bærekraftig utvikling av det nordiske arbeidsmiljøet, som allerede er av høy kvalitet, vil det være nødvendig å opprettholde en grunnleggende bevissthet angående konsekvenser for arbeidstakeres opplevelse av krav, autonomi, bemyndigelse, tillit og andre faktorer som diskuteres i denne rapporten.

Chapter 1: Background

A "new" work environment

For most people, a considerable part of their life is spent at work. While work is often seen as a means of ensuring the satisfaction of basic *physiological* needs such as food and shelter, it is also a crucial means of satisfying basic *psychological* needs such as *autonomy*, *competence* and *relatedness* (Ryan & Deci, 2017). A growing body of research has demonstrated the significance of a wide range of *non-physical aspects of the work environment*[1] to worker well-being, productivity, health and even mortality (Taouk et al., 2020).

In the Nordic countries, work is characterised by high levels of democracy and trust (Gustavsen, 2007, 2011), reflective of welfare states with a significant history of unionisation, collective bargaining, and social partner cooperation (Dølvik & Steen, 2018). Job satisfaction and job security are also generally high (Aagestad et al., 2017), and combined with relatively high job demands and participation in work life (Oinas et al., 2012) this should be an excellent starting point for ensuring a healthy, productive and sustainable work life in the future. However, changes to the world of work may incur costs to, as well as create benefits for, the health and productivity of the workforce, calling for active, well-prepared strategies to meet the challenges of the future. This is no less true for the Nordic countries than for others, in spite of a seemingly high-quality work environment. Ensuring a sustainable work life requires maintaining and promoting existing strengths as well as mitigating emerging risks.

Predictions and scenarios describing the "future of work" abound. A great number of reports and prognoses have painted vastly different scenarios for the development of jobs and working life. Work, and by extension the work environment, seem to face multiple possible futures (see e.g. Brun et al., 2018; Stacey et al., 2018). Seemingly arbitrary elements may determine the specific scenario that becomes reality, as has been made clear by the pandemic crisis of 2020. This specific, disruptive event may be driving changes in a certain direction, and many may consider the post-pandemic situation as being completely unforeseeable. Nevertheless, while this may be true of the specifics, this particular event seems to have catalysed certain already impending developments to the ways we work. "The future of work" has become more explicit in many respects. Virtually overnight, more than a third (37%) of workers in the EU commenced technology-assisted telework, with the highest prevalences in the Nordic countries (between 50% and 60% in Norway, Finland, Denmark, and Sweden) (Eurofound, 2020; Nergaard, 2020). Most of this home-based work was compulsory and not voluntary. This means that work environments across the globe forcefully and abruptly shifted location. Among those who had never worked from home prior to the pandemic, 24% debuted as remote workers (Eurofound, 2020). During the same period, a two- to threefold increase in clinical symptoms of depression and anxiety was observed in Norway while population level interventions were implemented to impede the virus spread (Ebrahimi et al., 2020). This association is presumably determined by many factors

1. Terminology varies, but in the current text we refer to this as "the psychosocial work environment" or simply "the work environment". Where *physical* aspects of the work environment are discussed, this is explicitly stated.

at many levels of society. However, as the way we work is well known to affect psychological and somatic health, *changes* to the way we work during the pandemic may have contributed to this development.

While the development of new technologies has always played a major role in how work is organised and experienced, special attention has recently been devoted to the increasing significance of information and communications technologies (ICTs) and the digitalisation of work. And while multiple other factors contribute to shaping the future of work, including globalisation, demographic change, and environmental pressures (Dølvik & Steen, 2018), the 2020 pandemic crisis in combination with digital communication technologies has already contributed to a large scale shift in ways of working that may bring about a new status quo and hence a "new" work environment.

"Traditional" approaches to psychosocial working conditions

Before elucidating the implications of ongoing developments for "future work factors", it is useful to provide a brief overview of existing approaches. Table 1.1 gives a brief yet fairly comprehensive overview of factors typically associated with the psychosocial work environment. As this overview makes clear, many aspects of contemporary work life development may affect "traditional" workplace hazards. For instance, increased prevalence of technology-assisted remote work from home may influence the home-work interface and may also potentially affect participation in decision making, communication and social stimulation and support. Hence, when discussing contemporary and "future" work factors, there is rarely a clear distinction between what is new and novel in principle and what are merely new ways in which established mechanisms are set in motion. Moreover, while some factors are already well established, they still may be considered emerging as their occurrence and distribution throughout work life shifts. For instance, demands related to social interaction are not new, but they may become more relevant to a larger proportion of the workforce as mechanical demands are increasingly being met by automated and artificial intelligence-controlled systems.

Although phrases such as "psychosocial work factors", "occupational psychosocial factors", or "the psychosocial work environment" are frequently invoked to describe non-tangible aspects of work, no universally agreed upon definition seems to exist. One rather comprehensive definition of "psychosocial factors at work" has been given by the International Labour Organisation and the World Health Organisation: "Psychosocial factors at work refer to interactions between and among work environment, job content, organisational conditions and workers' capacities, needs, culture, personal extra-job considerations that may, through perceptions and experience, influence health, work performance and job satisfaction" (Office, 1986). Another, more succinct definition that has been proposed is "those aspects of the design and management of work and its social and organisational contexts that have the potential for causing psychological or physical harm" (Cox & Griffiths, 2005).

Table 1.1: Occupational psychosocial hazards (risk factors) (Stavroula et al., 2010)

Job content	Lack of variety or short work cycles
	Fragmented or meaningless work
	Underuse of skills
	High uncertainty
	Continuous exposure to people through work
Workload & work pace	Work overload or underload
	Machine pacing
	High levels of time pressure
	Continually subject to deadlines
Work schedule	Shift working
	Night shifts
	Inflexible work schedules
	Unpredictable hours
	Long or unsociable hours
Control	Low participation in decision making
	Lack of control over workload, pacing, etc.
Environment & equipment	Inadequate equipment availability, suitability or maintenance
	Poor environmental conditions, e.g. lack of space, poor lighting, excessive noise
Organisational culture & function	Poor communication
	Low levels of support for problem solving and personal development
	Lack of definition of, or agreement on, organisational objectives
Interpersonal relationships at work	Social or physical isolation
	Poor relationships with superiors
	Interpersonal conflict
	Lack of social support
	Bullying, harassment
	Emotional demands
Role in organisation	Role ambiguity
	Role conflict
	Responsibility for people

Career development	Career stagnation and uncertainty
	Underpromotion or overpromotion
	Poor pay
	Job insecurity
	Low social value to work
Home-work interface	Conflicting demands of work and home
	Low support at home
	Dual career problems

Several theoretical models have been used to operationalise aspects of the psychosocial work environment with far-reaching implications for both research and practice for organisations, as well as monitoring, policy, legislation and labour inspections. Much of what has been influential in the Nordic countries' approaches to the work environment has been based on the "human relations" movement in industrial and organisational psychology, which originated in the 1930s and studied the implications of working conditions, worker motivation and satisfaction, and social relations for factory productivity (Mayo, 2004). One of the central notions of this movement was that workers who are intrinsically motivated and experience work as meaningful and worth doing in itself will be more productive than workers who are mechanically assigned small, specific tasks according to a plan that they themselves do not know or have the opportunity to influence. One influential researcher who was inspired by this movement was the Norwegian Einar Thorsrud, who wrote about industrial democracy and formulated so called "psychological job requirements", i.e. characteristics that should be present for a job to be considered good. These requirements were task variation, learning, influence, recognition, significance to society, and being consistent with a desirable future. Thorsrud's work became an important inspiration for and direct foundation of the Norwegian Work Environment Act of 1977 and its subsequent amendments, and consequently also for national labour inspection strategies (Hansen et al., 2015).

Arguably the most influential model pertaining to the health effects of psychosocial work factors during the previous four decades is Robert Karasek's job strain model, also known as the job demand-control model (Karasek, 1979). The crux of the model is that although the psychological load that workers experience can be harmful to their psychological and physiological health, this impact can be offset by the provision of perceived control over resources needed to meet those demands. In this case, job control refers to autonomy, i.e. the opportunity to make decisions that are important to the execution of one's work tasks, as well as skill discretion, referring to the opportunity to use valued skills. Most research has focused on the combination of high psychological demands (most often quantitative, i.e. amount of work and time pressure) with low job control – a combination referred to as job strain. Job strain has been shown to predict numerous health problems, such as mental health complaints (Stansfeld & Candy, 2006), musculoskeletal disorders (Hauke et al., 2011), sick leave (Amiri & Behnezhad, 2020a), cardiovascular disease (Kivimäki et al., 2012), and even mortality (Amiri & Behnezhad, 2020b).

Another influential model of psychosocial work factors is Johannes Siegrist's effort-reward imbalance (ERI) model (Siegrist, 1996). Similar to the job strain model, this model's central notion is that the effect working conditions have on the worker

depend on the balance between their different aspects. However, whereas the job strain model focuses on the more "structural" aspects of work tasks (i.e. demands and control over resources), the ERI model pertains more to the social contract at work by focusing on *reciprocity*. The essence of ERI theory is that while workers have to exert themselves and put effort into work tasks, the extent to which this causes strain depends on how they are rewarded for this effort. Reward does not only take the form of financial compensation but also praise and recognition, as well as financial rewards that are perceived as being proportionate with the invested effort. The ERI model is also supported by empirical research findings as a contributor to health problems such as musculoskeletal pain (Koch et al., 2014), blood pressure (Gilbert-Ouimet et al., 2014), immune function (Eddy et al., 2016), and coronary heart disease (Dragano et al., 2017).

Hence, the "psychosocial work environment" encompasses numerous known and hitherto unknown concepts, several of which have been consistently linked with worker health, well-being, and presence in the work place. The above-mentioned models and ways of understanding psychosocial work factors have all been – and continue to be – instrumental in Nordic approaches to the work environment, including in national monitoring of the work environment and labour inspections (Hansen et al., 2015).

The current report

The psychosocial work environment is a well-established contributor to health impairment, health improvement, and productivity for individual workers and society at large. As changes in society begin to bring about new forms of work and novel work environment challenges, occupational health and productivity may be affected in largely unforeseen ways. The current report aims to identify and discuss likely implications of contemporary work life developments for the Nordic work environment and occupational health in the future based on 1) a literature review pertaining to associations between new technologies, work environment, and health, and 2) a survey of experts on Nordic work life (a so-called Delphi study). Due to the scope of the project, the literature study focused on one specific driver of change in the world of work, namely *technology*, with the aim of summarizing existing knowledge about its implications for psychosocial working conditions and occupational health. The Delphi study had a broader aim, namely to comprehensively map notions pertaining to the impact of *any* driver of change on work environment and health. In order to maintain a realistic perspective on impending developments, a time perspective of 10–15 years was chosen.

Although the current report can be read as a free-standing text, two directly related publications may be of use for those who wish to obtain more detail on the two specific studies. The literature study has already been presented in a previous report (Christensen et al., 2020), and the expert survey will be presented in a forthcoming report. These separate reports go into much greater detail when presenting the specifics of each study. The current report is intended as a summary and discussion of the two studies, presenting some specific challenges that should be taken into account when planning efforts to develop and maintain a sustainable, health-promoting and productive work environment in the Nordic countries.

Chapter 2: Digitalisation of work – a literature study

Aim of the study

Digitalised communication, digital platforms and social media have altered the ways in which work can and must be carried out in traditional workspaces and has provided opportunities to organise work in fundamentally different ways. New ways of working also imply new ways for workers to experience work, which in turn pose new challenges for employers and employees. As such, the introduction of new technologies at work could influence the psychosocial work environment and its consequent health impacts. Although current debates seem polarised, with "techno-optimism" on one side and "techno-pessimism" on the other, the net effect of different technologies remains unknown.

Digitalisation is, of course, not a new phenomenon, and has been transforming workplaces and the way we work for many decades already, creating opportunities to design new products as well as new work processes and techniques. The impact of production technologies on workers has been a recurring theme in occupational health psychology for several decades (Tetrick & Quick, 2011), and the introduction of new technologies at work has long been recognised as a source of worry, uncertainty and new work environment risks (Schabracq & Cooper, 2000). Among the early examples of such thinking is Karl Marx's concept of alienation, developed during the industrialisation of the 1800s. More recently, the psychological implications of digitalised technologies have been a topic of particular interest, as reflected by terms such as "technostress", "new ways of working" and other similar concepts (Nijp et al., 2016; Wang et al., 2008), all of which refer to the potential of technology (usually information and communications technology) to alter the experience of work for those carrying it out.

Despite frequently voiced concerns about the effects new technologies ultimately have on individuals and society, the exact consequences for working conditions and employee health remain unclear. Therefore, the purpose of the literature review was to identify and review research published during the previous two decades pertaining to the effects of digitalisation and new technology on i) the psychosocial work environment and ii) employee health and well-being. With regard to health, we were primarily interested in effects attributable to changes in psychosocial working conditions.

Methods

The scope of the current review was limited to empirical studies published in peer-reviewed scientific journals between 2000 and June 2018 (inclusive) that elucidated the link of the introduction and use of new technology at work with psychosocial working conditions and/or employee health. Hence, studies were considered relevant if they reported, quantified, and statistically tested associations of

1. Technology use or consequences thereof with factors of the psychosocial work environment
2. Technology use or consequences thereof with health (psychological or somatic symptoms, well-being or disease)

The exposures (or working conditions) of interest that were included in the current review comprised all aspects of work that may be influenced by technology, such as working with e-mail, social media, automation, artificial intelligence, cyberbullying, automation and digital platform work.

Outcome variables of interest were indicators of somatic and mental health and well-being (e.g. burnout, depression, work ability and pain complaints) as well as psychosocial working conditions (e.g. job demands, job control, "stress" and effort-reward imbalance). Both self-reported measures and clinical diagnoses were included.

During May–June 2018, a librarian performed the literature search in the databases PsycINFO, MEDLINE and Web of Science. For further details on the literature search and the complete search string, see Christensen et al. (2020). Reference lists of relevant studies were also searched to detect relevant literature not picked up by the main literature search.

The screening process was twofold. First, to determine preliminary eligibility, titles and abstracts of all studies retrieved from the literature search were screened independently by five researchers in pairs. Disagreements were resolved by discussion with a third reviewer where necessary. The next step of the screening process included those studies that were published in scientific journals after the turn of the millennium that included some form of quantification and statistical test of relationships between new technology, work environment and employee health. The full texts of identified potentially eligible studies were independently assessed by two reviewers to determine eligibility for inclusion in the final summary. Additionally, reference lists of the full-text studies included for scoring were hand-searched to identify further eligible studies. More details on the screening process can be found in Christensen et al. (2020). Following the identification of relevant studies, a narrative review was performed. Information from each study was extracted according to a standardised form (for a short version of this form, see table 3 in Christensen et al. (2020). A narrative review does not include a quality rating of the included studies.

To exclude studies that were not relevant to the literature study, several exclusion criteria were developed. These can be found in Christensen et al. (2020).

Summary of results

The literature search, as described in the method section, resulted in the retrieval of 6,238 references. After the dual screening process, 43 studies were assessed to be relevant and hence included in the final summary. After searching the reference lists of these studies, ten publications were identified and added, resulting in a total of 53 studies being included in the current review. A detailed overview of the screening and selection process can be found in Fig. 2 in Christensen et al. (2020). Of the 53 studies, 40 had a cross-sectional design meaning that all study variables were measured at the same point in time thereby limiting the possibility of identifying cause-effect relationships.

Based on the narrative review, both exposures (i.e. all aspects of work that may be influenced by technology) and outcomes (i.e. indicators of somatic and mental health and well-being and psychosocial working conditions) identified in the final 53 studies were sorted into domains/categories.

Exposures were sorted into six different domains that have been applied to organise the report of results: 1) Introduction of new technologies, 2) "Information and communication Technology (ICT) demands", 3) "Technostress", 4) "Workplace telepressure", availability demands, and work-private life interference, 5) Attitudes towards technology, and 6) Technology-related harassment and incivility. It should be noted that due to the heterogeneity of the included studies (i.e. differences in for instance population/study design/measurements/concepts), this classification scheme is not intended to be exhaustive, with mutually exclusive categories. Rather, it serves as a broad scheme to organise the narrative review.

The outcomes are sorted into two general categories: "health and well-being" and "work factors". Burnout and components of burnout were the most frequently studied health/well-being outcome, while "stress" and "job satisfaction" were the most frequently studied work factor outcomes. However, it must be noted that these classifications, similarly to the exposure classifications, are very general and not necessarily directly comparable. For instance, "stress" is a term that could encompass a variety of experiences pertaining to work, including many of the other outcomes identified, such as job demands and role conflict. Also, some concepts, e.g. "job satisfaction", could be classified under both "work factors" and "health and well-being". In general, a vast heterogeneity of concepts and measurements was reported.

For an overview of all the different exposures and outcomes reported in the included studies, as well as the number of studies reporting them, see Tables 1 and 2 in Christensen et al. (2020).

Narrative review of included studies

The following section provides an overall summary of the results from the included studies based on the narrative review, organised by the six different domains into which the exposures were sorted. For a more thorough description, along with detailed and comprehensive summaries of each individual study belonging to each of the six domains, see the results section and Tables 3 and 4 in Christensen et al. (2020).

Introduction of new technologies

Some of the 53 included studies evaluated the results of explicit implementation of new technology in the workplace or the degree to which work and the workplace were characterised by technology recognised as "new" or "novel". Seventeen of the 53 studies were classified under this domain.

Although the generalisability of findings across studies is limited, since most focused on specific technological applications and specific groups of workers, some overall conclusions can be drawn. It seems that several studies highlight the potential of the degree of technological advancement ("high-tech" vs. "low-tech") to affect the experience of autonomy for employees. Reduced autonomy may in turn affect other work-related factors negatively. Some studies indicate that increased access to communication, or "simple" technological advancements that do not alter levels of experienced autonomy, can have beneficial effects on employee well-being. Based on the current evidence, there is no clear general effect of new technologies. Rather, the "empowerment/enslavement" paradox seems to apply, as there is evidence that the same technological change may have both negative and positive effects on employee well-being. Also, the potential for negative or positive effects may depend to a large extent on the context in which the technology is being applied, its specific function and the way in which it is implemented.

