BEYOND4.0
SCIENTIFIC CONFERENCE:
INCLUSIVE FUTURES FOR EUROPE BEYOND INDUSTRIE4.0 AND DIGITAL DISRUPTION

SEPTEMBER 30 – OCTOBER 1, 2021

SOFIA, BULGARIA

BOOK OF ABSTRACTS

BEYOND 40

European School of Social Innovation

EUWIN

European Commission

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CONTENTS

BEYOND4.0 SCIENTIFIC CONFERENCE:
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SEPTEMBER 30 – OCTOBER 1, 2021
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PROGRAMME

September 30

Local Time (EET)	Main Hall	Secondary Hall
9:00 - 9:30	**Registration**	
9:30 - 10:00	**Opening / Welcome speech**	
	Academician Julian Revalski, Chairman of BAS	
	Prof. D.Sc. Vesselin Petrov, Director of IPS - BAS	
	Prof. Steven Dhondt, BEYOND4.0 Project coordinator	
	Bulgarian Deputy Minister of Education and Science, TBC	
10:00 - 11:30	**Plenary Session I,** Moderator: **Steven Dhondt**	
	Prof. Marianna Mazzucato	
	Prof. Chris Warhurst	
	Discussion	
11:30 - 11:45	Coffee break	
11:45 - 13:15	**Parallel session A1**	**Parallel session B**
	Digital transformation and societal disruption after the Covid-19 crisis - Quo Vadis - facts and figures.	The next technological wave? The technology waves reassessed from a historical perspective - today's lessons from the past.
13:15 - 14:15	Lunch break	
14:15 - 16:15	**Parallel session C1**	**Parallel session D1**
	Work, organisation and management: workplace innovation to support digital transformation.	Change of technology and the need for on-going change for the demand of skills.
16:15- 16:30	Coffee break	
16:30 - 18:00	**Parallel session C2**	**Parallel session D2**
	Work, organisation and management: workplace innovation to support digital transformation.	Change of technology and the need for on-going change for the demand of skills.
18:00 - 19:30	**Plenary Session II,** Moderator: **Peter Oeij**	
	Prof. Paul Osterman	
	Prof. Olli Kangas	
	Discussion	

East European Time (EET)

October 1

Local Time (EET)	Main Hall	Secondary Hall
8:30 - 10:30	**Plenary Session III,** Moderator: **Nathalie Greenan**	
	Prof. Steven Dhondt	
	Prof. Jurgen Howaldt	
	Dr. Glenda Quintini	
	Discussion	
10:30 - 10:45	Coffee break	
10:45 - 12:45	**Parallel session A2**	**Parallel session G**
	Digital transformation and societal disruption after the Covid-19 crisis - Quo Vadis - facts and figures.	Ecosystems and Industrie 4.0
12:45 - 13:45	Lunch break	
13:45 - 15:45	**Parallel session C3**	**Parallel session E**
	Work, organisation and management: workplace innovation to support digital transformation.	Platform Economy
15:45 - 16:00	Coffee break	
16:00 - 18:00	**Parallel session F**	**Stakeholders round table**
	Working conditions in the context of digital transformation.	Industry 5.0 the view of policy makers and social partners.
18:00 - 18:30	**Concluding remarks** Prof. Steven Dhondt, TNO & Dr. Vassil Kirov, IPS-BAS	

East European Time (EET)

Keynote Speakers

Prof. Chris Warhurst, University of Warwick	For better or worse? The impact of digitalisation on future social relations at work.
Dr. Glenda Quintini, OECD	Getting skills right: changing skill needs for the recovery and beyond.
Prof. Jürgen Howaldt, TU Dortmund	Why digital transformation needs social innovation: a new twin strategy for sustainable development and inclusive futures.
Prof. Mariana Mazzucato, UCL	The Direction of Innovation: A Mission-Oriented Approach
Prof. Olli Kangas, University of Turku	How (and why) to plan a large-scale randomised field experiment?
Prof. Paul Osterman, MIT, TBC	The Changing Contours of Work: Implications for Employees and for Public Policy
Prof. Steven Dhondt, TNO and KU Leuven	Why Industrie 4.0 technology requires so much talent. Drilling deep into the entrepreneurial ecosystem results of Beyond4.0.

Parallel sessions

SESSION A. Digital transformation and societal disruption after the Covid-19 crisis - Quo Vadis - facts and figures.

Session A1	Moderator: **Dr. Ekaterina Markova**
Andrei Popov, Vologda Research Centre of the Russian Academy of Sciences	The Present and the Future of the Employment Paradigm in the Face of Global Changes
Atanas Hristov, DG ECFIN **Bjoern Doehring,** DG ECFIN **Werner Roeger,** DG ECFIN **Anna Thum-Thysen,** DG ECFIN	COVID-19 acceleration in digitalization, aggregate productivity growth and the functional income distribution
Branka Andjelkovic, Public Policy Research Centre **Tanja Jakobi,** Public Policy Research Centre	Naked At Home
Patrick Thill, Luxembourg Institute of Socio-Economic Research (LISER) **Dr. Vassil Kirov,** Institute of Philosophy and Sociology, Bulgarian Academy of Sciences **Andreas Kornelakis,** King's College London	The Digitalisation of Service Work: A Comparative Study of Restructuring of the Banking Sector in the United Kingdom and Luxembourg
Silvia Napolitano, CNAM CEET **Nathalie Greenan,** CNAM CEET **Imad El-Hamna,** CNAM CEET	Using a linked dataset at the EU wide level to describe technological and organisational changes and their relationship with innovation
Session A2	Moderator: **Prof. Mark Levels**
Dr. Egle Butkeviciene, Kaunas University of Technology **Dr. Audrone Nakrosiene,** ISM University of Management and Economics	Workplace innovation fostered by the Covid-19 crisis: the benefits and challenges of telework
Ester Ulloa Unanue, University of Cadiz **Marcela Iglesias Onofrio,** University of Cadiz **Sofía Pérez de Guzmán Padrón,** University of Cadiz **Lucía del Moral Espín,** University of Cadiz	Raising Awareness for Riders' Rights
Dr. Ludivine Martin, Luxembourg Institute of Socio-Economic Research (LISER) **Laetitia Hauret,** Luxembourg Institute of Socio-Economic Research (LISER) **Nicolas Poussing,** Luxembourg Institute of Socio-Economic Research (LISER)	How do digital tools use profiles of teleworkers influence their digital up-skilling during the spring 2020 lockdown?
Dr. Petya Klimentova, Institute of Philosophy and Sociology, Bulgarian Academy of Sciences	Digital transformation and new forms of civic activity in the field of labour (the example of online labour consultations)
Yennef Vereycken, KU Leuven **Dries Van Herreweghe,** KU Leuven	Social dialogue on technological innovation in Flanders: Results of a Delphi-study

SESSION B.