Technostress

Five of the included studies were categorised under "Technostress".

The concept of "technostress", as developed by Ragu-Nathan et al. (2008), consists of two dimensions: "technostress creators" and "technostress inhibitors". "Technostress creators" comprises 1) techno-overload, 2) techno-invasion, 3) techno-complexity, 4) techno-insecurity, and 5) techno-uncertainty. "Technostress inhibitors" includes 1) technical support provision, 2) literacy facilitation and 3) involvement facilitation.

In summary, the term "technostress" was coined specifically to capture harmful effects of technology and has been found to be associated with a range of adverse outcomes, such as low organisational commitment, low job satisfaction, higher levels of negative affect, burnout and even bullying. In contrast, "technostress inhibitors" are associated with positive outcomes such as job satisfaction and organisational commitment. With regard to factors that may be modified in order to alleviate "technostress", some results suggest that certain leadership styles ("transformational leadership") can attenuate "techno-scepticism" and emotional overload due to "techno-strain".

Information and communication technology (ICT) demands

Fourteen of the 53 studies were included in this domain.

New work technologies may influence job demands in several ways; various aspects of this were studied under headings such as "ICT demands", "ICT use intensity", "computer use", "work overload due to office-home smartphone use", "mental social media demands", "e-mail stressors/overload", "off-work hours technology-assisted job demands (off-TAJD)", and "workplace telepressure". A specific conceptualisation of "ICT demands" has been proposed, identifying eight types of demands associated with the use of ICT at work (Day et al., 2012): 1) "availability", 2) "poor communication", 3) "ICT lack of control", 4) "ICT hassles", 5) "employee monitoring", 6) "learning expectations", 7) "response expectations" and 8) "workload". These dimensions have been found to be associated with experiences of strain and burnout (Day et al., 2012).

The included studies classified under this domain provide a number of examples of the potentially adverse impact of demands that may arise due to the way the technology organises work communications. However, in many cases it is difficult to distinguish the medium from the message – that is, to isolate the effect of the technology from the content of the communication it facilitates. In the currently reviewed studies, ICT demands often appeared to be very similar to "traditional" psychosocial work demands, such as time pressure and work overload. Hence, in most of the studies it remained unclear whether demands were generated by the technology itself or merely mediated by it. Some of the studies did demonstrate the potential of ICTs to intensify work demands, suggesting that demands would have been less intense with traditional work forms. However, the current review does not allow us to make any general conclusions about the extent of this phenomenon in the working population.

"Workplace telepressure", availability demands and work-private life interference

Eighteen of the studies were classified under this domain.

A frequently cited topic related to ICT demands is how they affect the boundaries between work and private life. Several of the reviewed studies supported the notion that work technologies may affect these boundaries and that this may be harmful to employee well-being.

In summary, results regarding the health effects of workplace telepressure and related concepts are mixed. There are certainly studies that indicate adverse effects on both working conditions and health, but there are most likely numerous mitigating factors or circumstances under which such technology is beneficial. The studies under discussion suggest that employee autonomy is one important such factor. Hence, future studies should aim to gain more insight into the role of employee autonomy in managing the interface between the work and private life domains.

Attitudes towards technology

Two studies were categorised under "Attitudes towards technology".

In the current context, "attitudes towards technology" refers to workers' thoughts about and perceptions of new technologies and their implications for work and workers.

Taken together, the current studies find some association, whether adverse or beneficial, between workers' attitudes towards technology and health. In some cases, the driver of the relationship seemed to be the fear of a negative outcome, such as technological unemployment. However, there were also indications of perhaps less readily apparent mechanisms whereby information systems misalign with workers' personal values, creating role conflict, and in that way promote health problems. Finally, job control once again seemed to be an important factor as perceived control and mastery over computerised technology seems to be a factor that can counteract negative health effects.

Technology-related harassment and incivility

Two of the 53 studies were classified under this domain.

ICTs are used to facilitate the social transmission of messages. As non-physical harassment and incivility require social transmission, ICTs may also be used to facilitate such behaviours.

With the increase of work-related media use both at work and at home, technology may facilitate harassment and incivility that may affect employee health and well-being. In the study by Ford (2013), virtual harassment was more frequent than face-to-face harassment, and the two types of harassment frequently co-occurred. Hence, technologies that enable harassment and incivility to be perpetrated in virtual environments may even contribute to increased prevalence of such behaviours. However, there seems to be a strong need for more research to determine the corresponding prevalence in the working population and to clarify the ways in which the impact of technology-related incivility may differ from the impact of other forms of incivility.

Chapter 3: Expert opinions on the future of the work environment – a Delphi study

Aim of the study

"The fourth industrial revolution" is to a large extent driven by rapid technological advances. However, technological advancement is not the only "driver" of fundamental change in the world of work. In the initial Future of Work report, Dølvik and Steen (2018) discussed four drivers of change. In addition to technological change, they also pointed to demographic change, globalisation and climate change as "megatrends" that are particularly likely to shape the future of work and the Nordic labour market models. The looming question is, of course, *how* said trends will affect the labour market and the way we work and what the consequences will be for the work environment and occupational health. Well-informed predictions about trends and their potential implications for work and occupational health are important for enterprises and workers as such predictions can facilitate adaptation not only to future changes and developments but also to ones that are already happening. Likewise, they may assist employees, for instance through trade unions, in addressing developments that may affect the content and organisation of work and generally shape their work life, with potential consequences for their health and safety. Also, a fuller understanding of these megatrends and their consequences may raise awareness among key actors in the occupational health field – decision makers, authorities, researchers, consultants, advisors and other occupational health professionals. The early identification and highlighting of potential challenges may assist these key actors in showing due diligence by addressing challenges at an early stage.

The overarching aim of this Delphi study was to explore what a group of experts on Nordic work life and work environment think about how it will develop in the future. Naturally, true, accurate and precise predictions of future developments are unobtainable. Nevertheless, it is possible to delineate likely future developments by drawing on relevant experts' evaluations. Moreover, by assessing the evaluations of the group as a whole, a more comprehensive picture may emerge than what would be the case if one considered individual statements in isolation.

The specific aim of this study was to obtain expert views on what the main challenges and opportunities related to working conditions and occupational health will be in the "not so distant future" (i.e. 10–15 years from now). Furthermore, we wished to determine the extent to which the participating experts agreed and disagreed about these future possibilities. Hence, while no certain projections can be made, the aim of the study was to reflect expert judgments of what the Nordic countries should pay particular attention to in the coming decades.

Methods

The study utilised a Delphi method design wherein a group of experts on Nordic work life on three occasions. The Delphi method can be described as "an iterative multistage process designed to combine opinions into group consensus" (Hasson et al., 2000). The Delphi technique encompasses a structured process of multiple rounds of statement or data generation through a round of surveys, supplemented by a feedback process that allows respondents to elaborate and modify their previous statements after seeing other participants' contributions (Hsu & Sandford, 2007). In the data gathering rounds, participants complete a survey. After each round, survey answers are collected and then revised based on accumulated feedback. The next round then consists of the completion of a new, adapted survey based on the participant's own feedback as well as the feedback of the group as a whole. In subsequent rounds, Delphi participants are asked to re-evaluate and modify initial statements, leading to a final list of statements that should reflect the level of agreement between participants after careful consideration of the opinions of fellow experts.

In the present study, a three-wave Delphi data collection was designed a priori. Round 1 entailed the initial data collection consisting of responses to open-ended questions about future developments, challenges, opportunities and actions that could be taken to address potential challenges. Round 2 entailed replying to statements formulated by the researchers on the basis of the data collected in round 1. These statements were constructed to accurately reflect the content of participants' original responses. This means that minimal alteration or juxtaposition was imposed beyond what was necessary to reformulate responses into singular statements reflecting the different opinions expressed. Round 3 entailed the final data collection process, wherein the experts rated the statements that the researchers had finalised based on feedback from Round 2.

Recruitment of experts

Experts on Nordic working conditions and working environment were recruited from three types of organisations: social partner organisations (employee and employer organisations), national regulatory agencies (the Labour Inspection Authority and the Petroleum Safety Authority in Norway and the Danish Working Environment Authority in Denmark), and a third group comprising experts from academic institutions, private consulting firms and occupational health care. Along with an invitation to participate in the study, the selected experts received an information letter explaining the process of the study. None of the researchers carrying out the Delphi survey had any affiliation to or collaboration with the research institutions and groups that were invited to participate in the study.

Analyses

The outcome of the final round of the data collection in the Delphi study was expert ratings of statements about future developments that may affect work life with potential implications for the work environment and employees' health and safety at work. The majority of statements were rated using a scale of agreement (from "strongly disagree" to "strongly agree"). The rest of the statements were rated using a scale of likelihood (from "very unlikely" to "very likely"). In addition to rating their

agreement, the experts were also asked to rate positive and negative consequences for some statements (consequences were rated on a scale from "no consequences" to "considerable consequences").

It is therefore important to discern between consensus and agreement when analysing the experts' ratings. For example, there may be high consensus among the expert to disagree with a statement. We conceptualised consensus among the experts using Eijks measure of agreement (Van der Eijk, 2001). We henceforth refer to it as Eijk's measure of consensus, C, to distinguish between agreement with each single statement and consensus among the experts regarding the extent to which they agree with each other on the content of the statements. The measure gives a continuous score from -1 to 1, where 1 implies complete consensus (all experts have assigned the same rating to the item), 0 implies that ratings are evenly distributed across the scale, and -1 implies a bimodal distribution (i.e. half of the experts rated at one extreme end of the scale and the other half rated at the opposite end of the scale).

Summary of results

Rounds 1 and 2

Participants

The invitation to appoint an expert (in some cases two experts) to participate in the Delphi panel was accepted by 27 organisations in Denmark and 19 organisations in Norway. Table 3.1 presents the number of experts that accepted the invitation to participate in Denmark and Norway and the allocation of the experts into three subpanels. It also presents the number of experts that responded in the three Delphi survey rounds.

Table 3.1: The number of experts who accepted the invitation to participate and the number of respondents in survey rounds 1, 2 and 3

	Invitation accepted			
Participants		**Round 1**	**Round 2**	**Round 3**
Norway:				
Sub-panel 1 (Employee and employer organisations)	9	9	3	6
Sub-panel 2 (Working Environment Authority and Petroleum Safety Authority)	10	9	2	7
Sub-panel 3 (Consulting companies, occupational health services, researchers etc.)	8	8	3	8
Total (Norway)	27	26	8	21
Denmark:				
Sub-panel 1 (Employee and employer organisations)	18*	14	6	14
Sub-panel 2 (Working Environment Authority)	5	5	1	4
Sub-panel 3 (Consulting companies occupational health services researchers etc.)	7	7	1	6
Total (Denmark)	30*	26	8	24

*One participant withdrew before completing the survey, N/A: Not applicable.

Themes and topics the participants addressed

After the first round of the survey, the researchers conducted a thematic analysis of the texts submitted by the expert respondents. These themes were constructed to organise the questionnaire that was developed based on the respondent's statements and are displayed in Table 3.2. The number of statements reflecting each theme and driver is also given in the table. While this is not a direct measure of the significance or importance of the topics, since a single statement could reflect the thoughts of many experts, it does give an impression of the variation in the different statements and notions connected with each theme. For instance, the most frequently invoked theme was "skills and competency", reflecting the fact that the experts submitted a wide array of different notions and reflections pertaining to this theme in particular. The specific distribution of statements on themes will be presented in the forthcoming comprehensive report specifically pertaining to the Delphi study. With regard to drivers, 38 statements were classified addressing the driver "Technology", 11 statements addressed "Globalisation", 7 statements pertained to the driver "Environment", 53 statements pertained to "Skills", and finally 9 statements addressed the driver "Political, social and cultural developments". The remaining statements were not classified under any specific driver to topic but rather under the open topic "other statements".

Round 3

In the following, an overall summary of results will be presented under headings pertaining to drivers/topics. Statistics for all 210 statements are included herein, but more in-depth, detailed descriptions will be provided in a later report specifically about the Delphi study.

Reading guide

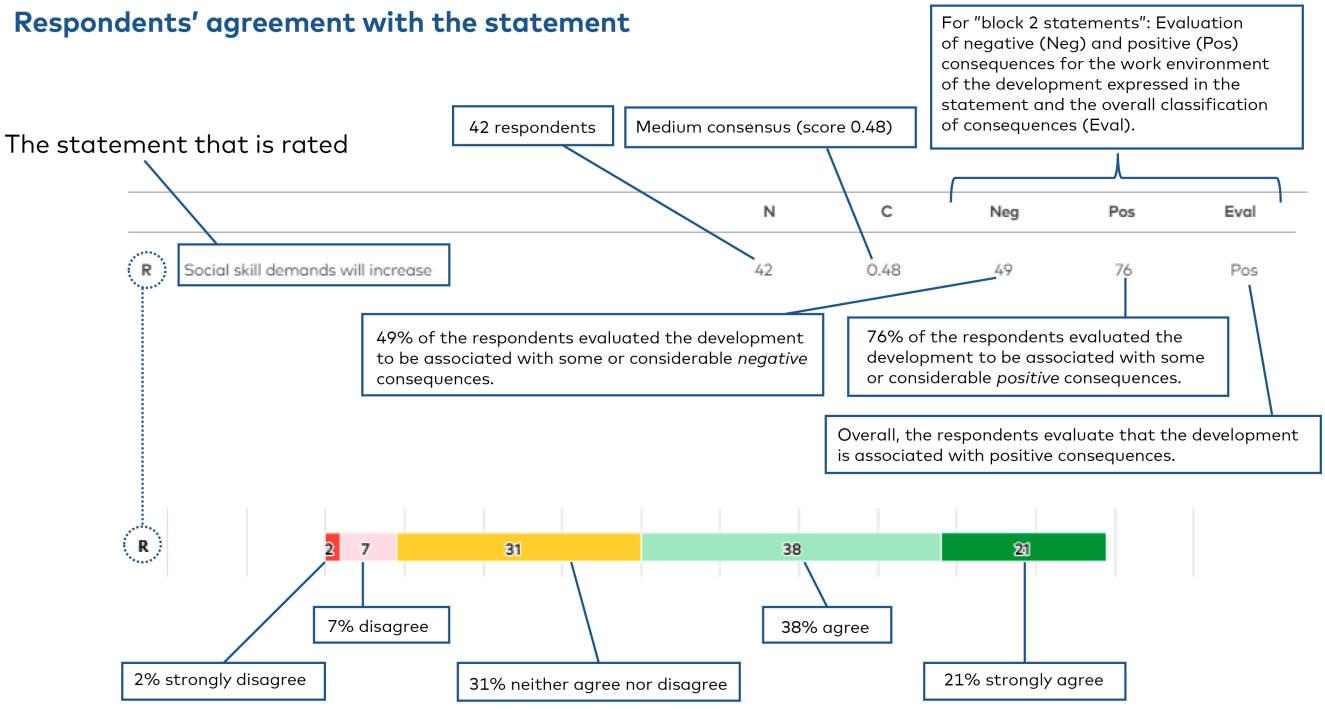
The questions asked in round 3 of the study were presented in three "blocks". *Block 1* consisted of statements that were rated on a scale of agreement from "strongly disagree" to "strongly agree". Statements from *block 2* utilised the same response scale, but respondents were also asked to rate the potential negative and positive consequences of the development described in the statement from "none" to "considerable". For *block 3,* the respondents rated the likelihood of various developments.

For each statement. the experts' ratings and a statistical summary of consensus and evaluations are presented graphically. Figure 3.1 shows how results for statements in blocks 1 and 2 are presented. Overall, the results presentation consists of three parts: 1) the statement that was rated, 2) a bar showing the respondents' ratings of agreement with the statement, and 3) summary statistics and evaluations. Figure 3.1 includes explanations of how this information should be understood. Note that for block 1 statements, respondents were not asked to evaluate consequences for the work environment. Hence, only statistics are presented (N and C), while for block 2 statements, evaluations of consequences are included as well.

Table 3.2: Themes the experts addressed and the number of statements pertaining to each theme and driver.
Note: Some statements were attributed to more than one driver; hence the total is 225 even though the number of statements was 210.

	Drivers							
	Technology	Globalisation	Demography	Environment	Skills	Political/ social/ cultural	Other	Sum
Skills and competency	5		1		23			29
Productivity, efficiency, and competitive advantages	7	3	3	1	5	1	5	25
Psychosocial work environment	1				1		17	19
Job creation, job destruction, job change, and predictability	6			1	4		6	17
General work environment	2				5		9	16
Interaction, cooperation, and culture	3	3		1	1		5	13
Demography		1	6			3	1	11
Roles and responsibilities					2		9	11
Terms and conditions of work	1				1	2	6	10
Time and place	1	1					8	10
Physical, ergonomical, chemical working conditions and accidents	4						3	7
Sustainability				4	1		1	6
Affiliation and connection					1		5	6
Regulations and control over work life					1	2	3	6
Work content	2						2	4

Figure 3.1: Example of the presentation of results for block 1 and block 2 statements, with explanations added

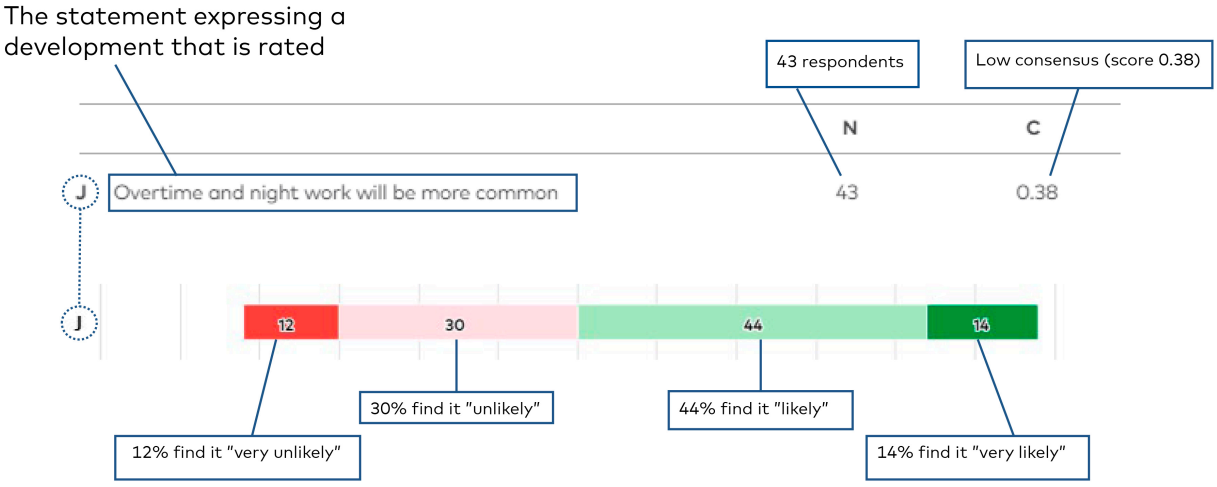


A central measure is the measure of *consensus* among the experts. The consensus score, C, can take a value between -1 and +1. In the current study, a score above 0.70 considered indicative of high consensus, a score between 0.50 and 0.70 was considered medium consensus, and a score below 0.50 was taken to express a low degree of consensus, which indicates that the experts tend to give different ratings (e.g. many experts disagree while many also agree with the statement). For statements in block 2, the experts were also asked to rate the negative/positive consequences for the work environment. These evaluations are summarised in two numbers labelled ''Neg'' and ''Pos''. ''Neg'' is the percentage of respondents that considered the development to be associated with some or considerable negative consequences, and ''Pos'' is the percentage of respondents that considered the development to be associated with some or considerable positive consequences (see Fig. 3.1). Moreover, the overall evaluation of negative and positive consequences was classified and labelled under the heading ''Eval'' (see Fig. 3.1). This overall evaluation was classified as ''Neg'' when at least 70% of the respondents considered the development in the statement to be associated with some or considerable negative consequences and ''Pos'' when at least 70% of the respondents considered the development to be associated with some or considerable positive consequences. The classification ''Neg/Pos'' is used when both these criteria are fulfilled (i.e. more than 70% of the experts foresee both positive and negative consequences of the statement in question). The classification ''Neutral'' was used when less than 70% associated the statement with positive or negative consequences. Finally, as an evaluation of consequences was considered less meaningful when the statement was judged by few to be plausible, when less than 50% of the respondents agreed

(or strongly agreed) with a statement, the overall evaluation was classified as "No agreement". Finally, Figure 3.2 illustrates how results for statements in block 3 are presented. As before, the results consist of three parts: 1) the statement being rated, 2) the respondents' rating of the likelihood of the development expressed by the statement, and 3) summary statistics. Explanations of the graphically presented information have been added to aid interpretation Figure 3.2. Consensus scores are interpreted as explained above.

Figure 3.2: Example of the presentation of results for Block 3 statements with explanations added

Respondents' rating of likelihood of the development



Technology

Technology is a salient topic when discussing of the future of work. Not surprisingly then, many of the expert opinions reflected in the statements compiled in the current study pertained to this topic/driver. Issues related to job creation, destruction, and change were prevalent, with the highest agreement and consensus seemingly about *positive* aspects of contemporary technological developments, namely the emergence of new types of jobs and educational opportunities (see Figs. 3.3 and 3.4). Implications for company productivity, efficiency, and competitive advantages were also frequently cited, here also often with emphasis on potential benefits and opportunities of technological development.

Figure 3.3 Technology:
Block 1: To what extent do you agree with the following statements?
Note: N= Number of respondents, C= Van der Eijk's measure of consensus

Block 1: To what extent do you agree with the following statements?

		N	C
A	Technological changes will give rise to new types of jobs	46	0.84
B	Employers will have to address the implications of new technologies and invest in new systems	40	0.83
C	Technological change will give rise to new educational opportunities	46	0.78
D	Work will be less physically demanding as a result of developments within robotics	42	0.76
E	New technologies will provide new opportunities for some	43	0.74
F	New technologies will bring new risks	42	0.74
G	Technology and expertise may increase innovation and productivity	43	0.73
H	Digitalisation may promote collaboration in the workplace	43	0.71
I	New technologies can contribute to better problem solving	42	0.69
J	The introduction of new technologies will streamline work processes and provide enterprises with a competitive advantage	43	0.69
K	New technologies will contribute to fewer physical risk factors in the workplace	42	0.67
L	New technologies will give rise to job insecurity as work tasks are taken over by machines and robots	45	0.67
M	New technologies make it easier to connect service users with service providers	43	0.65
N	Automation/digitalisation can give a better work environment	42	0.63
O	Digital solutions and climate considerations will lead to solitary work/working from home, which may hamper social relations in the workplace	43	0.63
P	New technologies will give a larger labor market and a better match between supply and demand for skills and manpower	43	0.62
Q	Technological developments can provide better work-related health and greater inclusiveness in the workplace for most workers	43	0.59
R	Employers will have to recruit employees who can secure the use of artificial intelligence	43	0.58
S	Technological developments will give rise to increased competition for certain types of jobs	45	0.58
T	It will be difficult to control the correct execution of automated processes	43	0.52
U	Technological developments will lead to fewer accidents	42	0.50
V	There will be less routine work a result of developments within robotics	42	0.49
W	Automation of low-skilled jobs can cause many to be left outside the labor market	45	0.48
X	Rapid technological development will lead to polarisation and greater social inequalities in work-related health	44	0.30

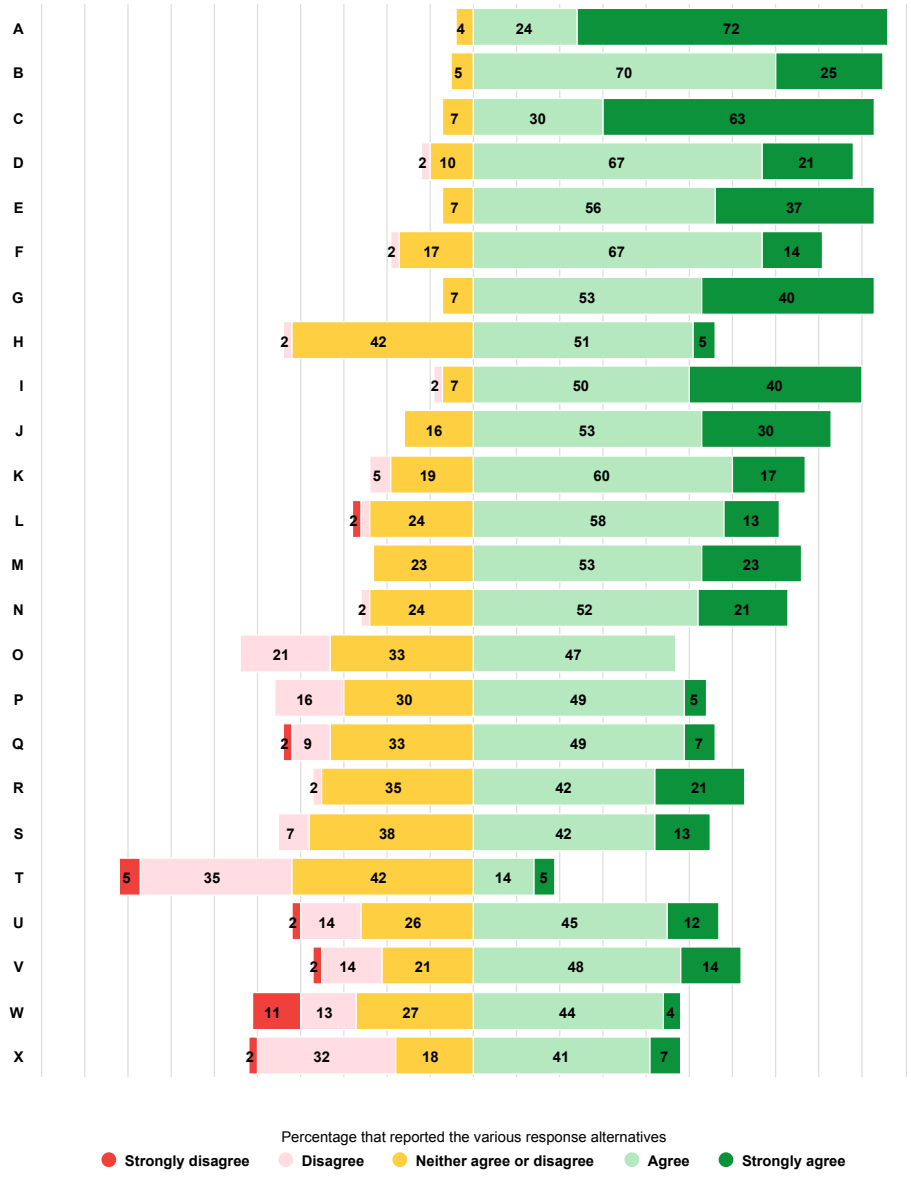
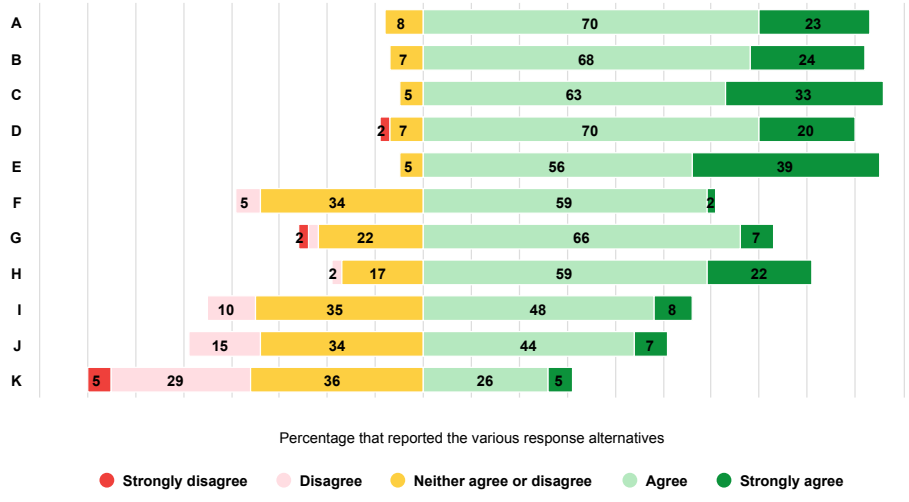

A 4 24 72
B 5 70 25
C 7 30 63
D 2 10 67 21
E 7 56 37
F 2 17 67 14
G 7 53 40
H 2 42 51 5
I 2 7 50 40
J 16 53 30
K 5 19 60 17
L 2 24 58 13
M 23 53 23
N 2 24 52 21
O 21 33 47
P 16 30 49 5
Q 2 9 33 49 7
R 2 35 42 21
S 7 38 42 13
T 5 35 42 14 5
U 2 14 26 45 12
V 2 14 21 48 14
W 11 13 27 44 4
X 2 32 18 41 7
Percentage that reported the various response alternatives
Strongly disagree
Disagree
Neither agree or disagree
Agree
Strongly agree

Figure 3.4 Technology: Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment? **Note:** N= Number or respondents, C= van der Eijk's measure of consensus, Neg/Pos= Percentage that answered 'some' or 'considerable' negative/positive consequences **Eval:** Overall classification of consequences. Neutral= <70 percent rated 'some' or 'considerable' negative or positive consequences, NA= No agreement - Less than 50 percent rated 'Agree' or 'Strongly agree'

Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?

		N	C	Neg	Pos	Eval
A	Digitalisation makes work more flexible in time and place	40	0.81	82	88	Neg/pos
B	New technologies will allow new ways of organising work	41	0.80	72	90	Neg/pos
C	New technologies (e.g. artificial intelligence, robots, ICT) will be a part of more work tasks and change the content of tasks	40	0.79	80	92	Neg/pos
D	Tasks will shift from workers to machines and robots	44	0.77	91	100	Neg/pos
E	Workers will have to continuously develop their skills and make sure they are relevant, e.g. in regards to new technologies	41	0.76	73	92	Neg/pos
F	New technologies provide opportunities to utilise residual work capacity and offer services in a global market	41	0.74	41	67	Neutral
G	Work tasks will become more varied and complex as new technologies take on more of the routine tasks	41	0.73	69	82	Pos
H	New technologies will make increased control and surveillance of workers possible	41	0.68	85	39	Neg
I	Technology will to a greater extent determine how work is organised	40	0.61	74	51	Neg
J	Technological developments will lead to increasing individualisation and less unionisation	41	0.57	74	26	Neg
K	Workers will experience alienation from work as a consequence of automation and robotisation	42	0.43	68	35	NA



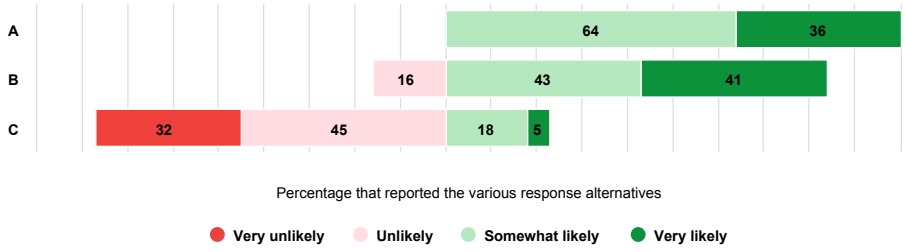
In general, responses tended towards agreement, indicating few controversial statements regarding developments and challenges associated with technological advancement. Consensus scores were also high for many statements (16 statements exhibiting high consensus, i.e. a score > 0.7), although some statements also exhibited low consensus (6 scores were 0.5 or below), indicating more varied opinions among the experts. The lowest consensus rating was observed for the statement "Rapid technological development will lead to polarisation and greater social inequalities in work-related health" (C = 0.35, Fig. 3.3), for which the experts used the full rating scale ranging from "strongly disagree" to "strongly agree".

One statement seemed to stand out as particularly controversial, with only 19% agreeing or strongly agreeing, and 40% disagreeing or strongly disagreeing. This statement referred to challenges associated with the monitoring of automated processes ("It will be difficult to control the correct execution of automated processes", see Fig. 3.3). This apparent disagreement about the implications of automation and robotisation was also reflected in assessments of statements such as "Rapid technological development will lead to polarisation and greater social inequalities in work-related health" (Fig. 3.3), "Workers will experience alienation from work as a consequence of automation and robotisation" (Fig. 3.4), and "Workers will to a larger extent be managed and lead by robots" (Fig. 3.5). This last statement was rated as unlikely or very unlikely by a clear majority of the experts. It was also among the few that actually referred to a specific technological development, namely robotisation. Most statements were rather broad and general, referring to "technology" as an overarching concept. With regard to robotization, specifically, there was high consensus among the experts that developments would be consequential, but less consensus regarding the specific consequences. They agreed that such developments would lead to physically less demanding work and there was moderate consensus that they would lead to increased job insecurity. However, there was little consensus that developments in robotics would lead to less routine work and that robots would manage and lead human employees to a larger extent. Hence, one may speculate that the high level of agreement is driven by the high level of abstraction, i.e. that disagreement would be more apparent if more specific statements were presented.

Figure 3.5 Technology:
Block 3: How likely do you think the trends in the following statements are?
Note: N= Number or respondents, C= van der Eijk's measure of consensus

Block 3: How likely do you think the trends in the following statements are?

		N	C
A	Workers will to a larger extent have to cooperate with robots	44	0.76
B	The digital economy will lead to increased socioeconomic differences between groups with different educations and skills (e.g. technology skills)	44	0.52
C	Workers will to a larger extent have to cooperate with robots	44	0.45



For the psychosocial work environment in particular, increasing workplace collaboration, increased flexibility in time and place of work execution, and more varied and complex work tasks appeared to be important notions. For other aspects of the work environment, the appearance of new risks at work, the possibility of organising work in novel ways, the demand for workers to continuously develop their skills, and an increased potential to utilise residual work capacity and thereby to strengthen labour market inclusivity appeared to be important. With regard to the specific technology of robotics, consensus seemed stronger for statements pertaining to the general or physical work environment than the psychosocial one. Interestingly, consensus was only moderate with regard to the consequences of robotics/automation for job security.

With regard to consequences of the statements listed in block 2 for work environment and health, the experts seemed to be more in agreement with each other regarding developments that could have both positive and negative outcomes. Only one statement, "Work tasks will become more varied and complex as new technologies take on more of the routine tasks", was categorised as only positive (Fig. 3.4). That statement exhibited high consensus, whereas the four statements that were categorised as only negative obtained only medium consensus. The remaining statements exhibiting high consensus were associated with both positive and negative consequences.

Demography

The experts generated ten distinct statements that were classified under the topic of demography. These statements revolved around the ageing population and demographical changes or diversification in the population that is likely to influence the world of work. Not surprisingly, perhaps, there was high agreement with general notions such as that of the work population's getting older and migration's increasing. However, while there was fairly high agreement with statements, consensus was generally only medium, and only three statements achieved high consensus (C>0.70). These were rather broad factual statements about the increasing proportion of seniors in the labour force and increasing diversity (see Figs. 3.6, 3.7 and 3.8). Interestingly, no statements were generated about urbanisation, a central component of the demography "megatrend" according to Dølvik and Steen (2018) (see the Introduction section).

Figure 3.6 Demography:
Block 1: To what extent do you agree with the following statements?
Note: N= Number or respondents, C= van der Eijk's measure of consensus

Block 1: To what extent do you agree with the following statements?