The next technological wave? The technology waves reassessed from a historical perspective - today's lessons from the past

Moderator: **Prof. Chris Warhurst**

Chiara Natalie Focacci **Dr. Vassil Kirov,** Institute of Philosophy and Sociology Bulgarian Academy of Sciences	Regional Entrepreneurial Ecosystems: Technological Transformation, Digitalisation and the Longer Term. The Automotive and ICT Sectors in the UK and Bulgaria.
Dr. Joanna Morawska-Jancelewicz, Adam Mickiewicz University, Poznań **Prof. Elias G. Carayannis,** George Washington University School of Business	Society 5.0 and Industry 5.0 as driving forces of future universities
Marta Candeias, Universidade Nova de Lisboa **António Brandão Moniz,** Universidade Nova de Lisboa **Nuno Boavida,** Universidade Nova de Lisboa	Digital transformation in the automotive sector in Portugal: data analysis on industrial R&D projects
Dr. Rumiana Jeleva, Institute of Philosophy and Sociology, Bulgarian Academy of Sciences	IT sustainability reporting, company performance and their value relevance

SESSION C. Work, organisation and management: workplace innovation to support digital transformation

Session C1	Moderators: **Dr. Peter Oeij, Prof. Frank Pot**
Prof. Frank Pot, Radboud University **Dr. Peter Oeij,** TNO	Introduction to the workshop
Prof. Ferry Koster, Erasmus University	Organizations in the knowledge economy. An investigation of knowledge-intensive work practices across 28 European countries
Dr. Ali Iftikhar Choudhary, COMSATS University Islamabad, Lahore Campus **Prof. Adela McMurray,** Flinders University, Australia	The Relationship between Digital Transformation and Workplace Innovation in a Developing Country
Aline Lohse, TU Chemnitz **Dr. Ing. André Dettmann,** TU Chemnitz **Prof. Dr. A. C. Bullinger,** TU Chemnitz	Workplace Innovation in times of digitalization and pandemic
Dr. Giverny De Boeck, Curtin University **Prof. Sharon Parker,** Curtin University	When beliefs about technology clash: The role of institutional logics in workers' experience of automation and work redesign
Session C2	Moderators: **Dr. Peter Oeij, Prof. Frank Pot**
Ine Smits, HIVA - KU Leuven **Prof. Ezra Dessers,** HIVA - KU Leuven	Sustainable employment in the age of digitalisation: unpacking the organisational level
Dr. Magdalena Parcheva, Technical University of Varna, Research Institute	Innovative potential of digital technologies and systems with artificial intelligence for transformation of work processes in specialised translation agencies
Prof. Paul Osterman, MIT Sloan	Sharing his ideas about the "High Road" perspective in the light of workplace innovation
Session C3	Moderators: **Dr. Peter Oeij, Prof. Frank Pot**
Dr. Paul Preenen, TNO **Ziagul Hosseini MSc,** Human Performance Management Group, Department of Industrial Engineering & Innovation Sciences, Eindhoven University of Technology	An ethical framework for evaluating experimental technologies in logistics workplace settings
Dr. Se Ri No, Korea Labor Institute **Dr. Kyoung Won Park,** Hanyang University **Prof. Young Jin Nho,** Seoul National University of Science and Technology	Smart Technology and Workplace Innovation: Focused on Smart Factory in Korean Manufacturing firms
Prof. Tuomo Alasoini, Finnish Institute of Occupational Health **Arja Ala-Laurinaho,** Finnish Institute of Occupational Health **Marja Känsälä,** Finnish Institute of Occupational Health	Driving high and low: Finnish logistics workers in digital transformation
Michiel Bal, CeSO, KU Leuven	Explaining the use of a digital technology in context.
Zsófia Riczu, University of Miskolc, Agricultural and Labour Law Department	Workplace innovation with digital technical support

SESSION D. Change of technology and the need for on-going change for the demand of skills.

Session D1	Moderator: **Dr. Egoitz Pomares**
Dr. Christina Ambareva, Institute of Philosophy and Sociology, Bulgarian Academy of Sciences	Which competencies are important to teach in the light of the digital transformation of knowledge?
Elżbieta Prucnal-Tumasz, University of Wrocław	What professional competences do employers expect from an 'ideal' candidate for the position of SAP consultant? The case of the professional job market in Poland
Prof. Ezra Dessers, HIVA - KU Leuven **Lise Meylemans,** HIVA - KU Leuven **Lise Szekér,** HIVA - KU Leuven	Empowering workers with the skills they need for tomorrow: Evaluation of the FutureFit training program in Belgium
Fanni Tamasi, University of Stirling	Technology adoption and skills development in Scottish manufacturing SMEs
Frederic Naedenoen, University of Liège **Marine Franssen,** Lentic - HEC ULiège - Université de Liège	When digital transformations causes restructuring: the role of a qualitative social dialogue
Dr. Mariana Todorova, Institute of Philosophy and Sociology, Bulgarian Academy of Sciences	The Digitalization of Education, the Role of Digital Technologies and Artificial Intelligence in Building of New Soft and Hard Skills
Session D2	Moderator: **Dr. Gabor Melipataki**
Prof. Mark Levels, Maastricht University **Per Bles,** Maastricht University **Giampiero Passaretta,** European University Institute **Reinhard Pollock,** Bamberg **Nora Muller,** GESIS Leibniz Institute for Social Sciences	Schools, Educations Systems and the Acquisition of Skills Relevant to the Future of Work.
Dr. Nevena Ivanova, Institute of Philosophy and Sociology, Bulgarian Academy of Sciences	Cognition and Education After Automatization
Prof. Valentina Milenkova, South-West University "Neofit Rilski"	Challenges to Digital Education in Contemporary Society
Dr. Michael Kohlgrüber, TU Dortmund University, Social Research Centre **Clara Behrend,** TU Dortmund University, Social Research Centre	Understanding Future Skills for the Digital Transformation
Svetlomir Zdravkov, Institute of Philosophy and Sociology, Bulgarian Academy of Sciences	Online education and digital inclusion. How different EU countries and their citizens are adapting to the technological change in education?

SESSION E. Platform economy

Moderator: **Dr. Magdalena Parcheva**

Prof. Andrey Shevchuk, National Research University – Higher School of Economics (HSE University)	Digital platforms and the changing freelance workforce in Russia: A ten-year perspective
Prof. Cecilia Manzo, Università Cattolica del Sacro Cuore **Prof. Ivana Pais,** Università Cattolica del Sacro Cuore	Digital platforms in welfare systems: towards a typology
Denis Strebkov, National Research University – Higher School of Economics (HSE University)	The Geography of the Digital Freelance Economy in Russia and Beyond
Mathilde Abel, Sorbonne Nouvelle University **Prof. Patrick Dieuaide,** Sorbonne Nouvelle University	Workplace, socio-spatial effects and algorithmic management. A perspective from the mobility service platforms
Tina Krell, Alexander von Humboldt Institute for Internet and Society **Dr. Nicolas Friederici,** Alexander von Humboldt Institute for Internet and Society	"One strategy does not fit all" - The role of foundational positioning in platform competition

SESSION F. Working conditions in the context of digital transformation

Moderator: **Clara Behrend**

Dr. Gábor Mélypataki, University of Miskolc	How can the human and the collaborative robots work together? – Legal and theoretical aspects
Dr. Laetitia Hauret, Luxembourg Institute of Socio-Economic Research (LISER) **Chantal Cucchi Fuhrer,** Université de la Réunion **Ludivine Martin,** Center for Research in Economics and Management (CREM, UMR CNRS 6211)	Digitally Transformed Work from Home Impacts on Job Satisfaction, Job Stress and Job Productivity. COVID-19 Findings
Dr. Luuk Collou, Saxion university of applied sciences **Mr Milan Wolffgramm,** Saxion University of Applied Sciences **Koen Nijland,** junior researcher, Saxion University of Applied Sciences	The Challenge of Joint Optimization human centered technology implementation in SMEs
Dr. Olga Chesalina, Max Planck Institute for Social Law and Social Policy	From the right to disconnect to mental health and wellbeing at work in the digital age
Patrick Till, Luxembourg Institute of Socio-Economic Research (LISER) **Dr. Gabriele Wolff,** University of Applied Sciences Koblenz	Assessing the psychological and social impact by applying human-centered approaches to implementing digital technologies in companies: a comparative study of the industry sector Germany and Luxembourg

SESSION G. Ecosystems and digital transformation

Moderator: **Prof. Ezra Dessers**

Antonius Schröder, TU Dortmund University	Sectoral Skills Alliances and Strategies: Industry 4.0 needs Work 4.0
Dr. Paul Preenen, TNO **Dr. Kars Mennens,** Maastricht University	A Conceptualization of Public-Private Learning Communities for technological transformations and beyond
Bieke Struyf, Antwerp Management School **Gabriel Möwis,** Frankfurt University of Applied Sciences **Dirk Stegelmeyer,** Frankfurt University of Applied Sciences **Bieke Struyf,** Paul Matthyssens Antwerp Management School	Leveraging ecosystem partnerships for Industry 4.0-enabled value creation: A Delphi-study
Mirella Schrijvers, University of Utrecht	Entrepreneurial ecosystems: metrics, configurations and outcomes
Prof. Hans Christian Garmann Johnsen, University of Agder **Clare Hildebrand,** University of Agder	Beyond the Human-Machine Dichotomy: Dialogical development in the age of digital transformation.

STAKEHOLDERS ROUNDTABLE

Moderator: **Vassil Kirov**

Arch. Lubomir Stanislavov, CEO & Board member, Bulgarian Employers Association Innovative Technologies (BRAIT)
Dr. Bartek Bednarowicz, Labour Mobility Officer, Coordinator for Labour Mobility Analyses & Risk Assessment, Enforcement & Analysis Unit, European Labour Authority (ELA)
Prof. Silvia Ilieva, Director of GATE Institute, Sofia University "Sv. Klimetnt Ohridski"
Veselin Mitov, International SecretaryConfederation of Labour PODKREPA

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BEYOND 40

ABOUT BEYOND4.0

BEYOND4.0 addresses the general priorities of the H2020 Work Programme (2018-2020) 'Europe in a changing world - Inclusive, innovative and reflective societies'. A top-tier consortium with engaged stakeholders utilises a multidisciplinary research approach. Beyond4.0 will provide insights and measures that help address poverty, equality, and decent work, in formulating an alternative for a "low road" Industry4.0 approach.

PROJECT OBJECTIVES

1. To provide new, scientific insight into technological transformation;
2. To render new, scientific insight into company strategies dealing with technological transformation;
3. To examine the impact of technological transformation on quality, content, work distribution, skills, education and value creation.
4. To identify policy options for: a. Fiscal policy (e.g. Robot taxes); b. Welfare policy (e.g. Basic income);
5. To develop social investment approaches and tools for inclusive growth.

HOW THE OBJECTIVES WILL BE ACHIEVED?

- By building on state-of-the-art research and other EU projects,
- Via innovative methods.
- Through combining historical, EU-wide, regional and company level data.

THE OUTCOMES

- Scientific understanding of the social impact of disruptive technology;
- Diagnostic and developmental tools to lever technological opportunities;
- Evidence-based support for social and competitive EU policy strategy.

PROJECT PARTNERS

Department of Social Research, University Of Turku, Finland
Institute for Employment Research, University of Warwick, UK
Institute of Philosophy and Sociology, Bulgarian Academy of Sciences (IPS-BAS), Bulgaria
Le CNAM-CEET, France
Nederlandse Organisatie Voor Toegepast Natuurwetenschappelijk Onderzoek TNO, Netherlands
Technische Universität Dortmund, Sozialforschungsstelle Dortmund (sfs) (TUDO), Germany
UCL Institute for Innovation and Public Purpose (IIPP), London, UK
University of Helsinki, Finland
University of the Basque Country - Sinnergiak Social Innovation, Spain

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ABOUT BEYOND4.0 SCIENTIFIC CONFERENCE: INCLUSIVE FUTURES FOR EUROPE BEYOND INDUSTRIE4.0 AND DIGITAL DISRUPTION

The conference is organised by the BEYOND4.0 Consortium and the Institute of Philosophy and Sociology at Bulgarian Academy of Sciences in collaboration with the European School of Social Innovation ESSI, the European Workplace Innovation EUWIN network in order to give international researchers in social sciences an opportunity to exchange the results of recent research in different fields of the consequences of digital transformations on work and employment.

The conference aim is to present and discuss project findings thus far. In addition, relevant contributions from other EU projects and research on the digital transformation are encouraged in order to synergize and synthesize results.

Scientific Committee

Prof. Chris Warhurst, University of Warwick

Dr. Egoitz Pomares, University of the Basque Country

Prof. Frank Pot, Radboud University

Prof. Jürgen Howaldt, TU Dortmund

Prof. Monique Ramioul, HIVA- KU Leuven

Prof. Nathalie Greenan, CEET-LeCnam,

Prof. Pepka Boyadjieva, Institute of Philosophy and Sociology, Bulgarian Academy of Scienc

Dr. Peter Oeij, TNO

Prof. Steven Dhondt, TNO

Prof. Vassil Kirov, Institute of Philosophy and Sociology, Bulgarian Academy of Sciences

THE KEYNOTE SPEAKERS OF BEYOND4.0 SCIENTIFIC CONFERENCE

Chris Warhurst

Professor and Director of the Institute for Employment Research at the University of Warwick. He is also a Trustee of the Tavistock Institute in London, an Associate Research Fellow of SKOPE at the University of Oxford and Chair of the Management Committee of Human Relations. His research focuses on job quality, skills and aesthetic labour. He has published 16 books including The Skills That Matter (2004), Are bad jobs inevitable? (2012), Job Quality in Australia (2015) and the Oxford Handbook of Skills and Training (2017). He has published over 50 articles in journals such as Work, Employment and Society, Administrative Science Quarterly and Journal of Management Studies. He has been an expert advisor to the UK, Scottish and Australian Governments as well the OECD, Oxfam and Scottish Living Wage Campaign. He is motivated by wanting to improve the quality of working lives through science.

Keynote speech: For better or worse? The impact of digitalisation on future social relations at work

Abstract: There are utopian and dystopian accounts of the digital age in terms of the future of work. The former sees the end of human work or at least liberation within work; the latter sees the death of jobs or, if human work survives, enhanced surveillance and control of workers. Current understanding of what will happen and what might happen is hampered by two challenges. The first is that initial accounts of the future of work were based on predictions and forecasts not empirics. The second is that the now merging empirics tend to be focused narrowly on particular developments rather then the broader range of impacts. These developments are the digitalisation of production – based on the so-called work being undertaken by clever robots and epitomised in Industrie 4.0 – or the digitalisation of work, also known as Uberisation and involving the migration of work to platforms and the brokering of work by those platforms. However the digitalisation of work has wider impacts. To these two developments can be add two others: the digitalisation of products, involving the capture and monetisation of what is thereby unpaid human labour by big tech, and the digitalisation of workers, involving the digital capture of human movement and behaviour within and outwith the workplace. Together these four developments have the potential to reshape future social relations at work.

Drawing on a range of secondary data, some generated through original research by the author and his colleagues, this paper outlines these four developments. In making the important distinction between the social relations of work and social relations in work, it highlights the actual and potential changes to both of these social relations in each of the four developments. It also indicates the existing and possible policy responses to these changes in each case. Making this distinction in the social relations at work provides better conceptualisation of how digitalisation is and might reshape working lives. It also helps identify the points of policy intervention to ensure that the benefits of digitisation benefit those working lives.

Dr. Glenda Quintini

Senior economist at OECD, overseeing the work on skills carried out by the Employment Labour and Social Affairs Directorate. In her role, Glenda leads a team of economists looking at how skill needs are changing in the labour market and identifying effective policy responses, particularly in the area of adult learning and on-the-job training. Glenda's team also contributes to the rolling out, further development and analysis of the OECD Survey of Adult Skills (PIAAC) and is currently managing the development of an employer module on skill gaps. Projects under Glenda's responsibility involve both country-specific analysis and cross-country comparisons, covering both OECD and developing countries. As part of the research programme on skills, Glenda has devoted a lot of attention to issues of changing skill needs, skills mismatch, skills use at work and work-based learning. In previous roles at OECD, Glenda worked extensively on school-to-work transitions, on the link between labour market institutions and employment outcomes and on make-work-pay policies. Before joining OECD, Glenda worked at Credit Suisse First Boston and at the Centre for Economic Performance (CEP) of the London School of Economics. While at CEP, she published a number of papers on job insecurity, public sector pay, nominal wage rigidity, the wage curve and labour market institutions in well-known economic journals.