		N	C
A	The increasing proportion of seniors in the labour market will have to be taken into account	43	0.74
B	New generations entering the labor market bring new perspectives on new challenges, such as digitalisation	43	0.69
C	Increased diversity will bring more innovation and enrichment, because there will be more vantage points	43	0.69
D	Better opportunities to implement local senior arrangements, which for example can help retain staff, increase cross-generational collaboration and increase productivity	42	0.67
E	Age-related illnesses will increasingly influence whether employees can cope with physical and mental work loads	44	0.58
F	Elderly workers will find it difficult to maintain relevant skills and job security	43	0.42

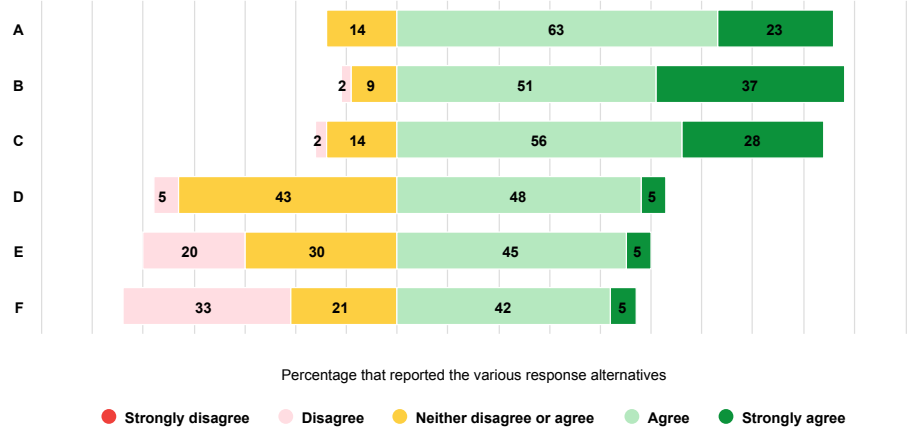


Figure 3.7 Demography:
Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?
Note: N= Number or respondents. C= van der Eijk's measure of consensus, Neg/Pos= Percentage that answered 'some' or 'considerable' negative/positive consequences
Eval: Overall classification of consequences. Neutral: <70 percent rated 'some' or 'considerable' negative or positive consequences, NA: No agreement - Less than 50 percent rated 'Agree' or 'Strongly agree'

Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?

		N	C	Neg	Pos	Eval
A	The workforce will become more diverse, with a more equal distribution of gender, ethnicity, and nationalities	42	0.85	67	88	Pos
B	There will be a higher proportion of elderly workers in important positions	42	0.55	56	63	NA

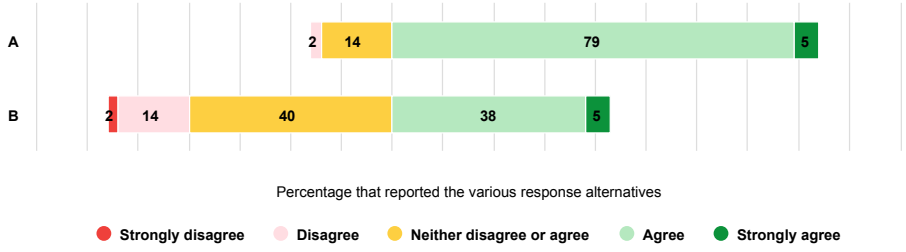
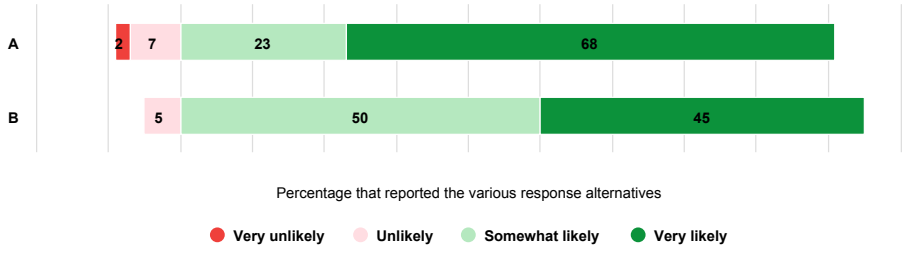


Figure 3.8 Demography:
Block 3: How likely do you think the trends in the following statements are?
Note: N= Number or respondents, C= van der Eijk's measure of consensus

Block 3: How likely do you think the trends in the following statements are?

		N	C
A	The proportion of older workers will increase	44	0.71
B	Migration will increase	44	0.63



The most controversial statement, when judging by consensus rating, was "Elderly workers will find it difficult to maintain relevant skills and job security" (C = 0.42, Fig. 3.6); it was the only statement to exhibit low consensus. The only statement with which any experts strongly disagreed was "There will be a higher proportion of elderly workers in important positions" (Fig. 3.7). The main source of controversy under the demography heading seemed to be notions of negative implications and challenges of a changing world of work to ageing workers, such as age-related illnesses, maintenance of skills and job security.

Globalisation

The eleven statements concerning globalisation can be roughly divided into three topics, namely culture/language, competition/productivity, and the borderless nature of work and the labour market. More than half of the statements pertained to the last topic. Agreement was high for all statements, with the lowest proportion of "agree"/ "strongly agree" being 61% ("New technologies provide opportunities to utilise residual work capacity and offer services in a global market", Fig. 3.9). Consensus was also high, with nine statements exhibiting high consensus (C>0.70) and the remaining two exhibiting medium consensus (C between 0.50 and 0.70). Hence, the overall impression was that there was little controversy regarding the globalisation of work.

Figure 3.9 Globalisation:
Block 1: To what extent do you agree with the following statements?
Note: N= Number of respondents, C= Van der Eijk's measure of consensus

Block 1: To what extent do you agree with the following statements?

		N	C
A	More cross-border mobility will involve having to deal with workers with different needs (culture, language)	46	0.93
B	International competition will increase	43	0.85
C	A more international labor market makes intercultural exchanges possible	43	0.85
D	Globalisation may result in time-related 'borderlessness', because workers increasingly work across time zones	43	0.72
E	More collaboration across geographical borders, time zones, and cultures will bring challenges related to language and cultural differences	43	0.63
F	An international market will allow for higher production volumes	43	0.62

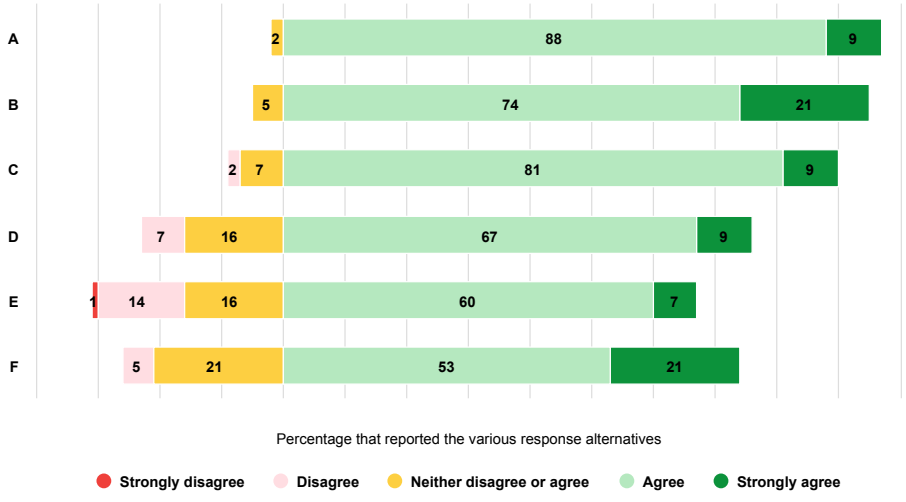
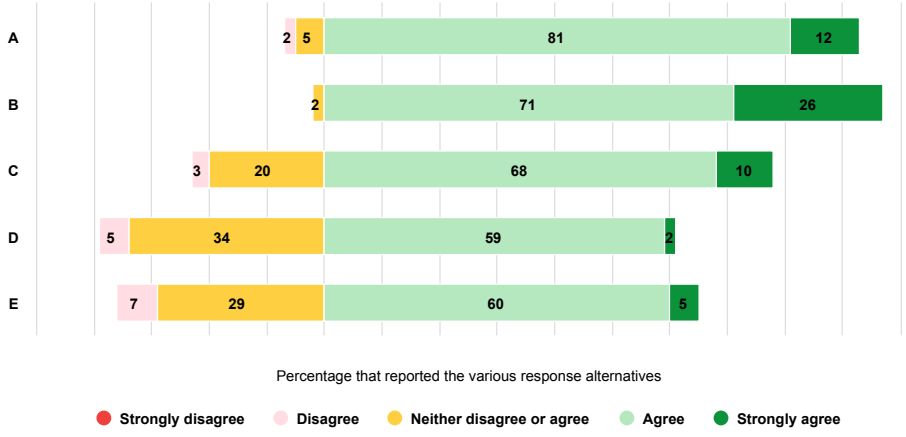


Figure 3.10 Globalisation:
Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?
Note: N= Number or respondents, C= van der Eijk's measure of consensus, Neg/Pos= Percentage that answered 'some' or 'considerable' negative/positive consequences
Eval: Overall classification of consequences. Neutral= <70 percent rated 'some' or 'considerable' negative or positive consequences, NA= No agreement - Less than 50 percent rated 'Agree' or 'Strongly agree'

Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?

		N	C	Neg	Pos	Eval
A	Workers will experience more competition due to globalisation	42	0.86	95	60	Neg
B	Globalisation will increase (e.g. cross-border businesses, offshoring)	42	0.85	80	83	Neg/pos
C	Globalisation will make it easier to recruit the appropriate labor resources across country borders	40	0.76	66	69	Neutral
D	New technologies provide opportunities to utilise residual work capacity and offer services in a global market	41	0.74	41	67	Neutral
E	The labor market will open up and be larger for many due to migration	42	0.71	69	73	Pos



With regard to consequences, there were five statements under block 2 (see Fig. 3.10), and one statement was mainly associated with negative consequences ("Workers will experience more competition due to globalisation") and one with positive consequences ("The labour market will open up and be larger for many due to migration"). The remaining statements were either both positive and negative or neutral, i.e. less than 70% rated them as positive or negative.

Environment

Seven statements were devoted to the topic of the environment, including climate change and sustainability (see Figs. 3.11, 3.12 and 3.13). These statements revolved around challenges associated with attempting to reduce climate gas emissions, such as cutting back on work travel and increasing remote work with less direct social contact, sustainability as a competitive advantage, and some more general declarative statements about the prospective development of a work life with increased environmental awareness. Generally, statements pertained to effects of adjustments workplaces will have to make due to climate change.

Figure 3.11 Environment:
Block 1: To what extent do you agree with the following statements?
Note: N= Number of respondents, C= Van der Eijk's measure of consensus

Block 1: To what extent do you agree with the following statements?

		N	C
A	Environmentally friendly solutions with less travel and fewer physical meetings will be more prominent	43	0.86
B	New types of industries and jobs will be created with the green transition	43	0.73
C	An ethical and sustainable corporate profile can make the workplace more attractive	46	0.76
D	Digital solutions and climate considerations will lead to solitary work/working from home, which may hamper social relations in the workplace	43	0.63
E	Transportation to and from the workplace will become more difficult due to required reductions of greenhouse gases	43	0.52

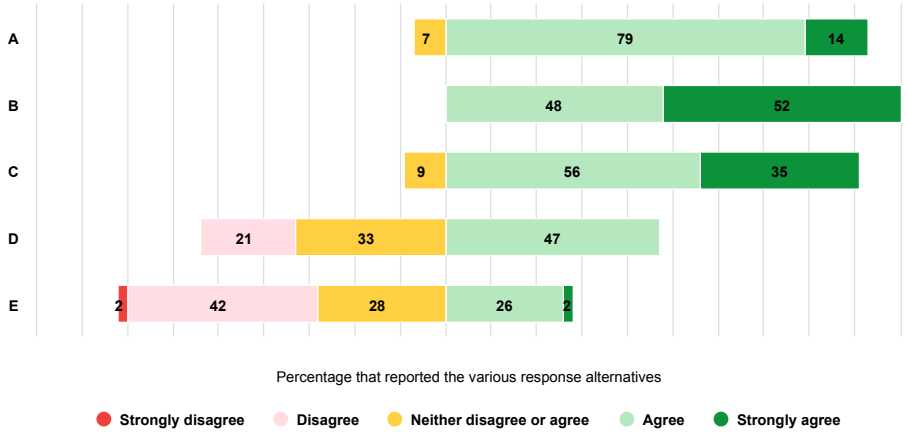


Figure 3.12 Environment:
Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?
Note: N= Number or respondents, C= van der Eijk's measure of consensus, Neg/Pos: Percentage that answered 'some' or 'considerable' negative/positive consequences
Eval: Overall classification of consequences. Neutral= <70 percent rated 'some' or 'considerable' negative or positive consequences, NA= No agreement - Less than 50 percent rated 'Agree' or 'Strongly agree'

Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?

		N	C	Neg	Pos	Eval
A	A sustainable work environment will become more important as a strategic competitive factor	40	0.67	23	87	Pos

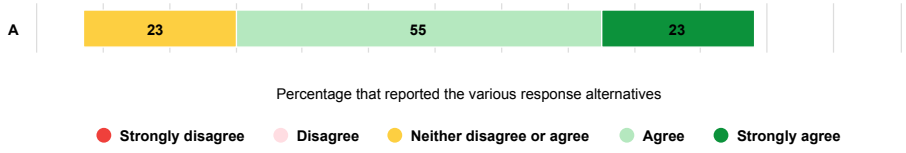
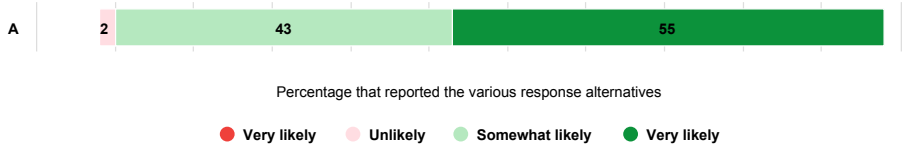


Figure 3.13 Environment:
Block 3: How likely do you think the trends in the following statements are?
Note: N= Number or respondents, C= van der Eijk's measure of consensus

Block 3: How likely do you think the trends in the following statements are?

		N	C
A	Demands for ethical awareness, sustainability, and environmental awareness will increase across all workplaces	44	0.68



In general, there was a high level of agreement with statements, and consensus was medium to high, with consensus scores ranging from 0.52 to 0.86. Notably, the most agreed upon statement in the study, namely "New types of industries and jobs will be created with the green transition", pertained to this driver (Fig. 3.11). More than half (52%) strongly agreed with this statement, while the remaining 48% agreed.

Interestingly, the statements pertaining to the environment seemed to be mainly positive or optimistic in nature, referring to new opportunities or constructive ways of meeting new requirements. For example, the three statements receiving the highest consensus scores, and with most experts agreeing, reflected the increased prominence of environmentally friendly solutions, new types of industries emerging due to the green transition, and competitive advantages for corporations with ethical and sustainable corporate profiles.

Skills/competence

A relatively high number of statements compiled in the current study pertained to skills (see Figs. 3.14, 3.15 and 3.16). There was a wide variety of subtopics addressed under this main topic, presumably reflecting the broadness of the definition of "skills" applied by the researchers in this context. The most commonly applied theme used by the researchers to label statements under this topic was "skills and competency" referring to changes in supply of and demand for new types of skills, as well as both opportunities and challenges that these developments will represent for employers and workers. Interestingly, as suggested by Fig. 3.15, the experts tended to attribute both negative and positive consequences to the developments under this theme, albeit with a slight bias towards the positive (8 negative versus 10 positive).

Figure 3.14 Skills/competence:
Block 1: To what extent do you agree with the following statements?
Note: N= Number of respondents, C= Van der Eijk's measure of consensus

Block 1: To what extent do you agree with the following statements?

		N	C
A	New generations entering the labor market will bring new types of skills	43	0.81
B	Employers will have access to more and better tools to provide knowledge about the working environment	42	0.79
C	Technological change will give rise to new educational opportunities	46	0.78
D	Employers will have to make sure leaders have competence to handle both the physical and the psychosocial work environment	42	0.74
E	Technology and expertise may increase innovation and productivity	43	0.73
F	Employers will have access to more employees who can solve complex and novel tasks	43	0.72
G	Higher levels of education and higher skill levels among employees at all levels will facilitate the ability to develop	43	0.70
H	In the event of job loss, many employees will lack qualifications to get a new job at the same level	43	0.69
I	New generations entering the labor market bring new perspectives on new challenges, such as digitalisation	45	0.69
J	Higher and more varied skills will require a well adjusted work environment	43	0.67
K	The need for new skills will imply more interesting jobs	46	0.66
L	Skill development will be more readily available	43	0.63
M	New industries will increase the demand for previously less sought after skills	43	0.63
N	New technologies will give a larger labor market and a better match between supply and demand for skills and manpower	43	0.62
O	Employers will have to recruit employees who can secure the use of artificial intelligence	43	0.58
P	Employers will have more engaged, innovative, and creative employees	43	0.58
Q	There will be a shortage of systems that can effectively map, assess, and document skills and skill requirements	43	0.55
R	Bureaucracy will increase	42	0.54
S	Less overall workload can lead to a good supply of skilled labor and low wage costs	43	0.53
T	Companies will need to map employee skills to a larger extent	43	0.52
U	Automation of low-skilled jobs can cause many to be left outside the labor market	45	0.48
V	As a result of rising education levels, employers will be able to get highly qualified workers at a lower cost than before	43	0.47
W	Shortages of skilled labor is an advantage for the highly qualified	43	0.47
X	Elderly workers will find it difficult to maintain relevant skills and job security	43	0.42
Y	It will be more difficult to satisfy the need for meaningful tasks, sufficient organisational resources, adequate feedback culture, opportunities for influence, skill development and collaboration	41	0.41

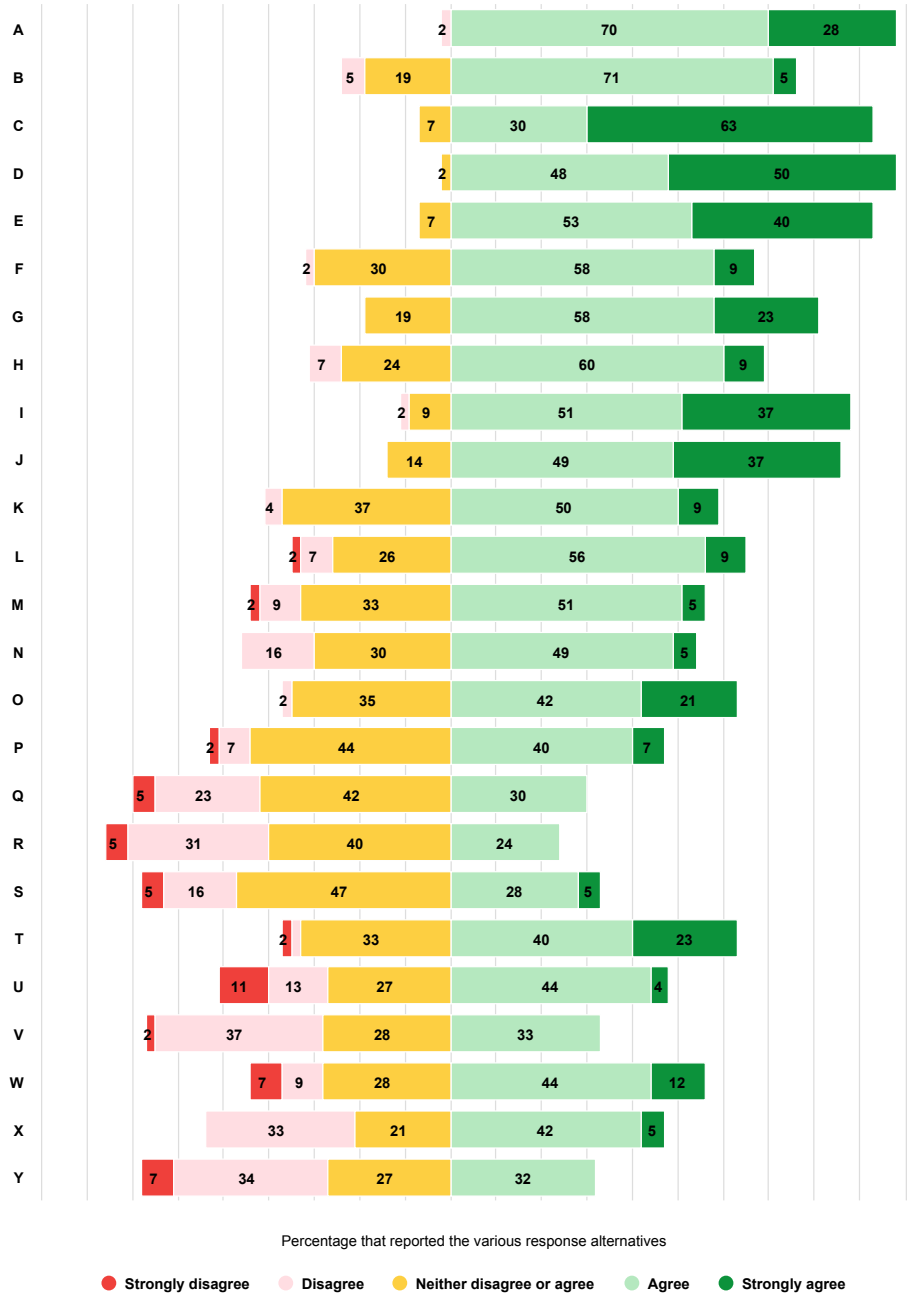

A 2 70 28
B 5 19 71 5
C 7 30 63
D 2 48 50
E 7 53 40
F 2 30 58 9
G 19 58 23
H 7 24 60 9
I 2 9 51 37
J 14 49 37
K 4 37 50 9
L 2 7 26 56 9
M 2 9 33 51 5
N 16 30 49 5
O 2 35 42 21
P 2 7 44 40 7
Q 5 23 42 30
R 5 31 40 24
S 5 16 47 28 5
T 2 33 40 23
U 11 13 27 44 4
V 2 37 28 33
W 7 9 28 44 12
X 33 21 42 5
Y 7 34 27 32
Percentage that reported the various response alternatives
Strongly disagree
Disagree
Neither disagree or agree
Agree
Strongly agree

Figure 3.15 Skills/competence:
Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?
Note: N= Number or respondents, C= van der Eijk's measure of consensus, Neg/Pos= Percentage that answered 'some' or 'considerable' negative/positive consequences
Eval: Overall classification of consequences. Neutral= <70 percent rated 'some' or 'considerable' negative or positive consequences, NA= No agreement - Less than 50 percent rated 'Agree' or 'Strongly agree'

Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?

		N	C	Neg	Pos	Eval
A	Self leadership will be required to a larger extent	41	0.84	95	92	Neg/pos
B	Streamlining demands will increase	40	0.79	84	56	Neg
C	Requirements to remain in work longer will increase	42	0.77	86	69	Neg
D	Globalisation will make it easier to recruit the appropriate labor resources across country borders	41	0.76	73	92	Neg/pos
E	Employers will have a vested interest in investing in employee skill development	42	0.76	46	90	Pos
F	Workers will have to continuously develop their skills and make sure they are relevant, e.g. in regards to new technologies	40	0.76	66	69	Neutral
G	Companies will have to invest more in skill development	42	0.75	34	95	Pos
H	Employees will become more flexible	41	0.74	77	90	Neg/pos
I	The ability to work with innovative solutions will become more important	41	0.72	50	80	Pos
J	Companies will to a greater extent have to include ethics, sustainability, and corporate social responsibility in their value chains	40	0.70	24	89	Pos
K	Work life will become more task-driven	41	0.68	61	69	Neutral
L	A sustainable work environment will become more important as a strategic competitive factor	40	0.66	23	87	Pos
M	The labor market will be more individualised	40	0.66	84	37	Neg
N	Collaboration between professionals and volunteers in the labor market will become more widespread	41	0.65	61	66	NA
O	Innovation culture will become more important	42	0.62	42	80	Pos
P	Work contracts will become more individualised and the role of unions will be lessened	40	0.56	81	32	Neg
Q	The individual employee will to a larger extent have to take responsibility for their own work situation	42	0.55	72	56	Neg
R	Social skill demands will increase	42	0.48	49	76	Pos

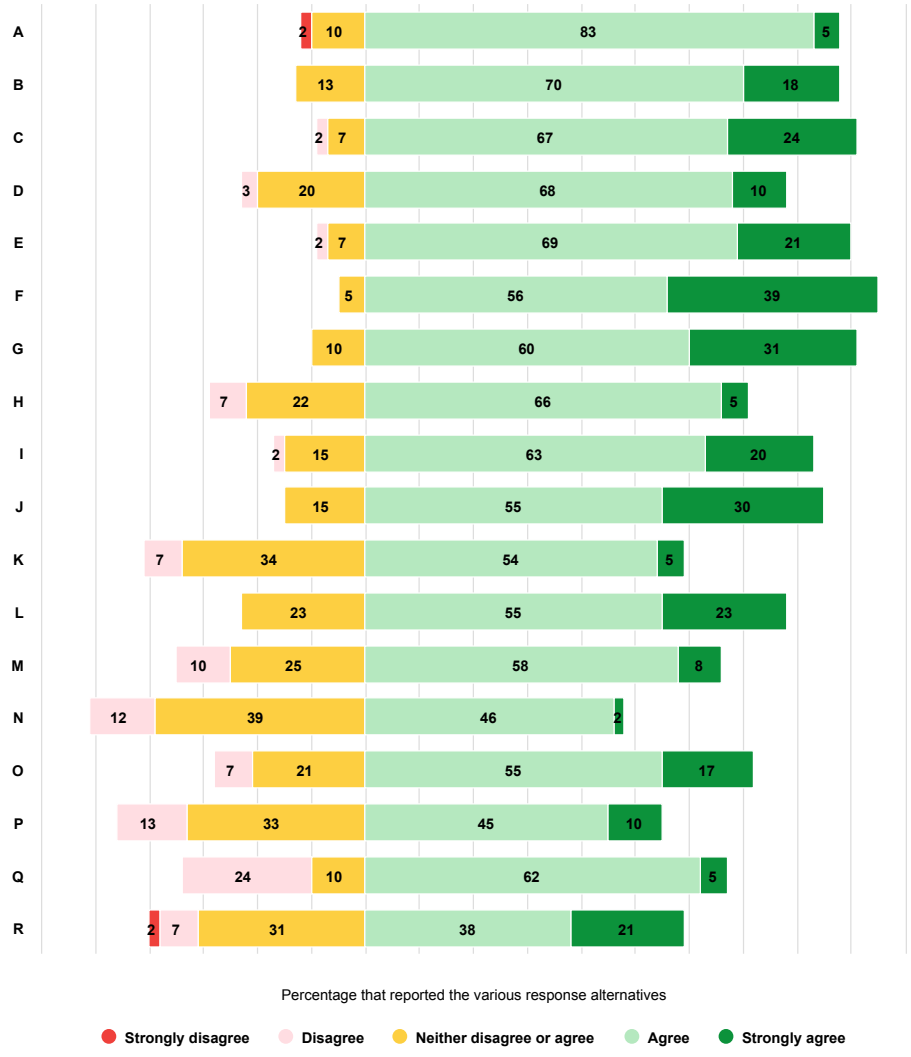
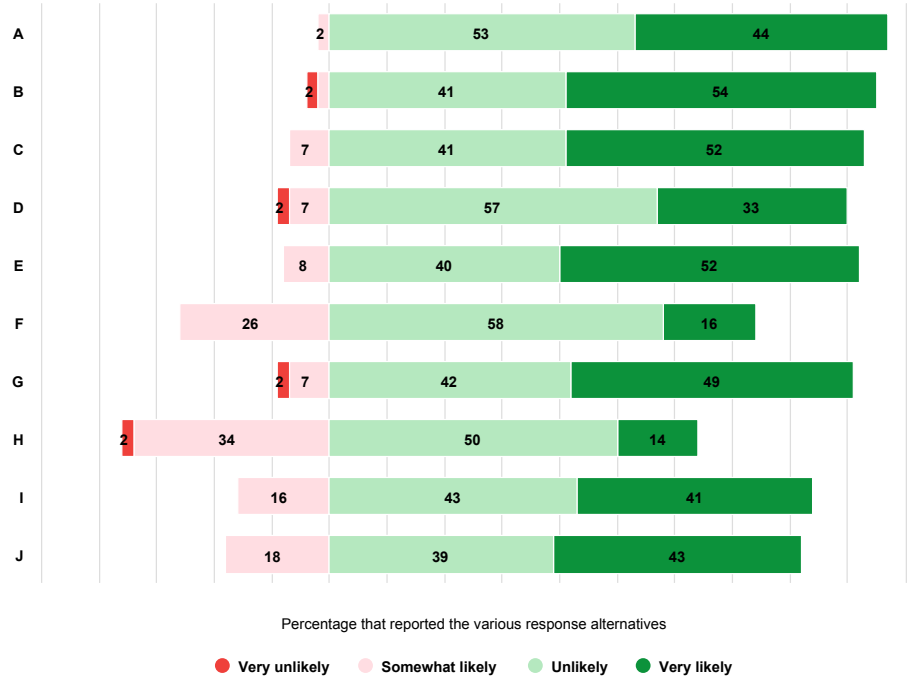

A 2 10 83 5
B 13 70 18
C 2 7 67 24
D 3 20 68 10
E 2 7 69 21
F 5 56 39
G 10 60 31
H 7 22 66 5
I 2 15 63 20
J 15 55 30
K 7 34 54 5
L 23 55 23
M 10 25 58 8
N 12 39 46 2
O 7 21 55 17
P 13 33 45 10
Q 24 10 62 5
R 2 7 31 38 21
Percentage that reported the various response alternatives
Strongly disagree
Disagree
Neither disagree or agree
Agree
Strongly agree

Figure 3.16 Skills/competence:
Block 3: How likely do you think the trends in the following statements are?
Note: N= Number or respondents, C= van der Eijk's measure of consensus

Block 1: To what extent do you agree with the following statements?

		N	C
A	There will be a growing need for more 'customer-sentric' and 'person-focused' organisations	43	0.67
B	Which skills are in high demand will change	41	0.64
C	Competence and work ability will be more important than age	44	0.64
D	Workers with high levels of skill will be in higher demand, while access to skilled labor will decline	25	0.63
E	Work environment, engagement, and commitment to the organisation will become strategic competitive factors	42	0.63
F	The focus on people and intrinsic motivation will gain traction	43	0.61
G	Competition for skilled labor will increase	43	0.58
H	There will be more rogue players in work life and more work-related crime	44	0.55
I	The digital economy will lead to increased socioeconomic differences between groups with different educations and skills (e.g. technology skills)	44	0.52
J	Time-limited employment and assignments will become more widespread	44	0.50



No statement explicitly expressed that the need for investment in skills development would increase in the future, although this seems to be an implicit assumption reflected in many statements. For example, several of the statements in block 1 with the highest consensus (Fig. 3.14) expressed positive views on the opportunities to develop and maintain skills in the future. Examples are "New generations entering the labour market will bring new types of skills" and "Employers will have access to more and better tools to provide knowledge about the working environment". Thus, although the high consensus statements may implicitly assume a major need for workers to acquire and develop skills to meet the demands of the future, they also contain positive indications that these challenges can and will be adequately addressed. There was also high consensus for several statements expressing apparently positive consequences of this development, such as "Technology and expertise may increase innovation and productivity" and "Competence and work ability will be more important than age". In contrast, statements seemingly expressing negative consequences of the future demand for novel skills, for example, "Elderly workers will find it difficult to maintain relevant skills and job security", were more controversial and resulted in larger variability in the experts' ratings than statements expressing positive aspects.

Another general observation in the statements about skills was that not only would the demand for skills be higher, but the type of skills that are needed in the future would also change considerably. This was expressed in several high consensus statements such as "Employers will have a vested interest in investing in employee skill development" (Fig. 3.15), "There will be a growing need for more 'customer-centric' and 'person-focused' organisations" (Fig. 3.16) (i.e. requiring that more employees receive training in these areas) and the more general assertion that "Which skills are in high demands will change" (Fig. 3.16).

With regard to possible consequences for the psychosocial work environment, no obvious overall tendency emerged from the statements. A reasonable expectation might be that the increased significance of continuously acquiring and maintaining skills in the future (see above) could instigate increased work pressure for some groups. However, statements expressing such developments, like "Elderly workers will find it difficult to maintain relevant skills and job security" (Fig. 3.14), exhibited low consensus. When a statement addressing this subject exhibited high consensus, it was rated as associated with both positive and negative consequences; this was the case with the statement "Workers will have to continuously develop their skills and make sure that they are relevant, e.g. in regard to new technologies" (Fig. 3.15). Overall, a small majority of the high consensus statements were rated as being predominantly associated with positive consequences (7 statements), while slightly fewer were predominantly associated with negative consequences (5 statements).

Political, social, and cultural developments

The nine statements derived in the present study pertaining to political, cultural and social developments addressed issues of equality, legislation, and work-related crime (see Figs. 3.17 and 3.18; no statements under block 3 pertained to this topic). While agreement was generally high here also, relatively high levels of disagreement were observed for statements regarding legislation and control ("Working conditions will be regulated and controlled to a lesser extent", "Legislation and regulations will be more complex"), gender issues ("There will be an increased awareness of gender

differences in the significance of the work environment") and social security ("More workers will experience a lack of social security at work (e.g. entitlement to parental leave, vacation, sick pay, etc.")), with 21%–34% of the experts either disagreeing or strongly disagreeing. Consensus was mostly medium to high, with one statement receiving low consensus and consensus scores of 0.42–0.79. The highest levels of consensus were achieved for statements about diversity. Most experts agreed that both gender and cultural diversity, and therefore the focus on such topics, would increase in the coming years.

Figure 3.17 Political/social/cultural developments:
Block 1: To what extent do you agree with the following statements?
Note: N= Number of respondents, C= Van der Eijk's measure of consensus

Block 1: To what extent do you agree with the following statements?

		N	C
A	There will be more focus on diversity and inclusion in the workplace	43	0.79
B	Increased diversity will bring more innovation and enrichment, because there will be more vantage points	43	0.69
C	Employers will have to deal with more diversity in the workplace, e.g. gender issues (male, female, other genders)	44	0.62
D	More workers will experience a lack of social security at work (e.g. entitlement to parental leave, vacation, sick pay, etc.)	44	0.42

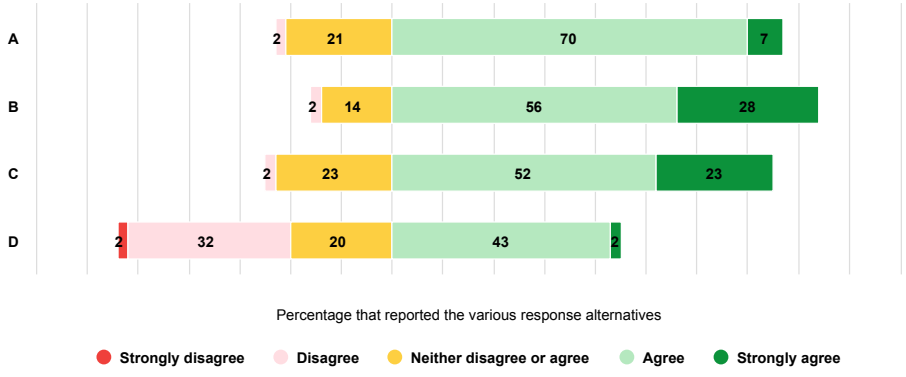
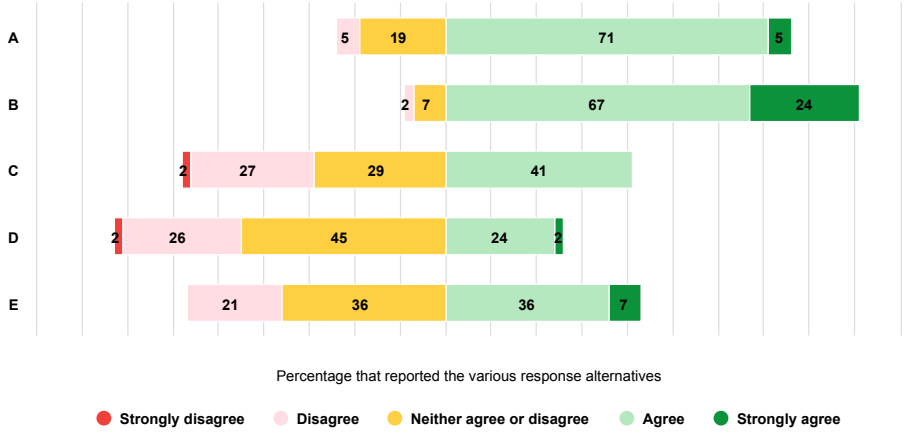


Figure 3.18 Political/social/cultural developments:
Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?
Note: N= Number or respondents, C= van der Eijk's measure of consensus, Neg/Pos: Percentage that answered 'some' or 'considerable' negative/positive consequences
Eval: Overall classification of consequences. Neutral= <70 percent rated 'some' or 'considerable' negative or positive consequences, NA= No agreement - Less than 50 percent rated 'Agree' or 'Strongly agree'

Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?