Keynote speech: Getting Skills Right: Changing Skill Needs for the Recovery and Beyond

Dr Quintini will discuss trends in skills demand and training participation and discuss promising innovations in adult learning. She will start by providing an overview of how skills demand has been evolving as a result of megatrends and how the COVID-19 pandemic has affected the progression of these trends. She will shed light on training participation in the context of the pandemic and how it is likely to progress in the recovery and the medium term. Looking further ahead to the challenges that rapidly changing skill needs are raising, Glenda will highlight some key innovations in the area of skill development, with the potential to facilitate skills adaptation in the context of job reallocation and transitions between jobs.

Prof. Dr. Jürgen Howaldt

Director of Social Research Centre Dortmund, TU Dortmund University, and professor at the Faculty of Social Sciences. He is an internationally renowned expert in the field of social innovation and co-founder and chair of the European School of Social Innovation. He was the scientific coordinator of the global research project "SI-DRIVE - Social Innovation: Driving Force of Social Change", funded within the 7th Framework Program of the European Union, and has co-edited the Atlas of Social Innovation (https://www.socialinnovationatlas.net/). His research focuses on social sciences-based innovation research and social innovation.

Keynote speech: Why Digital Transformation Needs Social Innovation: A New Twin Strategy for Sustainable Development and Inclusive Futures

Abstract: In many European countries we are witnessing a strong push of technological driven innovations which could be covered by the term digitalization. Even the area of traditional economy (industrial sector) is on the brink of a number of technological breakthroughs f. e. in robotics, artificial intelligence and machine learning. Technological innovations are ubiquitously, promising a wide range of solutions and get big support and all kind of resources they need for development and diffusion. But

there is much evidence that technological innovation is not enough and often the wrong way to address the social and economic challenges of 21th century (Schwab 2016). What is needed is to overcome the techno-reduced perspective in favor of a comprehensive understanding that includes social innovations.

Although there is widespread recognition of the need for innovation and a long history of academic debate, there is no clear understanding of how innovation leads to a sustainable and inclusive society. "To find a way to bring together the triple objectives of smart innovation-led growth, inclusion and sustainability, we must first answer the critical question of how to direct innovation to solve the pressing global challenges of our time." (Mazzucato 2019, 2). For most of the challenges summarised in the Sustainable Development Goals of the UN there are no pure technological innovations available. To cope with the great societal challenges a new understanding of innovation focusing on social innovation and the innovation capacity of the whole society is indispensable. Against this background the article traces the emergence of a New Innovation Paradigm as basic condition for a mission-oriented innovation policy (Howaldt et al. 2019).

Social innovations are gaining importance in processes of sustainability transitions which require the coordinated interplay between technological and social innovation (Schot/Steinmüller 2018, 1562). Social innovation has evolved from an opportunity to a necessity, and a lack of integration of social innovation as such in policy frameworks is a missed opportunity. Social and technological innovations are closely interconnected - gains from fast-developing technological innovations cannot be fully realized without complementary social innovations that allow their successful societal adoption (Kohlgrüber et al. 2019; Oeji et al 2021).

The European Twin Transformation (digital and green) and Industry 4.0 development need to be aligned with the concept of social innovation. This is the foundation for a mission-oriented innovation policy exploiting the potential of technological and social innovation for the whole society. Just as the conditions to explore the potentials of the natural sciences and to make them usable for society were created through a systematic innovation policy in the middle of the last century, at the beginning of the 21st century we need just as great a pioneering spirit in the search for new social practices that enable us to secure the future and make our societies more inclusive and sustainable.

Mariana Mazzucato (PhD)

Professor in the Economics of Innovation and Public Value at University College London (UCL), where she is Founding Director of the UCL Institute for Innovation & Public Purpose (IIPP). She is winner of international prizes including the 2020 John von Neumann Award, the 2019 All European Academies Madame de Staël Prize for Cultural Values, and 2018 Leontief Prize for Advancing the Frontiers of Economic Thought. She was named as one of the '3 most important thinkers about innovation' by *The New Republic,* one of the 50 most creative people in business in 2020 by *Fast Company*, and one of the 25 leaders shaping the future of capitalism by *WIRED.* Her highly-acclaimed book *The Entrepreneurial State: Debunking Public vs. Private Sector Myths* (2013) investigates the critical role the state plays in driving growth–and her book *The Value of Everything: Making and Taking in the Global Economy* (2018) looks at how value creation needs to be rewarded over value extraction. Her latest book *Mission Economy: A Moonshot Guide to Changing Capitalism* will be released in the UK on 28 January 2021 and in the US on 23 March 2021.

Keynote speech: The Direction of Innovation: A Mission-Oriented Approach

Mariana Mazzucato's lecture will elaborate on the concept of 'mission-oriented innovation'. Drawing on her new book, 'Mission Economy' and the reactions of governments to the Covid-19 crisis, she will

consider the challenges facing modern capitalist economies and consider how mission-oriented policy can help shape markets and provide a direction for innovation and economic policy across a range of spheres, including Big Tech.

Olli Kangas

Professor of Practice at the University of Turku and the Director of Equals Society research programme at the Academy of Finland. Previously he has been the Director of Governmental Relations at the Social Insurance Institution of Finland (Kela, 2015-2018) and Research Director (2007-2014). He has worked as Olof Palme visiting Professor at the Uppsala University; H.C. Andersen Professor at the University of Southern Denmark, Professor at the Danish National Institute for Social Research (2004-2007), Professor in Social Policy, University of Turku (1994-2003) and research fellow at the Academy of Finland 1987-1993. His research interests revolve around comparative analysis of social policy systems, their causes and consequences in terms of macro-economy, income distribution and legitimacy of social institutions. He is the leader of the research group evaluating results from the Finnish experiment with basic income. His latest publication is Olafsson S.; Daly, M., Kangas, O. & Palme, J. (eds.) Welfare and the Great Depression. Oxford U.P. (2019).

Keynote speech: How (and why) to plan a large-scale randomised field experiment?

Abstract: One main reason for experimenting with basic income was to determine whether it could diminish the bureaucracy and dissolve the monetary disincentives involved in today's social security system. The task of the experiment was to evaluate whether basic income would be a device for simplifying the system and making it more transparent. The main question was whether basic income could reduce various work disincentives and consequently increase the employment rate.

Numerous microsimulations were run, and models evaluated, and endless legal, practical, and political problems were more or less successfully solved during the planning of the experiment. The planning phase was full of inspiration, perspiration, and frustration.

The same applies for the experiment and its results. Because of time-related, legal and monetary constraints, the experiment was squeezed and comprised only unemployed people.

Register-based results regarding the employment effects of the experiment were negligible. Those who received basic income neither did work more no less that the control group. However, the recipients of basic income reported less experiences of bureaucracy, higher trust in social institutions and higher level of well-being.

Prof. Paul Osterman

Professor at Nanyang Technological University (NTU) Professor of Human Resources and Management at the M.I.T. Sloan School of Management, member of the Department of Urban Planning at M.I.T.

His research concerns changes in work organization within companies, career patterns and processes within firms, economic development, urban poverty, and public policy surrounding skills training and employment programs.

His most recent book is Who Will Care For Us: Long Term Care and the Long Term Workforce (Russell Sage, 2017). Other recent books include Good Jobs America: Making Work Better for Everyone (Russell Sage, 2011); The Truth About Middle Managers: Who They Are, How They Work, How They Matter (Harvard Business School Press, 2009); Gathering Power: The Future of Progressive Politics in America (Beacon Press, 2003),; Securing Prosperity: The American Labour Market: How It Has Changed and What to Do About It (Princeton University Press, 1999), and Working In America: A Blueprint for the New Labour Market (MIT Press, 2001).