		N	C	Neg	Pos	Eval
A	It will be possible to attain a stronger gender balance in the labor market (more female leaders, more men in disciplines traditionally dominated by women)	42	0.79	39	88	Pos
B	Requirements to remain in work longer will increase	42	0.77	86	69	Neg
C	Working conditions will to a lesser extent be regulated and controlled	41	0.55	65	38	NA
D	Legislation and regulations will be more complex	42	0.55	55	31	NA
E	There will be an increased awareness of gender differences in the significance of the work environment	42	0.50	28	62	NA



Interestingly, while only few (nine) statements on the topic emerged from the first Delphi rounds, the experts seemed to have many thoughts regarding concrete suggestions (not shown in the current report). These suggestions seemed to focus mainly on legislation – some experts seemed to imply current legislation may be overly complex. However, the statement "Legislation and regulations will be more complex" received a consensus score of 0.55; 28% of the experts either disagreed or strongly disagreed with the statement, yet 26% either strongly agreed or agreed. This may imply that while some experts believe regulations will become more complex and perhaps hard to follow for workers and employees, many experts also reject this notion. It is possible this difference is a result of the different experts' views on the complexity of already existing regulations.

Other statements

The open theme designated "other themes" included a wide variety of topics that were not classified by the researchers as belonging to the aforementioned drivers or topics (see Figs. 3.19, 3.20, and 3.21). Some of these statements were rather general and unspecific, such as "There will be more focus on the psychosocial work environment" or "Stress and burnout will become more prominent". Some statements also seemed to encompass a broad range of issues, making them hard to classify, such as "Workers will increasingly experience a variety of psychosocial work demands (emotional demands, role uncertainty, job insecurity, more unstable relationships) as a result of new forms of employment (digital platform work, casual employment, freelance, etc.)".

Figure 3.19 Other statements:
Block 1: To what extent do you agree with the following statements?
Note: N= Number of respondents, C= Van der Eijk's measure of consensus

Block 1: To what extent do you agree with the following statements?

		N	C
A	Employers will to a greater extent have to care for their employees to retain them in the workplace	43	0.84
B	There will be more focus on the psychosocial work environment	40	0.82
C	New industries can provide new markets for the employers	43	0.80
D	There will be more sedentary work	42	0.80
E	Efficiency gains could be realised as leisure time for employees - or financial gains for businesses	41	0.77
F	Some jobs will disappear	46	0.75
G	More mobility between employers will be required	41	0.73
H	Stress management and resilience will be required to a larger extent	43	0.73
I	It will be possible to aim attention at creating sustainable solutions in a sustainable labor market	41	0.71
J	Employees will experience increased flexibility- and adaptability demands, for example when it comes to working hours	43	0.71
K	There will be more openness about the psychological work environment	43	0.71
L	There will be less opportunity to adapt work for workers with functional impairments	43	0.69
M	Management will occur in collaboration with the employees	44	0.67
N	More workers with looser job attachments may lead to difficulties in establishing a good work environment culture in workplaces	43	0.67
O	New requirements will arise with regard to physical fitness, large work pressure, etc.	44	0.66
P	Creating predictability will be challenging for employers	41	0.66
Q	It will be easier for the individual worker to organise work to fit their own requirements and life situation (e.g family circumstances and age)	41	0.65
R	Work load and time pressures will increase	43	0.65
S	Problems with disruptive noise in the workplace will increase	43	0.64
T	Telework makes it more difficult to create a sense of workplace commitment	43	0.64
U	Availibilty demands will increase and it will be more challenging to balance work and private life	42	0.64
V	Empowerment and autonomy will be more important to create intrinsic motivations to adapt to new demands from the environment	41	0.63
W	Employers will face the challenge of retaining younger employees who have higher demands	42	0.63
X	Productivity-, efficiency-, and quality demands will increase while resources become more limited	41	0.62
Y	Greater collective demands will be made from an overall larger group of employees at the individual workplaces	43	0.62
Z	Employees will be more involved in work organisation, which can provide new opportunities	43	0.62
Ø	Too low mobility in the workforce may become a challenge for employers	42	0.60
Æ	New forms of work schedules will promote higher work intensity and less recovery time	43	0.60
Å	A political agreement regarding the work environment effort will have a great positive effect on the working environment	42	0.60
#	New ownership structures will make collaboration with social partners more difficult	42	0.58
a	Work will be more monotonous	43	0.58
b	There will be an increasing degree of legal professionalisation that will make supervisory work and injunctions more difficult and time consuming	44	0.57

c	Stress and burnout will become more prominent	41	0.56
d	It becomes more difficult for workers to know what is required and expected of them	41	0.56
e	We will see a development towards full employment	45	0.56
f	Engagement and organisational commitment will be crucial indicators for distinguishing between good and bad companies	43	0.55
g	Weekly working hours will increase	43	0.55
h	Predictability and job security will be reduced	44	0.54
i	Mental health problems will increase among young workers	42	0.54
j	The degree of unionisation will decrease, and increased competition for jobs may give rise to less protection against being laid off	44	0.53
k	There will be more focus on the chemical work environment	43	0.52
l	More tasks will have to be carried out with fewer resources	42	0.52
m	More employees will face health challenges	44	0.51
n	Increased flexibility and insecure job attachments will result in lower predictability (for example fluctuating income)	42	0.51
o	Many employees will experience reduced influence and participation in decision making processes	41	0.49
p	Workers will increasingly experience a variety of psychosocial work demands (emotional demands, role uncertainty, job insecurity, more unstable relationships) as a result of new forms of employment (digital platform work, casual employment, freelance, etc.)	44	0.49
q	Many employment seekers will not be able to find work	42	0.48
r	Pressure on pricing and wages could cause some actors not to comply with health and safety regulations	44	0.48
s	Because of telework or remote work, it will become harder to ensure work is being carried out in accordance with health- and safety requirements	44	0.48
t	New organisational forms could reduce the costs associated with the employer's responsibility for working conditions.	43	0.47
u	It will be challenging to limit the control of workers and diminish workers' loss of autonomy	44	0.43
v	Working conditions will deteriorate in the low-wage sector	44	0.40
w	Employees will experience more meaningless work due to increased job insecurity and flexible contracts	41	0.39
x	Responsibilities and roles will be less clear, for instance the roles as employer and employee	43	0.38
y	Active, job-specific HSE management will become more difficult	41	0.37
z	Ensuring fair rewards will become challenging as capital/ownership becomes more important in a digital world	43	0.35
ø	It will become less clear who is responsible for health, work environment and safety	41	0.35
æ	Wages and employment conditions will worsen	44	0.33
å	Many employment relations will be organised in a disadvantageous and unhealthy way for workers due to increasing 'contractualisation' of working conditions that gives more power to the employer	44	0.23

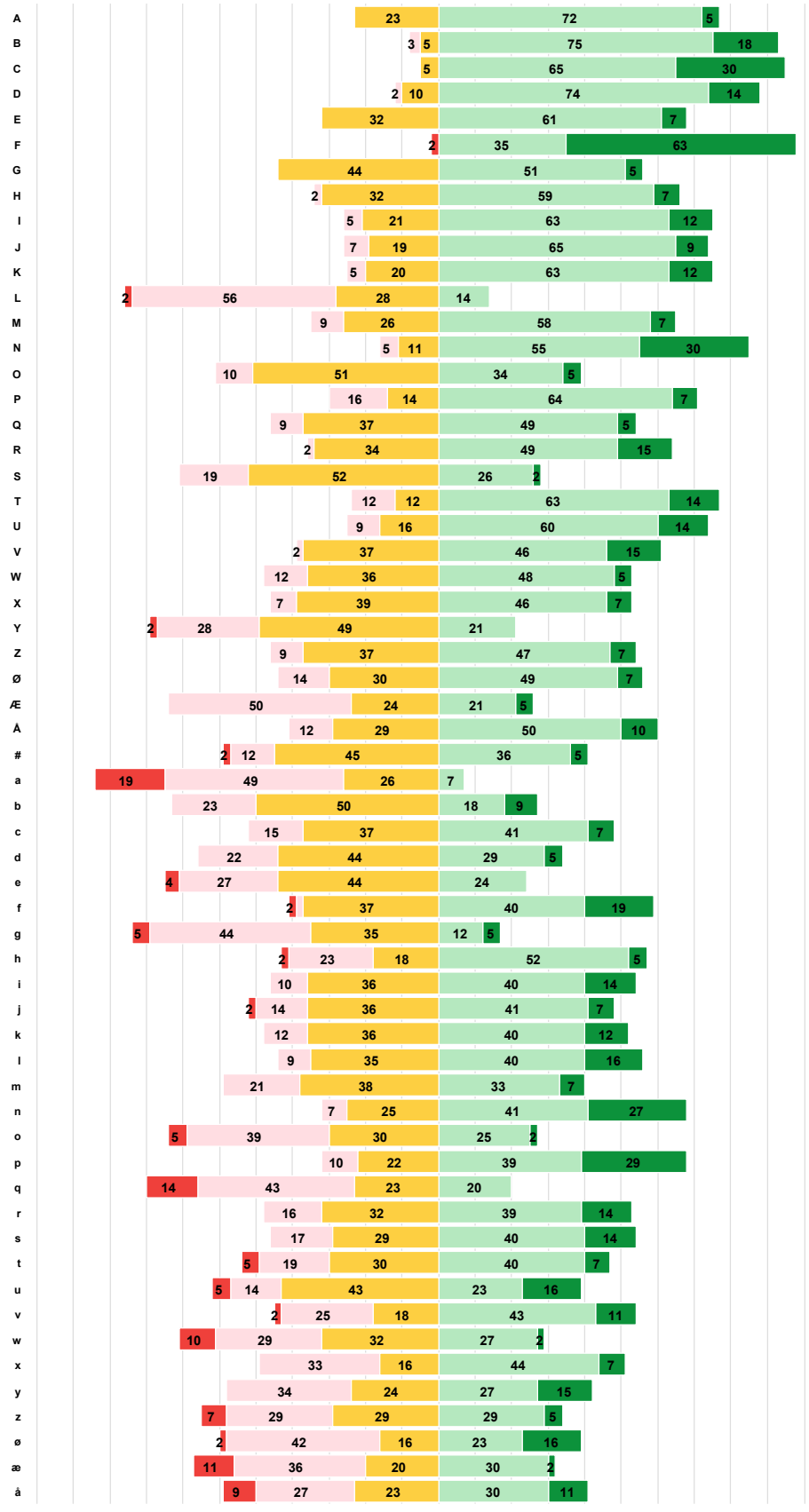

A 23 72 5
B 3 5 75 18
C 5 65 30
D 2 10 74 14
E 32 61 7
F 2 35 63
G 44 51 5
H 2 32 59 7
I 5 21 63 12
J 7 19 65 9
K 5 20 63 12
L 2 56 28 14
M 9 26 58 7
N 5 11 55 30
O 10 51 34 5
P 16 14 64 7
Q 9 37 49 5
R 2 34 49 15
S 19 52 26 2
T 12 12 63 14
U 9 16 60 14
V 2 37 46 15
W 12 36 48 5
X 7 39 46 7
Y 2 28 49 21
Z 9 37 47 7
Ø 14 30 49 7
Æ 50 24 21 5
Å 12 29 50 10
2 12 45 36 5
a 19 49 26 7
b 23 50 18 9
c 15 37 41 7
d 22 44 29 5
e 4 27 44 24
f 2 37 40 19
g 5 44 35 12 5
h 2 23 18 52 5
i 10 36 40 14
j 2 14 36 41 7
k 12 36 40 12
l 9 35 40 16
m 21 38 33 7
n 7 25 41 27
o 5 39 30 25 2
p 10 22 39 29
q 14 43 23 20
r 16 32 39 14
s 17 29 40 14
t 5 19 30 40 7
u 5 14 43 23 16
v 2 25 18 43 11
w 10 29 32 27 2
x 33 16 44 7
y 34 24 27 15
z 7 29 29 29 5
ø 2 42 16 23 16
æ 11 36 20 30 2
å 9 27 23 30 11
Percentage that reported the various response alternatives
Strongly disagree
Disagree
Neither agree or disagree
Agree
Strongly agree

Figure 3.20 Other statements:

Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?

Note: N= Number or respondents, C= van der Eijk's measure of consensus, Neg/Pos= Percentage that answered 'some' or 'considerable' negative/positive consequences

Eval: Overall classification of consequences. Neutral= <70 percent rated 'some' or 'considerable' negative or positive consequences, NA= No agreement - Less than 50 percent rated 'Agree' or 'Strongly agree'

Block 2: To what extent do you agree with the following statements, and to what extent do you think there will be positive and/or negative consequences for the working environment?

		N	C	Neg	Pos	Eval
A	Employees will to larger extent demand individual adaptations of the work	40	0.81	68	92	Pos
B	Demands from patients/customers/clients will increase	42	0.79	90	63	Neg
C	More workers will become self-employed (e.g. freelancers and digital platform workers)	43	0.78	90	76	Neg/pos
D	Employees will to a larger extent have to be proactive and create their own job content	41	0.77	49	87	Pos
E	Workers will have a larger influence on their own work environment and work content	41	0.77	28	88	Pos
F	More attention will be devoted to considering the work environment in combination with the core task and meaningfulness	42	0.77	55	80	Neg/pos
G	There will be more problem solving across professions and disciplines	42	0.77	76	82	Neg/pos
H	It will be easier to change job multiple times	43	0.76	78	83	Pos
I	Larger work places will increase demands for leadership	41	0.74	53	90	Pos
J	Employees will increasingly have to take responsibility for and contribute to a good work environment	41	0.73	47	87	Neg/pos
K	Agile organisational forms will become more widespread	44	0.72	76	85	Pos
L	Workers will to a larger extent be expected to take responsibility for their own health and well-being	41	0.71	30	79	Neg
M	Some trends will be more difficult for older than younger employees to relate to	42	0.71	72	68	Neg
N	Appropriate utilisation of established collaboration systems will provide adaptability	43	0.71	90	52	Neg
O	The growing service sector will lead to increased emotional demands	42	0.69	85	52	Neg
P	Employees will remain in a job for shorter time periods before changing job	43	0.69	76	64	Neg
Q	There will be more solitary work	40	0.68	79	34	Neg
R	Each worker will to a large extent have to look after their own work environment	42	0.64	79	62	Neg
S	Psychosocial and organisational working conditions will be more in focus than physical, chemical, and biological factors	41	0.61	54	90	Pos
T	Employees will experience less autonomy coupled with growing requirements to work independently	41	0.60	63	50	NA
U	Some workers' tasks will become less complex	41	0.57	74	50	Neg

V	It will be easier to adjust the workforce to fit market needs	44	0.57	71	55	NA
W	Employers must meet employees' demands for constant feedback and coaching	41	0.56	51	85	Pos
X	There will be less focus on HSE and looking after employees	42	0.56	71	41	NA
Y	Employees' own responsibility for the working environment will become more apparent	41	0.54	68	51	NA
Z	People will become the 'real capital', and hence employees will gain more ownership in organisations	44	0.52	39	70	NA
Ø	A larger proportion of employees will work jobs that are not adequately covered by work environment legislation	42	0.40	81	26	Neg