Professor Osterman is also the author of Employment Futures: Reorganization, Dislocation, and Public Policy; Getting Started: The Youth Labor Market; The Mutual Gains Enterprise: Forging a Winning Partnership Among Labor, Management, and Government; and Change At Work.

Keynote speech: The Changing Contours of Work: Implications for Employees and for Public Policy

Abstract: This presentation will begin by discussing debates and confusion regarding the trajectory of the American labor market and, in particular, the evolving relationship of employers and their workforce. These debates focus on the extent to which employers make commitments to their employees as exemplified by the rise of outsourcing and freelancing. The presentation will then present the results of a new national survey of a representative sample of adult employees that was conducted in January, 2020 (just prior to the COVID crisis). The survey carefully distinguished between the status of standard employment, freelancing, and contract company employment and hence is able to provide reliable estimates of the prevalence of each relationship. With these estimates in hand the presentation will describe and estimate models regarding who enters in each kind of relationship. Next the presentation will turn to estimates of employer provided training in each relationship. Training is a significant indicator because it is important in career development and also because it is a central feature of Internal Labor Markets. If employer investment in training declines this is a signal of the fraying of stable Internal Labor Markets. The presentation concludes by discussing the implications of the findings for employees, for firms, and for public policy.

Prof. Dr. Steven Dhondt

Scientific coordinator of the H2020 Beyond4.0-project. His first (also European) project as a junior scientist, some 30 years ago, was about the impact of technology on work. Microelectronics was the technology revolution at that time. CIM would make all workers unemployed. Thirty years along the line, Steven is still delving into this fascinating world of technology, organisation and work. He does this as a senior scientist at TNO and as a professor at the University of Leuven (Belgium). Next to Beyond4.0, he is also coordinating another project on work in advanced manufacturing, the SBO Paradigms4.0. With his expertise, he is an advisor of the European Commission on the next research programme 2021-2029 Horizon Europe; member of the Scientific Advisory Board for the German research institute sozial-forshung-stelle TU Dortmund. He has written extensively on topics such as technology and work, workplace innovation, quality of work.

Keynote speech: Why Industrie 4.0 technology requires so much talent. Drilling deep into the entrepreneurial ecosystem results of Beyond4.0

Abstract: Industrie 4.0 technology is the introduction of interconnected technologies and the use of data and data analytics to drive production and services. Companies are struggling with this introduction, and this is visible in rising employment levels and limited productivity growth. The main question is how to make this digital transformation speed up? Most studies on technology limit themselves at the level of separate companies to understand how companies deal with adaptation. However, the examples of successful companies mask the context they are embedded in. The speed of the few masks the slowness of the many. An example is how slow the major car manufacturers have been to try and catch electric care producer Tesla. If you look at the changes in implementing Industry 4.0 technology, one thing that is apparent is the stickiness of the transformation. The concept of entrepreneurial ecosystems allows us to analyse the driving factors of change and to compare regions and networks. It allows us to understand this 'stickiness. We add to this concept of entrepreneurial ecosystems the distinction between incumbent and emerging entrepreneurial ecosystems. We focus in our keynote on the (preliminary) results of a comparison between six regions in Europe, covering six incumbent and six emerging entrepreneurial ecosystems. We limit ourselves to how companies and supporting networks change their recruiting and knowledge development strategies to adopt Industrie 4.0 technology. All of the ecosystems see their personnel needs and knowledge demands rise significantly. Differences in speed in adapting to these needs and demands are explained by the degree of collaboration between companies and networks in these ecosystems. Companies cannot rely on traditional relationships with their suppliers and customers but must find new ways to shift knowledge and talent within and outside the confines of their enterprise. The strength of the ecosystem determines the speed of change. Comparing incumbents with emerging entrepreneurial ecosystems allows assessing the main hurdles new ecosystems are confronted with to grow.

SESSION A
DIGITAL TRANSFORMATION AND SOCIETAL DISRUPTION AFTER THE COVID-19 CRISIS – QUO VADIS – FACTS AND FIGURES

SESSION A1

Andrei Popov Vologda Research Center of the Russian Academy of Sciences

The Present and the Future of the Employment Paradigm in the Face of Global Changes

The dynamism of the modern world reinforces the attention of scholars and practitioners to the issues of future human development. Under the influence of global trends (digitalization, automation, population ageing, globalization, etc.), the conventional ideas of human life are undergoing fundamental changes, which is reflected in various fields. The realm of employment is no exception: only in recent decades the standard model of labor relations has eroded, fundamentally new opportunities for teleworking and direct interaction between the worker and the client have emerged. In this regard, the COVID-19 pandemic has clearly demonstrated that the future is much closer than it seems. In particular, 35% of the US workforce worked entirely from home in May 2020, up from 8% in February. Even after the full removal of all quarantine restrictions, not only workers, but also business administrations would like to resort to this kind of practice more often. A similar situation is observed in Russia, while the scale of remote work is smaller than in the Western world (about 20%). Contemporary reality indicates that humanity has entered a transformational era when destruction becomes the norm. The horizon of the coming changes is reflected in the strategic planning documents of many nations. On the other hand, there is an increasingly active discussion on the threats associated with the future of work, including the risks of technological unemployment, labor market polarization, skill gaps, employment precarization, etc. All this raises the importance of theoretical understanding and conceptualization of the process of forming a new employment paradigm through the prism of global challenges. The research is based on the relevant publications in this area, official and survey statistics, including monitoring data of the quality of labor potential of the Vologda region (Russia) population. We used general scientific methods of critical analysis, generalization, comparison, classification, based on system-logical and interdisciplinary approaches. The study systematized the distinctive features of the modern employment paradigm. To that end, we turned to the issues of intersectoral transfer of labor force, the evolution of the institutional environment, changes in the organization of labor and the requirements for human capital, rethinking of work's role in society and so on. Special attention was paid to a critical analysis of the discourse on the impact of current trends on the future of employment. The research concluded with an analytical review of international experience to address the negative consequences of the employment transformation (the introduction of a universal basic income, development of job guarantee programs, support for social innovations, etc.).

Atanas Hristov, Bjoern Doehring, Werner Roeger, Anna Thum-Thysen
European Commission, DG Economic and Financial Affairs, Unit B.3: Economic modelling and databases

COVID-19 Acceleration in Digitalization, Aggregate Productivity Growth and the Functional Income Distribution

COVID-19 has been accelerating the current wave of digital transformation. Following an earlier wave of communication technology and robotisation, the current wave is driven by further automation, communication, the internet of things, big data and artificial intelligence. These ongoing transformations can be expected to have a positive impact on productivity growth in the digital sector, but the effect is not necessarily visible at the aggregate level. If these are general-purpose technologies, the productivity impact would not remain confined to the digital sector. We partly take this into account by also looking at digital-adopting sectors such as e-commerce in retail trade in the calibration of value added shares. Moreover, they can affect economic sectors and the workforce in quite differentiated

ways, possibly exacerbating the decline in labour shares (functional income distribution) as well as demand for, and returns to, different types of skills.

In the corporate sector, firms that exploit digital platforms enabling them to expand activity at very low marginal cost are benefitting most from the COVID-related boost. Profits, sales and stock prices of major oligopolistic digital companies ("Big Tech" companies), which had already been so-called "superstar firms" with low labour shares before the pandemic (Autor et al 2020), have risen sharply. Mark-ups have also been rising pronouncedly in the digital sector characterized by fast-paced technological change (Calligaris et al 2018) and oligopolistic competition.

In the labour market, low-wage earners in routine tasks have been hit hard by the pandemic. This is the same group that had already suffered from the impact of structural shifts and skills-biased technological change for many years. The boost to digitalisation is likely to lead to a reduction of the labour share, in particular if it is accompanied by a reduction of competition (Dierx et al, 2017) in the presence of network externalities. Furthermore, it is likely to shift the relative demand for skills in favour of high-skilled workers.

This paper studies three questions, namely: (1) what are the likely growth effects associated with a shift of demand towards digital services and how is aggregate productivity affected; (2) what are possible functional income distributional effects i.e. how are prices, profits, wages and digital skill premia affected; and (3) what could be possible policy responses?

We extend the standard one sector neoclassical growth model by distinguishing a conventional and a digital sector The latter is characterised by the presence of digital platforms with fixed costs but low marginal cost. In the model, entry of new platforms is endogenous and they are produced via a design production function with firms deciding about new varieties of digital goods. Workers are mobile between sectors and have digital or conventional skills, which are not substitutable. Physical capital is either of the ICT or the non-ICT type. We calibrate the traditional and the digital sector to EU data using information from EU KLEMS and Eurostat over the period 1997 to 2018. A positive demand shock in the digital sector simulates the surge in demand for digital goods during the last year. We explore the short and long run effects under the assumption that this demand shift is persistent.

An important policy response is the Next Generation EU fund, which includes fostering digital skills. We explore the effect of a positive digital skills shock in our model set-up. Another possible policy scenario to explore could be the current revisions in the EU Digital Services Single Act set to "overhaul" the digital market, including how tech giants operate. We consider both the provision of digital skills and the effects of entry barriers in this paper.

Branka Andjelkovic, Tanja Jakobi
Public Policy Research Center, Belgrade, Serbia
Naked At Home

This paper draws attention to the increasing concerns related to ICT-enabled surveillance during telework, which skyrocketed during the COVID-19 pandemic. New monitoring tools were often diving deep into workers home settings, in this way jeopardizing their privacy and labour rights. The topic of staff surveillance is not likely to disappear even if the majority of employees return to the offices as the firms are increasingly looking into what monitoring tools they can introduce into the workplace in order to track workers. This paper seeks to explore how monitoring of workers at their homes during telework affects their labour rights and right to privacy. The paper argues that lack of institutional response, primarily in the fields of labour law and data protection, increases the grey zone of telework and exposes workers to a number of unforeseen vulnerabilities.

This first exploratory research in Serbia about the status of labour rights of workers who have been shifted to work from home during the pandemic relies on mix method approach. It deploys two online surveys: first one is focusing on the working age population in Serbia who have the experience in remote work; the second survey concentrates on managers across all industries to explore their experience in usage of the ICT- enabled monitoring tools. These methods are complemented with semi-structured interviews with shapers in the field of labour law and data protection (policy makers, scholars, law firms, representatives of trade unions, monitoring businesses, etc.) with the aim to obtain more detailed and reflexive responses about the topic.

This paper presents the preliminary results of the effects of surveillance of workers in their home settings via live webcam feeds, mouse and keyboard tracking, face tracking, and emotion recognition. Serbian employers are often breaching the rights of employees stated in the Labour Law and the Law on the Privacy Data Protection. This points to a specific decent work deficit defined as a denial of rights at work (ILO, 2017). If remote work is going to become a new norm regardless of the pandemic, the regulation addressing surveillance at work has to be thoroughly renegotiated and introduced to the practices of both public and private employers.

The topic of surveillance gained traction with the rise of Internet and its application on employee surveillance (Ball, 2010). The researchers mostly focused on three major issues related to surveillance at work: performance i.e. effects of digitalization, big data creation, machine learning and artificial intelligence on individual productivity (Moore and Hayes, 2017), behavior patterns of the workers (Moore et al., 2018; Zuboff, 2019; Karen and Lodge, 2019) and their personal characteristics (Tambe et al., 2019). This paper aims to offer novel empirical assessment of the intrusiveness and reasonableness of the emerging work surveillance technologies at work from the less researched perspectives of workers privacy rights and their autonomy (Spencer et al., 2021), while taking the opportunity to explore the proliferation of surveillance at work among broad variety of industries whose workers were for the first time confined to telework. The findings contribute to the growing body of literature aimed at informing public policies seeking to reconcile application of technology at work, labor rights and the right to privacy.

Patrick Thill Luxembourg Institute of Socio-Economic Research, **Andreas Kornelakis** King's College London, **Vassil Kirov** Institute of Philosophy and Sociology, Bulgarian Academy of Sciences

The Digitalisation of Service Work: A Comparative Study of Restructuring of the Banking Sector in the United Kingdom and Luxembourg

The debate around the impact of digitalisation on the future of work has been polarised between pessimistic and optimistic perspectives among either academics, practitioners, policymakers and international organizations (Grimshaw 2020; Ilsøe 2017; O'Reilly et al. 2018). On the one hand, the more alarming perspectives emphasise the likely effects of automation in job losses and massive technological unemployment (Frey and Osborne 2017), the detrimental impact of new technologies for the quality of work (Holtgrewe 2014) and the precariousness that is associated with work in the gig economy (Gandini 2019). On the other side, the more optimistic perspectives emphasise the potential of increased autonomy even in the gig economy (Wood et al. 2019), the potential for job creation that will counterbalance job losses (Grimshaw 2020) and opportunities for work-life balance and reskilling. Pertinent to this debate, earlier research illustrated how collective voice institutions moderate the impact of convergent pressures unleashed from globalisation processes, services liberalisation and offshoring on to work reorganisation and job quality outcomes (Batt et al. 2009; Doellgast et al. 2009a; Doellgast et al. 2009b; Doellgast 2010; Holman and Rafferty 2018). However, there is limited explicit research on how and to what extent collective voice institutions respond to the challenge of digitalisation.

Our contribution examines critically the divergent trajectories of change in response to digitalisation pressures. We argue that digitalisation pressures lead to a variety of adjustment paths, but the direction of change depends on embedded institutions, actors and practices in the employment relations' system. We draw on comparative case studies in the banking sector of the UK and Luxembourg, with a focus on HSBC (UK) and BNP Paribas (Luxembourg). Our findings suggest that despite similar pressures, the responses to digitalisation are in large part diverged. In the UK banking sector, the adjustment path followed the pattern of job losses and displacement of work via offshoring and branch downsizing. In Luxembourg, the adjustment path entailed limited job losses, but also reskilling measures and attempts to a greater diffusion of autonomy to suit work-life balance. We explain this variation by reference to the embedded employment relations institutions and actors. In Luxembourg, the government enabled the adjustment via reskilling and a consensual social partnership approach and moderated the pace towards cost-cutting measures. By contrast, in the UK, cost-cutting measures were not tempered and unilateral management decisions prompted union campaigning and local lobbying initiatives.

Silvia Napolitano, Nathalie Greenan, Imad El-Hamna CNAM CEET

Using a Linked Dataset at the EU Wide Level to Describe Technological and Organisational Changes and Their Relationship with Innovation

Innovation is recognised as central to obtain productivity growth. The literature has been thus focusing on the drivers of innovations and, in particular, on the relationship between R&D investments and innovations outputs. Recently, a strand of literature based on the Crépon, Duguet and Mairesse model (1998) expanded the definition of innovation to include innovative usage of ICTs and organisational innovation and thus to assess a production function augmented by a knowledge function relating investments in innovative activities with innovation outputs (Polder et al., 2010; Bartelsman et al., 2017).

This paper aims to contribute to this strand of literature by providing some evidence about the effects of technological and organisational changes on innovation in Europe. We indeed consider that technological and organisational changes are interdependent and that the the co-evolution of organisational forms and uses of new technologies are key in creating new opportunities for companies.

To this aim, we analyse the cross-country and industry differences in innovation outputs and their relationship with observed differences in firms' investments and capabilities to adopt and adapt to new technologies. We propose a model, which describes the relationship between tangible and intangible investments within firms to implement innovative activities and innovation outputs. In particular, we identify investments in R&D as well as ICTs and digital technologies adoption. We then expand the definition of innovative activity to enclose those intangible investments aimed at improving the learning capacity within the organisation through the adoption of management tools concerned with the improvement of individual and organizational learning (OECD, 2010). Innovation outputs are identified in the product, process, organizational and marketing innovations introduced onto the market.