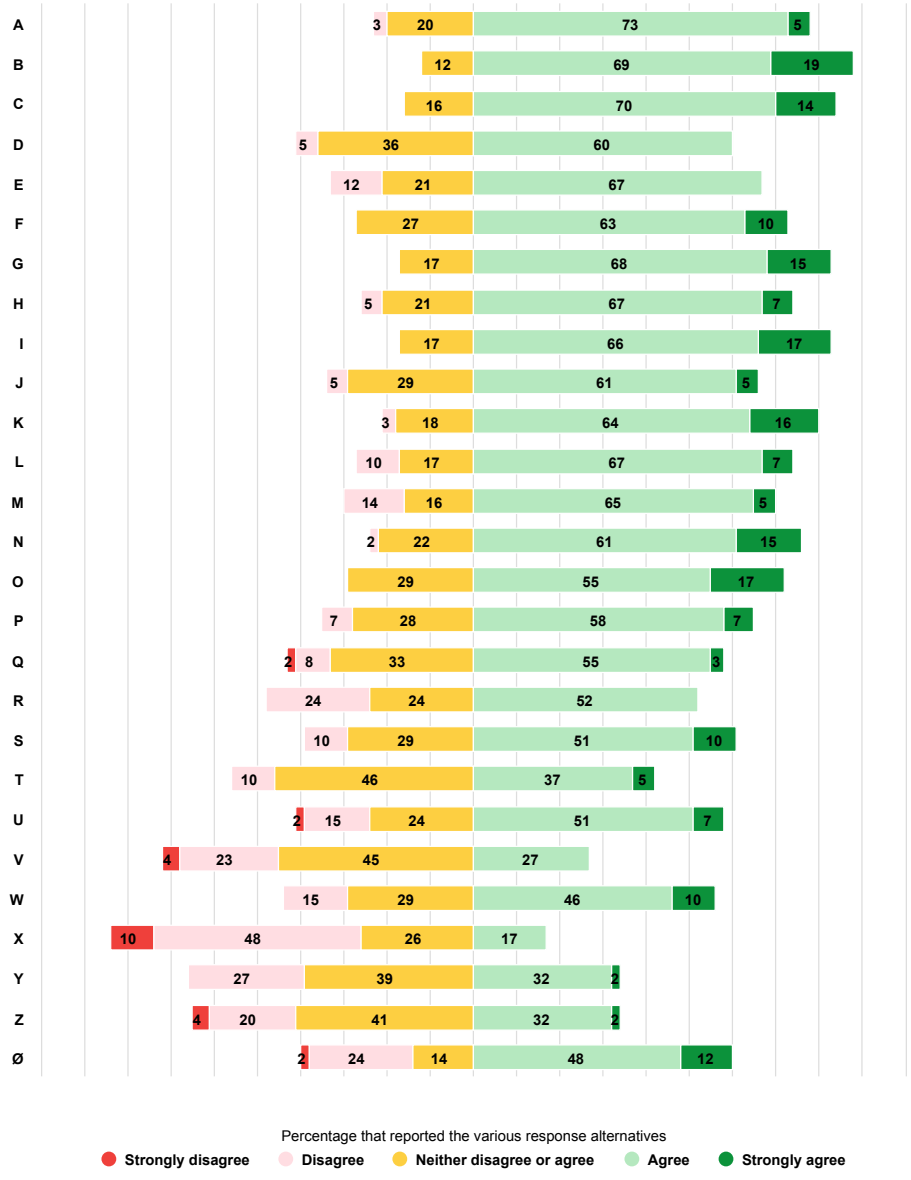
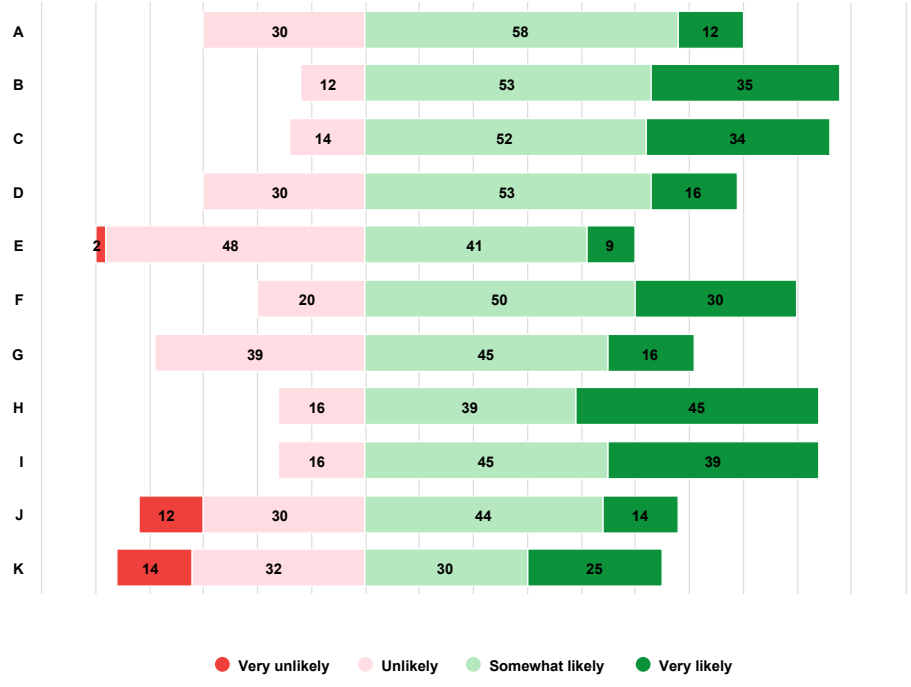


Figure 3.21 Other statements:
Block 3: How likely do you think the trends in the following statements are?
Note: N= Number or respondents, C= van der Eijk's measure of consensus

Block 3: How likely do you think the trends in the following statements are?

		N	C
A	Employees will become more involved in the facilitation of the work	43	0.64
B	There will be a growing focus on preventing health problems through a good work environment and positive factors such as satisfaction, motivation and engagement	43	0.61
C	Discrepancies between good and bad work environments will increase	44	0.59
D	The individual worker's health and well being will receive more attention	43	0.58
E	There will be an increase in conflicts and bullying in the workplace and an increased focus on preventing offensive or abusive behaviors	44	0.56
F	Acquisitions by foreign owners with a different management culture will become more common	44	0.53
G	Employers may to a larger extent be required to cover greater costs pertaining to illness and reduced work ability	44	0.53
H	Remote work will be more widespread	44	0.53
I	Remote management will occur more often	44	0.53
J	Overtime and night work will be more common	43	0.38
K	The rise of new forms of employment (freelance, digital platform work etc.) will entail less requirements for employers to provide acceptable work environments	44	0.20



In addition to statements that pertained specifically to the work environment, a number of other issues were mentioned, for instance pertaining to structural aspects of work at higher levels of society, such as job creation, job destruction, job change, relations between employees and employers, regulations and control over work life, and demography.

Focusing on the statements in this category that referred specifically to work environment issues, some suggested an improved work environment in the future, with workers expecting more of employers ("Employers will have to care for their employees to a greater extent to retain them in the workplace", "There will be more focus on the psychosocial work environment", "There will be more openness about the psychological work environment", Fig. 3.19). These statements received high degrees of agreement, as well as high consensus (C>0.70). On the other hand, some statements suggested more worrying developments ("More workers with looser job attachments may lead to difficulties in establishing a good work environment culture in workplaces", "Workers will increasingly experience a variety of psychosocial work demands (emotional demands, role uncertainty, job insecurity, more unstable relationships) as a result of new forms of employment (digital platform work, casual employment, freelance, etc.)", "Because of telework or remote work, it will become harder to ensure work is being carried out in accordance with health and safety requirements", "It will become less clear who is responsible for health, work environment and safety", "Wages and employment conditions will worsen", "Many employment relations will be organised in a disadvantageous and unhealthy way for workers due to increasing 'contractualisation' of working conditions that gives more power to the employer", Fig. 3.19). However, these last statements were considerably more controversial, with only low to medium consensus and lower agreement than the aforementioned ones. Hence, this could point to a certain degree of optimism in the group while also highlighting some possible challenges.

Interestingly, a number of statements addressed the prospect of increasing demands on one hand, while a number of statements suggested higher autonomy/control.[2] Again, while these statements do not give much information about the likely composition of demands and control in the future, they point to some challenges that must be met as well as specifying some means to meet them. It should, however, be noted that some statements also referred to decreased demands and decreased autonomy.

2. Selected statements from Figs. 3.19 and 3.20 illustrating both increased demands and autonomy: Increased demands: ''Work load and time pressures will increase'','' Productivity, efficiency, and quality demands will increase while resources will become more limited''. Increased autonomy: ''It will be easier for individual workers to organise work to fit their own requirements and life situation (e.g family circumstances and age)''– ''Empowerment and autonomy will be more important to create intrinsic motivation to adapt to new demands from the environment''

Chapter 4: Discussion

The Nordic world of work has been characterised by democracy, collective bargaining and a strong social partner influence on legislation and policy. Accompanying this tradition, a human relations perspective has been instrumental in the management of the Nordic work environment. The current report gives no reason to expect this perspective will become less relevant in the future. Work factors such as empowering leadership, meaningful work, security and autonomy may be tantamount to maintaining a high-quality work environment, which may in turn be an important precondition for a sustainable future of work. Nevertheless, it also seems clear that established models and frameworks used to understand and govern the psychosocial work environment may not be sufficient to address specific emerging concerns. For instance, psychological "demands" will continue to be relevant insofar as workers will continue to be psychological beings, but the particular circumstances that *generate* psychological demands will take on new forms. The studies summarised in this report seem to imply that researchers, practitioners and policy makers will have to address rising levels of certain relatively specific risk factors, such as social interaction demands, "telepressure", "technostress" and work-private life imbalance. However, in addition to the different specific risk factors that may emerge, there is also a general uncertainty associated with "newness" per se and the sheer complexity of the multitude of new developments. The results of the literature study illustrated this complexity by compiling a large number of studies covering a wide range of concepts and themes. Similarly, the Delphi study generated a magnitude of statements, demonstrating a wide range of notions pertaining to the future of work. In the following, we discuss some of these topics and themes. It should, however, be noted that although it is comprehensive, this discussion is not exhaustive with regard to the many topics addressed by the studies. This is true in particular for the Delphi study, and readers are encouraged to pay particular attention to the figures displaying all of the generated statements. Although an in-depth discussion of each single statement is outside the scope of this report, we believe that there is a potential for many additional discussions based on these statements.

Technology-assisted job demands and resources

This report has highlighted that while it is possible that novel technologies will have a negative impact on occupational health is possible, this outcome is by no means determined. New technology is not inherently harmful and is usually intended to improve work processes and production output. Nevertheless, it often threatens the well-being, health and productivity of workers, in which case the overall end result may not be improvement. Hence, awareness of potential side-effects must be prioritised during the implementation of new technologies and systems. For instance, while social media use at work may facilitate and enrich work processes, it may also cause workers to become overly preoccupied with work communication and start to intrude into their private life, which in turn may result in psychological exhaustion and burnout (cf. the "enslavement/ empowerment" paradox (Jarvenpaa & Lang, 2005; Schlachter et al., 2018)).

Many of the studies of the literature review elucidated the impact of new work technologies on the interface between work and private life. Derks and Bakker (2014) studied consequences of work-home interference specifically linked to smartphone use, and both Ghislieri et al. (2017) and Wright et al. (2014) studied work-private life balance as an outcome of telepressure. There is already an established line of research on the consequences of imbalance between demands and expectations from the work and family domains (see Michel et al., (2011) or Nijp et al. (2012) for systematic reviews). Many of the expert statements from the Delphi study cited similar issues owing to the multi-faceted and perhaps fragmented nature of contemporary work life. Technology and globalisation enable and often require communication across time zones, and for many, ongoing work tasks can be accessed remotely. Notions of the "borderlessness" of work and the "24-hour employee" have been prominent in public debate for decades already. However, with the acceleration of technological advances, these notions are increasingly relevant. Contemporary ICTs are more pervasive than ever, and during recent years, the increased use of social media for work purposes, combined with increasingly sophisticated smartphones, have made it easier to blur the boundaries between work and private life (Bucher et al., 2013). Social media does not usually have opening hours, and asynchronous message technologies enable us to send and receive work-related information at all times. This can certainly amplify the potential of work interfering with private life and recreation time (Ayyagari et al., 2011), potentially prolonging psychological work exposures and impairing recovery.

Overall, the literature study showed that there is mounting evidence that digitalisation and new technologies can disrupt the work environment as well as worker health and well-being. However, some studies identified factors that may mitigate negative impacts, and some also focused specifically on positive aspects of novel technologies, i.e. how their application can represent a resource for the worker when carrying out work tasks. In other words, there is mixed evidence based on a variety of approaches, and the question of the empirical net health consequence of new technologies and ways of working remains unresolved. However, keeping the limitations of the evidence in mind (see Christensen et al., (2020) for a comprehensive summary), it seems safe to conclude that there was indeed support for the notion that novel technologies (information technologies in particular) *can* – but not necessarily *will* – be disruptive to both the work environment and health.

Regulating technology-assisted job demands

Recognising the extinction of natural boundaries between work and private life, France implemented a law on the "right to disconnect" in 2017, mandating organisations of more than 50 employees to explicitly define times during which employees are not required to respond (Schlachter et al., 2018). In Germany, the work councils at Volkswagen and BMW enforced decisions in 2012 and 2014 to ban the after-work hours use of work-related communicative devices (Hesselberth, 2018), implying that all emails reaching company servers after office hours are put on hold or deleted and that company phones are not operational outside of work hours. Notably, this means that even if implicit norms were to dictate that employees respond, they would not be able to.

The abovementioned company- and government-initiated restrictions illustrate

innovative possible approaches to preserve the boundaries between work and private life. However, an important question is whether such measures, i.e. specific rules and legislation aimed at specific work tools, are effective in the long run as these tools are also changing rapidly and may overlap with tools used within the private life domain. Employees may (seemingly) voluntarily remain continuously "connected" if, for instance, private social media accounts are used for work purposes or work social media accounts are used for private purposes. This could be the case if a private Twitter account is used to follow work-related news, or if a business Skype account is used for personal messaging. Work e-mail accounts may depend on servers at the workplace, but social media accounts may be more ambiguously located, possibly providing employees with opportunities to further blur the boundaries between work and private life. Zoonen et al. (2016) specifically investigated the impact of work-related social media use on work-private life boundaries, finding that it was indeed associated with work-private life conflicts and emotional exhaustion (a component of burnout).

Another important question with regard to restricting access to work tools is whether it decreases demands or rather diminishes the resources available to meet those demands. In other words, it is important not to conflate the demands of the job with the mediation of those demands by technological devices. It is often unclear whether frequent *reminders* of demands (e.g. email notifications) add substantial strain to the already existing burden of the demands they communicate. If the workload itself is excessive, denying the worker the opportunity to read and respond to emails may not be helpful.

New job demands added to existing ones

Many expert statements in the Delphi study seemed to reflect an anticipation of intensified job demands in the future with workers expected to become more efficient and productive with less time and fewer available resources. However, new ways of performing work tasks also imply *new skill requirements*, meaning workers must renew and expand their skills, and rapid, disruptive turnover of technological systems may further intensify these learning demands (Maaleki, 2018). This may involve both increased *qualitative demands* (i.e. work becomes more difficult) and *quantitative demands* (i.e. the task load increases and work becomes more intense). While some tasks, such as calculation and data processing, have become more manageable, task complexity, information processing requirements and information overload may have intensified demands on memory, precision, concentration and multi-tasking abilities.

One example of a way of working that has recently become more common, and that is relatively novel to many, is communication by video conference. While the phenomenon is not new, the range of purposes that can be fulfilled by this type of communication seems to have considerably extended recently, as face-to-face meetings have become less common. This way of communicating may be more emotionally and cognitively demanding as well as less effective than face-to-face interactions for many purposes (Stacey et al., 2018). Recent reports of "video call fatigue" suggest this to be a stressor that may influence well-being considerably. Importantly, the adaptations that workers have to actively make are often not seen as work tasks in themselves, although they may require considerable efforts. And

while an increased degree of flexibility may help workers adjust, it should also be noted that flexibility – as was clearly reflected in the expert statements of the Delphi study – can be both a demand and a resource. This dual potential, which was apparent from both studies included in the current report, may serve simultaneously as a warning and an encouragement, as it informs us of both potential risks and resources with which to address them.

Worker autonomy versus worker isolation

A decisive, but open, question for the future of work seems to be how worker *autonomy* will be affected. Time- and location-independent ways of working could, for instance, imply more freedom and job control, empowering employees to flexibly manage work-private life balance. However, the opposite may also be true if work overload results, as work-private life balance could be disrupted (Nijp et al., 2016). Some studies have indeed found that technological implementations that reduced worker autonomy hampered well-being while those that enhanced autonomy promoted well-being (see e.g. Carlson et al., 2017). This theme was often touched upon in the literature review as well as in the Delphi study. "Delocalisation" of work is a central aspect of the recently emerged concept of "new ways of working" (Blok et al., 2012). A present-day example of this is of course the current increase in *remote working* (often referred to as "home office").

While the allowance of autonomy, based on trust, may be an important tool to counteract adverse effects of future work stressors. However, autonomy and empowerment must not be confused with laissez-faire, unsupportive or absent leadership. While autonomy may be a basic psychological need, so is *competence* (Ryan & Deci, 2017), implying that workers need a sense of mastery and efficacy. Feedback and evaluation are necessary for individuals to know whether mastery has been achieved. Community and connectedness with others are also basic psychological needs (Ryan & Deci, 2017), and while technology may give us the opportunity to work alone, it can and should also be a remedy for social deprivation by allowing novel forms of interpersonal interactions. Once again, the conclusion seems to be that both advantages and disadvantages must be taken into consideration, weighed against each other, and appropriately managed when implementing new ways of working.

The potential social isolation that new ways of working may entail for some can exacerbate existing job strain. The theoretical concept of "job strain" was extended during the 1980s to include social support, highlighting the particularly aversive effects of job strain (i.e. high job demands with low job control/autonomy) when support from social networks is absent (Johnson & Hall, 1988). This situation was denoted "iso-strain" (i.e. job strain in social isolation). It is possible that the delocalisation of work will necessitate an increased awareness of the virtues of social support and the need to prevent *physical* distance from implying *social* distance. Hence, emotional and instrumental support from colleagues and/or superiors may become even more imperative to ensure in the future for many types of work. While little research has focused on this specific combination of adverse exposures so far (Alves et al., 2013), some studies have indicated effects on health, including heart disease (Eller et al., 2009). More generally, loneliness and social isolation have been found to be as predictive of mortality as standard risk factors

(Holt-Lunstad et al., 2015). While the psychological strain of isolation may partly account for this, health behaviours such as unhealthy diet and excessive alcohol consumption, which may be influenced by psychological states as well as increased opportunities to indulge in them, are also likely to play a significant role.

As remote work, self-employment and other forms of solitary work become more common, the ability of individuals to practice *self-leadership* becomes increasingly important. For many, this entails freedom and flexibility, but it can also be a considerable demand, which may require training and preparation. Related to the demands of managing one's own work situation, a frequently cited concern is whether current and future legislation will be adapted to provide security and safety for workers that work alone (e.g. isolated self-employed, see NFoW report 4, Jesnes & Oppegaard, 2020). This is of course important when situations occur in which workers need help but may also be crucial for their ongoing well-being and sense of security.

For workers who are employed by businesses and work from home or other remote locations, managers must decide whether they want to practice *empowering* and trust-based forms of leadership, allowing employees greater autonomy than before, or whether they wish to maintain or even increase their level of control over worker task execution. One way of doing this could be to provide more detailed schematic instructions for work tasks and develop more elaborate reporting systems for remote-working employees. Such work monitoring may be perceived as intrusive and may result in tasks that are over-categorised and routinised, detracting from the sense of meaning and purpose of the job (Brown et al., 2011). For businesses, the balance between empowering employees to work independently and providing support to avoid isolation, without monitoring them, may not be easy to strike.

The experts involved in the Delphi study cited numerous challenges and opportunities pertaining to remote leadership, solitary work and self-leadership. While some studies have suggested that people who telework tend to experience less work strain, less exhaustion, and enhanced performance for complex tasks, they may also experience more social and professional isolation and blurred boundaries between work and personal life (Allen et al., 2015; Golden & Gajendran, 2019). Performance also seemed to benefit from remote working, but mostly for employees who experienced low levels of social support in the workplace in the first place (Golden & Gajendran, 2019), perhaps reflecting the lack of social support that social and professional isolation may entail.

Role clarity in a fragmented world of work

As work becomes more delocalised, communication of goals, standards and requirement specifications may be fragmented, possibly making it harder for workers to maintain a clear understanding of their job. Studies have indicated that remote workers experienced more social and professional isolation and poorer information sharing (Allen et al., 2015; Golden & Gajendran, 2019). That is, in addition to novel and increased demands, many employees may face less clarity regarding expectations pertaining to job tasks (i.e. *role ambiguity*) and possibly less meaningful jobs. Role ambiguity is a well-established psychosocial hazard that has been linked to mental health complaints in particular (Schmidt et al., 2014).

While role ambiguity is not a novel concept, the specific ambiguities that workers experience are likely to take on new forms. This notion highlights a common challenge when dealing with psychosocial work factors in practice, namely the operationalisation of relatively broad concepts at a high level of abstraction. That is, while role ambiguity and job demands as such may continue to exist unaltered as psychological experiences, the specific conditions under which they emerge may change drastically in the future. Hence, there is a need for more extensive exploration and mapping of the *specific* occurrences of such problems in order to provide a more concrete starting point for practical applications of this knowledge.

Related topics not explicitly addressed in the current report

Due to its focus on the explicit links between digitalisation and new technology and health and work environment, the literature study does not comprehensively cover a number of topics that are nevertheless pertinent to related discussions. For instance, no studies were included that pertained to the *digital platform economy* (e.g. Uber, Foodora) (see NFoW report 4, Jesnes & Oppegaard, 2020). Presumably, this also reflects a provisional lack of research on the implications of these new forms of digitally driven employment for psychosocial working conditions and worker health.

The topic of *job security,* which is often linked to technological advances such as automation and robotisation, was also brought up by the experts of the Delphi study. While comprehensively capturing this topic was outside the scope of the literature study, some of the included research investigated job security as a consequence of new technologies (Nijp et al., 2016; Vieitez et al., 2001). For a systematic review of the health impacts of job insecurity, see Kim and Knesebeck (2015).

Another topic linked to the current discussion is *organisational change*. Technological change often implies changes in ways of organising and executing work, and the impact of organisational change on health and working conditions is also a well-established topic in occupational health psychology. Different types of organisational changes can be associated with health effects, partially due to their influence on the work environment (Fløvik et al., 2019).

Future avenues for studying and managing the evolving work environment

In 2020, the final year of the current project, the Covid-19 pandemic changed the world of work in profound ways, at least temporarily but most likely also permanently. The pandemic swiftly caused a surge in developments and adaptations of ICT applications that allow remote work and propose new ways of organising and performing work tasks. In Norway, the majority of those commencing telework from home during the pandemic reported that they expect to continue partially working from home in the future (Nergaard, 2020). While the specific juncture at which the current pandemic arose may not have been possible to foresee, it has catalysed and amplified trends that were already evident in the world of work – trends that were reflected in the assessment of the expert panels in the current study prior to the

pandemic. Most, if not all, of the drivers of change were in some way or another involved in what happened to the world of work in 2020 – *globalisation* caused the rapid spread of the virus, *technology* enabled remote work as an adaptation to maintain social distance, the *environmental* impact was evident shortly after the outbreak, and so on. This serves as a useful reminder of the challenges that need to be addressed, even if the situation shifts back to a new normal in the near future.

Although the changes associated with the pandemic may have clarified some aspects of the future of the work environment in the short term, little is known about the specific dynamics involved. Hence, the need for more knowledge about specific processes and factors that are relevant to the work environment persists. Moreover, although many of the topics elucidated in the present report are quite universal, the context in question is the Nordic societies. The scope of the Delphi study limited the sample to representatives from Norway and Denmark. Therefore, although the experts were asked to consider the Nordic work environment, there is obviously a risk that issues of particular relevance to the countries not represented were omitted. For this reason, further investigations that include all of the Nordic countries are called for.

In conclusion, it seems clear that changes to the ways in which we work can have considerable repercussions for occupational health. However, whether the net consequence turns out to be diminished or enhanced health and productivity depends on how prospective challenges are met. Therefore, knowledge of specific factors that may induce or mitigate risk is essential for legislators, policy-makers, inspection authorities, employers and others seeking to protect and enhance working conditions to ensure a sustainable future of work. Policies and practices that protect worker autonomy, prevent the obliteration of boundaries between work and private life, maintain and strengthen social support for solitary workers, prevent "technostress" and facilitate lifelong positive learning will most likely enhance occupational health and productivity. In addition to the need to address these issues, and others raised in this report, there is of course also a strong need to acquire more specific, empirical knowledge about what forthcoming changes will consist of and what impact they may have on businesses and workers.

Bibliography

Aagestad, C., Bjerkan, A. M., & Gravseth, H. M. U. (2017). Arbeidsmiljøet i Norge og EU-en sammenligning. STAMI-Rapport.

Allen, T. D., Golden, T. D., & Shockley, K. M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. Psychological Science in the Public Interest, 16(2), 40–68.

Alves, M. G. de M., Hökerberg, Y. H., & Faerstein, E. (2013). Trends and diversity in the empirical use of karasek's demand-control model (job strain): A systematic review. Revista Brasileira de Epidemiologia, 16(1), 125–136.

Amiri, S., & Behnezhad, S. (2020a). Association between job strain and sick leave: A systematic review and meta-analysis of prospective cohort studies. Public Health, 185, 235–242.

Amiri, S., & Behnezhad, S. (2020b). Job strain and mortality ratio: A systematic review and meta-analysis of cohort studies. Public Health, 181, 24–33.

Ayyagari, R., Grover, V., & Purvis, R. (2011). Technostress: Technological antecedents and implications. MIS Quarterly, 35(4), 831–858.

Blok, M. M., Groenesteijn, L., Schelvis, R., & Vink, P. (2012). New ways of working: Does flexibility in time and location of work change work behavior and affect business outcomes? Work, 41 Suppl 1, 5075–5080. https://doi.org/https://dx.doi.org/10.3233/WOR-2012-0800-5075

Brown, P., Lauder, H., & Ashton, D. (2011). Digital taylorism. The Global Auction: The Broken Promises of Education, Jobs and Incomes.

Brun, E., Palmer, K., Sas, K., Starren, A., & Irastorza, X. (2018). Impact of digitalisation on occupational safety and health–an eu-osha foresight [Report]. EU-OSHA; BMJ Publishing Group Ltd.

Bucher, E., Fieseler, C., & Suphan, A. (2013). The stress potential of social media in the workplace. Information, Communication & Society, 16(10), 1639–1667. https://doi.org/http://dx.doi.org/10.1080/1369118X.2012.710245

Carlson, J. R., Carlson, D. S., Zivnuska, S., Harris, R. B., & Harris, K. J. (2017). Applying the job demands resources model to understand technology as a predictor of turnover intentions. Computers in Human Behavior, 77, 317–325. https://doi.org/http://dx.doi.org/10.1016/j.chb.2017.09.009

Christensen, J. O., Finne, L. B., Garde, A. H., Nielsen, M. B., Sørensen, K., & Vleeshouwers, J. (2020). The influence of digitalization and new technologies on psychosocial work environment and employee health: A literature review [Report]. Statens Arbeidsmiljøinstitutt, Nationalt Forskningscenter for Arbejdsmiljø.

Cox, T., & Griffiths, A. (2005). The nature and measurement of work-related stress: Theory and practice.

Day, A., Paquet, S., Scott, N., & Hambley, L. (2012). Perceived information and communication technology (ict) demands on employee outcomes: The moderating effect of organizational ict support. Journal of Occupational Health Psychology,

17(4), 473–491. https://doi.org/https://dx.doi.org/10.1037/a0029837

Derks, D., & Bakker, A. B. (2014). Smartphone use, work-home interference, and burnout: A diary study on the role of recovery. Applied Psychology-an International Review-Psychologie Appliquee-Revue Internationale, 63(3), 411–440. https://doi.org/10.1111/j.1464-0597.2012.00530.x

Dragano, N., Siegrist, J., Nyberg, S. T., Lunau, T., Fransson, E. I., Alfredsson, L., Bjorner, J. B., Borritz, M., Burr, H., Erbel, R., & others. (2017). Effort–reward imbalance at work and incident coronary heart disease: A multicohort study of 90,164 individuals. Epidemiology (Cambridge, Mass.), 28(4), 619.

Dølvik, J. E., & Steen, J. R. (2018). The nordic future of work - drivers, institutions, and politics (Report TemaNord 2018:555). The Nordic Council of Ministers.

Ebrahimi, O. V., Hoffart, A., & Johnson, S. U. (2020). The mental health impact of non-pharmacological interventions aimed at impeding viral transmission during the covid-19 pandemic in a general adult population and the factors associated with adherence to these mitigation strategies. Unpublished Manuscript.

Eddy, P., Heckenberg, R., Wertheim, E. H., Kent, S., & Wright, B. J. (2016). A systematic review and meta-analysis of the effort-reward imbalance model of workplace stress with indicators of immune function. Journal of Psychosomatic Research, 91, 1–8.

Eller, N. H., Netterstrøm, B., Gyntelberg, F., Kristensen, T. S., Nielsen, F., Steptoe, A., & Theorell, T. (2009). Work-related psychosocial factors and the development of ischemic heart disease: A systematic review. Cardiology in Review, 17(2), 83–97.

Eurofound. (2020). Living, working and covid-19: First findings [Report]. Eurofound.

Fløvik, L., Knardahl, S., & Christensen, J. O. (2019). Organizational change and employee mental health: A prospective multilevel study of the associations between organizational changes and clinically relevant mental distress. Scandinavian Journal of Work, Environment & Health, 45(2), 134–145.

Ford, D. P. (2013). Virtual harassment: Media characteristics role in psychological health. Journal of Managerial Psychology, 28(4), 408–428. https://doi.org/10.1108/JMP-12-2012-0398

Ghislieri, C., Emanuel, F., Molino, M., Cortese, C. G., & Colombo, L. (2017). New technologies smart, or harm work-family boundaries management? Gender differences in conflict and enrichment using the jd-r theory. Frontiers in Psychology, 8, 1070.

Gilbert-Ouimet, M., Trudel, X., Brisson, C., Milot, A., & Vezina, M. (2014). Adverse effects of psychosocial work factors on blood pressure: Systematic review of studies on demand-control-support and effort-reward imbalance models. Scandinavian Journal of Work, Environment & Health, 109–132.

Golden, T. D., & Gajendran, R. S. (2019). Unpacking the role of a telecommuter's job in their performance: Examining job complexity, problem solving, interdependence, and social support. Journal of Business and Psychology, 34(1), 55–69.

Gustavsen, B. (2007). Work organization andthe scandinavian model'. Economic and Industrial Democracy, 28(4), 650–671.

Gustavsen, B. (2011). The nordic model of work organization. Journal of the Knowledge Economy, 2(4), 463–480.

Hansen, T., Lidsmoes, L. C., Laursen, P., Mathiassen, L., Jensen, A.-M., Raby, C. S., Sørensen, L., Jurvelius, H., Rintala, J., Hararson, S., Sveinsdóttir, Þ., Søvik, S. R., Hjorth, B., Schyberg, P., & Tiborn, M. (2015). Psychosocial working environment: Workplace inspection of the psychosocial working environment in the nordic countries. Nordic Council of Ministers.

Hasson, F., Keeney, S., & McKenna, H. (2000). Research guidelines for the delphi survey technique [Journal Article]. Journal of Advanced Nursing, 32(4), 1008–1015.

Hauke, A., Flintrop, J., Brun, E., & Rugulies, R. (2011). The impact of work-related psychosocial stressors on the onset of musculoskeletal disorders in specific body regions: A review and meta-analysis of 54 longitudinal studies. Ws, 25(3), 243–256.

Hesselberth, P. (2018). Discourses on disconnectivity and the right to disconnect. New Media & Society, 20(5), 1994–2010.

Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: A meta-analytic review. Perspectives on Psychological Science, 10(2), 227–237.

Hsu, C.-C., & Sandford, B. A. (2007). The delphi technique: Making sense of consensus [Journal Article]. Practical Assessment, Research & Evaluation, 12(10), 1–8.

Jarvenpaa, S. L., & Lang, K. R. (2005). Managing the paradoxes of mobile technology. Information Systems Management, 22(4), 7–23.

Jesnes, K., & Oppegaard, S. M. N. (2020). Platform work in the nordic models: Issues, cases and responses. Nordic Council of Ministers.

Johnson, J. V., & Hall, E. M. (1988). Job strain, work place social support, and cardiovascular disease - a cross-sectional study of a random sample of the swedish working population [Journal Article]. American Journal of Public Health, 78(10), 1336–1342.

Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain - implications for job redesign [Journal Article]. Administrative Science Quarterly, 24(2), 285–308.

Kim, T. J., & Knesebeck, O. von dem. (2015). Is an insecure job better for health than having no job at all? A systematic review of studies investigating the health-related risks of both job insecurity and unemployment. BMC Public Health, 15(1), 985.

Kivimäki, M., Nyberg, S. T., Batty, G. D., Fransson, E. I., Heikkilä, K., Alfredsson, L., Bjorner, J. B., Borritz, M., Burr, H., Casini, A., & others. (2012). Job strain as a risk factor for coronary heart disease: A collaborative meta-analysis of individual participant data. The Lancet, 380(9852), 1491–1497.

Koch, P., Schablon, A., Latza, U., & Nienhaus, A. (2014). Musculoskeletal pain and effort-reward imbalance- a systematic review. Bph, 14(1), 37. https://doi.org/10.1186/1471-2458-14-37

Maaleki, A. (2018). The arzesh competency model.

Mayo, E. (2004). The human problems of an industrial civilization. Routledge.

Michel, J. S., Kotrba, L. M., Mitchelson, J. K., Clark, M. A., & Baltes, B. B. (2011). Antecedents of work–family conflict: A meta-analytic review. Journal of Organizational Behavior, 32(5), 689–725.

Nergaard, K. (2020). Hjemmekontor og digitale løsninger [Report]. Fafo.

Nijp, H. H., Beckers, D. G., Geurts, S. A., Tucker, P., & Kompier, M. A. (2012). Systematic review on the association between employee worktime control and work-non-work balance, health and well-being, and job-related outcomes. Scandinavian Journal of Work, Environment & Health, 38, 299–313.

Nijp, H. H., Beckers, D. G., Voorde, K. van de, Geurts, S. A., & Kompier, M. A. (2016). Effects of new ways of working on work hours and work location, health and job-related outcomes. Chronobiology International, 33(6), 604–618.

Office, I. L. (1986). Psychosocial factors at work: Recognition and control: Report of the joint ilo/who committee on occupational health, ninth session, geneva, 18-24 september 1984. International Labour Office.

Oinas, T., Anttila, T., Mustosmäki, A., & Nätti, J. (2012). The nordic difference: Job quality in europe 1995-2010. Nordic Journal of Working Life Studies, 2(4), 135.

Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., & Tu, Q. (2008). The consequences of technostress for end users in organizations: Conceptual development and empirical validation. Information Systems Research, 19(4), 417–433. https://doi.org/http://dx.doi.org/10.1287/isre.1070.0165

Ryan, R. M., & Deci, E. L. (2017). Self-determination theory: Basic psychological needs in motivation, development, and wellness. Guilford Publications.

Schabracq, M. J., & Cooper, C. L. (2000). The changing nature of work and stress. Journal of Managerial Psychology, 15(3), 227–241.

Schlachter, S., McDowall, A., Cropley, M., & Inceoglu, I. (2018). Voluntary work-related technology use during non-work time: A narrative synthesis of empirical research and research agenda. International Journal of Management Reviews, 20(4), 825–846.

Schmidt, S., Roesler, U., Kusserow, T., & Rau, R. (2014). Uncertainty in the workplace: Examining role ambiguity and role conflict, and their link to depression—a meta-analysis. European Journal of Work and Organizational Psychology, 23(1), 91–106.

Siegrist, J. (1996). Adverse health effects of high-effort/low-reward conditions. Johp, 1(1), 27.

Stacey, N., Ellwood, P., Bradbrook, S., Reynolds, J., Williams, H., & Lye, D. (2018). Foresight on new and emerging occupational safety and health risks associated digitalisation by 2025. Luxembourg: Publications Office of the European Union, 159.

Stansfeld, S., & Candy, B. (2006). Psychosocial work environment and mental health—a meta-analytic review. Scandinavian Journal of Work, Environment & Health, 443–462.

Taouk, Y., Spittal, M. J., LaMontagne, A. D., & Milner, A. J. (2020). Psychosocial work stressors and risk of all-cause and coronary heart disease mortality: A systematic review and meta-analysis. Scandinavian Journal of Work, Environment & Health, 46(1), 19–31.

Tetrick, L. E., & Quick, J. C. (2011). Overview of occupational health psychology: Public health in occupational settings. American Psychological Association.

Van der Eijk, C. (2001). Measuring agreement in ordered rating scales. Quality and Quantity, 35(3), 325–341.

Vieitez, J. C., Carćia, A. D. L. T., & Rodŕiguez, M. T. V. (2001). Perception of job security in a process of technological change: Its influence on psychological well-

being. Behaviour & Information Technology, 20(3), 213–223.

Wang, K., Shu, Q., & Tu, Q. (2008). Technostress under different organizational environments: An empirical investigation. Computers in Human Behavior, 24(6), 3002–3013.

Wright, K. B., Abendschein, B., Wombacher, K., O'Connor, M., Hoffman, M., Dempsey, M., Krull, C., Dewes, A., & Shelton, A. (2014). Work-related communication technology use outside of regular work hours and work life conflict: The influence of communication technologies on perceived work life conflict, burnout, job satisfaction, and turnover intentions. Management Communication Quarterly, 28(4), 507–530.

Zoonen, W. van, Verhoeven, J. W. M., & Vliegenthart, R. (2016). Social media's dark side: Inducing boundary conflicts. Journal of Managerial Psychology, 31(8), 1297–1311. https://doi.org/10.1108/JMP-10-2015-0388

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