Data are gathered by constructing a unique linked dataset, which uses EU-wide aggregated data from the Community Innovation Survey and the ICT usage by businesses and aggregates employees' information from the European Working Conditions Survey at the country-industry-year level. We were able to link those datasets for three time periods: 2010-2012, 2012-2014 and 2014-2016, where the starting year is used for variables concerning inputs and the concluding year for the output variables.

SESSION A2

Prof. Dr Egle Butkeviciene Kaunas University of Technology, **Assoc. Prof. Dr Audrone Nakrosiene** ISM University of Management and Economics

Workplace Innovation Fostered By the Covid-19 Crisis: The Benefits and Challenges of Telework

Purpose – to identify workplace innovation during the Covid – 19 crisis, analysing benefits and challenges of telework on individual and organisational level in pre Covid-19 time and during Covid-19 crisis.

Theoretical approach – Previous studies that were conducted before the Covid-19 crisis have revealed a number of benefits and challenges of telework (Nakrosiene, et.al., 2019). Time planning freedom (Ammons, Markham 2004), increased autonomy (Harpaz, 2002), increased productivity (Golden, Veiga, 2008), lower stress (Fonner, Raloff, 2010), increased work-life balance (Ammons, Markham 2004), reduced commuting time (Tremblay, Thomsin, 2012), possibility to reduce communication with co-workers (Khalifa, Davidson, 2000), reduced travel costs (Morgan, 2004) were indicated as the main benefits of telework. Overtime (Bailey, Kurland, 2002), unmet communication needs (Wilson, Greenhill, 2005), reduced opportunities for professional development (Salaff, 2002), lost boundaries between work and family (Redman, et.al, 2009) were identified as the main challenges of telework (Nakrosiene, Butkeviciene, 2016). During Covid-19 crisis, telework intensity was increased significantly. This led us to formulate the main research question, answering what are workplace innovations, addressing challenges created by Covid-19 crisis.

Methodology/Findings – this paper is based on qualitative methodology. In 2015 the authors of this paper conducted interviews, focussing on benefits and challenges of telework in Lithuania. These findings have been published in WoS indexed journal. During Covid-19 crisis, authors conducted interviews, using the same methodology.

The comparison of findings in pre Covid-19 period with data gathered during Covid-19 period shows that previously identified benefits of telework (such as time planning freedom, work-life balance, less stressful working environment, unnecessary social interactions with co-workers, etc.) turned into challenges in period of Covid-19 crisis. Some of benefits (such as autonomy or travel time savings) remained the same, however challenges that have been identified in pre Covid-19 period got much more importance during Covid-19 crisis.

The data show that on organizational level, there was a struggle to facilitate telework, resulting in different innovations (including increased use of IT platforms and tools) that organizations tried to create, making a rapid transit to remote working more smooth and effective.

Practical implications – The study provides new knowledge on the workplace innovation which emerged during the Covid-19 crisis, comparing the benefits and challenges of telework in the pre Covid-19 and during the Covid-19 crisis periods. The findings may be utilised for the development of new work organisation strategies to overcome telework challenges on individual and organisational level.

Originality/value – The paper contributes to theory development, as it provides new knowledge on workplace innovation depending on telework intensity, identifying and comparing the change of perception of benefits and challenges of telework on individual and organisational level in the pre Covid-19 and during the Covid-19 crisis periods.

Ester Ulloa Unanue, Marcela Iglesias Onofrio, Sofía Pérez de Guzmán Padrón, Lucía Del Moral Espín University of Cadiz

Raising Awareness for Riders' Rights

This paper presents partial results of a research carried out in the framework of the project *Slash Workers and Industrial Relations (SWIRL)* financed by the Directorate-General for Employment, Social Affairs and Inclusion of the European Commission seeking to analyse the collective representation of contingent workers in five European countries.

While the fragmentation of work and the rise of "atypical" working conditions date well back into the 20th century, the recent surge of digital labour platforms has intensified the growth of what is referred to as "contingent work": "a general term for forms of employment tied to the completion of a specific task and, hence, of relatively short duration".

Besides presenting many opportunities, the digitalization of the economy also entails regulatory challenges which must be addressed in order to ensure workers an adequate level of social protection regarding working conditions. The fact that digital delivery platforms in Spain classify their workers as self-employed implies depriving workers of the protection labour law bestows". The Covid-19 crisis had a double effect on delivery platforms in Spain: a considerable increase in the activity and an ensuing worsening of the terms of work. This has brought to the forefront of public debate the challenges to be addressed regarding working and employment conditions of digital workers resulting in social dialogue efforts seeking to regulate these new realities through what is commonly referred to as "the rider law".

This paper aims to delve into the collective action and representation of digital platform workers in Spain through two different channels: the traditional unions' action strategies to represent platform workers and the new workers' own self-organization. To this end, we have selected two different types of collective organizations: "Your Trade Union Answer Now"- an online chapter created to meet the demands of workers engaged in digital platforms developed by the traditional trade union, Unión General de Trabajadores (UGT), - and RidersXDerechos - a riders' self-organization platform.

In order to explore their needs, aspirations and obstacles for collective protection and representation, we analysed semi-structured in-depth interviews conducted with representatives from both, the UGT union and the workers' organisation RidersXRights, as well as with digital platform workers.

Dr. Ludivine Martin Luxembourg Institute of Socio-Economic Research (LISER)

How Do Digital Tools Use Profiles Of Teleworkers Influence Their Digital Up-Skilling During The Spring 2020 Lockdown?

With the COVID-19 lockdown the use of digital tools soared as underlined both by services providers (e.g. Zoom, Microsoft) and researchers (e.g. DeFilippis et al. 2020). Notwithstanding, the digitalization of work have been exacerbated and its consequence on teleworkers need to be further understood in order to be ameliorated in a post-COVID digitalized work environment as asked by many researchers (e.g. Barnes 2020, Dwivedi et al. 2020, He et al. 2021, Venkatesh 2020, Watson et al. 2020). The aim of this paper is to analyze the evolution of the use of digital tools by employees who telework during the spring 2020 lockdown and its repercussions on their perceived digital up-skilling.

We follow an applied economics approach and proceed in two stages. In a first stage, we identify profiles of teleworkers according to the evolution of their use of digital tools and the intensity of use comparing before and during the lockdown covering ten digital tools: Company social network, internal blogs and wikis; Computer-assisted design/manufacturing (CAD); Client relationship management (CRM); Enterprise resource planning (ERP); Instant messaging;

Intelligent and self-learning technologies; Platform for documents sharing (groupware); Process automation tools (workflow); Support tools for meetings, trainings, etc.; Web conference tools. To profile teleworkers' use of digital tools, we use a multiple correspondence analyses (MCA) followed by hierarchical cluster analyses. In a second stage, we investigate the links between belonging to these different profiles and digital up-skilling. Our measure of digital up-skilling is based on the self-assessment following question: "If you compare your working conditions in a typical week in April 2020, during the COVID-19 lockdown, to your normal working environment in February 2020, would you say your digital skills have...? 1. Greatly decreased; 2. Decreased; 3. Remained the same; 4. Increased; 5 Greatly increased". Based on it we created a dummy variable estimated with a Probit model.

Our analyses draw on a sample of 438 employees working for firms located in Luxembourg from the first wave of the *COVID-19 socio-economic impacts in Luxembourg survey* (SEI) conducted between May and July 2020 by LISER and the University of Luxembourg.

Our analysis enable us, first, to classify employees working from home during the lockdown in five digital tools user profiles and, second, identify the main drivers of the improvement of teleworkers' digital skills. We show that a majority of teleworkers increased their use of digital tools during the lockdown and the use of many digital tools is beneficial to teleworkers' digital skills improvement. More specifically, it is teleworkers who have experienced new digital tools during the lockdown and who have used them intensively ('High extensive use' profile) that are those who estimate the most that their digital skills improved during the lockdown.

Dr. Petya Klimentova
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Digital Transformation and New Forms of Civic Activity in the Field Of Labour (The Example of Online Labour Consultations)

The subject of the sociological research are the modern alternative forms of civic activity in the field of labour, which appear, manifest and develop without the mediation of trade unions, companies, employers, non-governmental and other organizations. The main question (hypothesis) here is if in the post-industrial situation of labour, accompanied by post-unionism, the protection of labour rights and related human dignity, recognition and justice increasingly leaves the field of collective solidarity and becomes the subject of individual efforts and initiatives. We examine the free consultations in the Bulgarian Internet forum on labour law issues to show that the individual works in the case give rise to civic behaviour (free consultations), as generating informal, voluntary social relations, contact the taking and defending the position in support of the other / others. Our thesis is that these relationships transform a virtual space into a large space of everyday civic activity and civic culture.

The research contribution is the finding that the search for individual and collective solutions to a given problem constitutes others (consultants, professionals) into active citizens and turns the virtual space into an interactive space for the formation of civic knowledge and skills in order to provide labour protection. Thus, through cyberspace, participants in online consultations create new forms of civic behaviour, despite remaining in the traditional roles of employment (interviewers seek advice on issues of their daily lives; consultants are specialists in labour law).

However, the growing number of individual protection strategies through free consultations on social networks does not lead to collective opposition. The new forms of social solidarity are caused by a lack of recognition, or a trade union response, mobilization resources and remain at the level of individual protection strategies.

The first part of the study presents the concept of "orders of importance" and "engagement regimes" of Luc Boltanski and Laurent Teveno, through whose theoretical prism in the second part of the case - labour consultations in the forum of lex.bg - are interpreted as acts of civil behaviour.

Quantitative and qualitative **methods** were used to empirically test the hypothesis. 256 labour cases and related discussions were studied as registered in the forum of lex.bg for the period 2007-2016. Processed with a questionnaire, labour consultations are systematized in Excel. Ten interviews with consultants were conducted in the forum.

Yennef Vereycken, Dries Van Herreweghe, Senior researcher, Monique Ramioul, Prof. HIVA-KU Leuven

Social Dialogue on Technological Innovation in Flanders: Results of a Delphi-Study

The impact of social dialogue on technological innovation in Flanders has historically been limited and this despite the distinct interests both employers and trade unions have in the governance of technology at the workplace. Research in the 80's and 90's formulated several explanations, ranging from ideological to practical barriers. The current Fourth Industrial Revolution fosters a renewed interest in technological innovation and its governance. Considering the far-reaching consequences of technological innovation in terms of the regulation of work and industrial relations, social dialogue is often expected to play an important role in this governance of technology. Using the Delphi-method, we investigated how social partners in Flanders themselves evaluate the current impact of social dialogue on technological innovation, guided by the following questions:

What **goals** of social dialogue over technological innovation do social partners put forward?

What **barriers** for social dialogue over technological innovation do social partners identify?

What **opportunities** do social partners identify to reinforce social dialogue over technological innovation?

Results show that both employers and trade unions agree on the necessity to reinforce social dialogue on technological innovation, however, for different reasons. Employers, starting from a unitarist perspective, evaluate social dialogue as a means to increase the efficiency of technological innovation and to foster technological acceptance. Trade unions, from a pluralist perspective, emphasize the role of social dialogue in balancing potential opposite interests of employers and employees. Although the urgency to strengthen social dialogue is considered high, the study also identifies several ideological, structural and practical challenges.

A Delphi method is a method of structuring communication between a group of experts, and consists of a series of questionnaires interspersed with structured, anonymous feedback. The first round consisted of a brain-storm, gathering as much input as possible, followed up by a round to narrow down the different arguments. The study concluded with a ranking exercise based on a selective list of arguments. Although widely used in health and technology related research, it's to our knowledge the first time the method is applied to study industrial relations issues.

SESSION B.
THE NEXT TECHNOLOGICAL WAVE? THE TECHNOLOGY WAVES REASSESSED FROM A HISTORICAL PERSPECTIVE – TODAY'S LESSONS FROM THE PAST

Chiara Natalie Focacci Dept. of Economics, University of Bologna, **Dr. Vassil Kirov** Institute of Philosophy and Sociology, Bulgarian Academy of Sciences

Regional Entrepreneurial Ecosystems: Technological Transformation, Digitalisation and the Longer Term. The Case of UK (West Midlands) and Bulgaria (Sofia)

We investigate how regional entrepreneurial ecosystems have adapted to the information revolution as a techno-economic paradigm since the 1960s. Particularly, we look at how the organisation of firms and labour has changed in the automotive and ICT sectors in, respectively, the UK and Bulgaria. Findings show that, in both countries, it was the degree of cooperation between the local entrepreneurs, research institutions and the government that enabled successful innovation in the regional clusters of the West Midlands and Sofia. The resulting ecosystems allowed, on the one hand, the already mature automotive sector in the UK to survive; and, on the other hand, the newly developed ICT sector to be successfully installed in Bulgaria.

Dr. Joanna Morawska-Jancelewicz Adam Mickiewicz University, Poznań, **Prof. Elias G. Carayannis** George Washington University School of Business

Society 5.0 and Industry 5.0 as Driving Forces of Future Universities

The concept of Society and Industry 5.0. is not a simple chronological continuation or alternative to Industry 4.0 paradigm. Society 5.0 aims to place human beings at the midpoint of innovation, exploiting the impact of technology and Industry 4.0 results with the technological integration to improve quality of life, social responsibility and sustainability. This ground-breaking perspective has common points with the objectives of the "United Nations Development Program" "Sustainable Development Goals". This new concept has also major implication for universities transformations. Updating and upgrading skills for new digital economy, developing of new hybrid learning models, redefining of the space of education, research and innovation, addressing needs of different generations are only few examples of challenges need to be considered for future university models. Universities are called upon producing knowledge for new technologies and social innovation. In new paradigm the importance of knowledge is not determined exclusively by competitiveness and productivity, but by taking into account the creation of social well-being, the impact on the quality of life and co-creation of knowledge as part of public-private partnerships. This requires not only integrating societal values and needs in research and learning environments but it also shapes the way universities work and build new types of relations with the society and what types of tools (including digital) they can use to shape new types of engagement. In our paper we argue that digitalization opens new perspectives for universities and can become one of the main drivers of their change. Incorporating the assumptions of Society 5.0 and Industry 5.0 into the universities practices and policies will allow both universities and societies to fully benefit from digital transformation. Making the human oriented innovation as the universities trademark and developing new cooperative models will also help to achieve sustainable priorities. Covid-19 pandemic has undoubtedly accelerated those process and gave evidence that universities have a crucial role to play in new Society and Industry 5.0. The use of the Quintuple Helix Model (QHM) might foster the process of necessary transformations capacities as it integrates different perspectives and sets the stage for sustainability priorities and considerations. As far as the practical goal is concerned, the paper proposes a set of recommendations for universities aiming at developing new forms and channels of distribution of education, research and innovation within in the context of QHM and Society 5.0.

Marta Candeias, António Brandão Moniz, Nuno Boavida
Universidade Nova de Lisboa

Digital Transformation in the Automotive Sector in Portugal: Data Analysis on Industrial R&D Projects

New technologies, sustainability policies, protectionism and consumers preferences are pushing for the reorganization of the automotive cluster. (ILO, 2020) Due to recent technological advances derived from the application of digital transformation in the domains of autonomous driving, connectivity, automation, and robotics, the automotive sector is evolving from the traditional, linear, product-oriented value chain to a mobility, service oriented one including new players (ILO, 2020). In the last years, several digital competences centers are supplying the automotive sector and have been installed in Portugal. These changes are put in place to enhance the product quality, control costs and improve productivity. In several cases they include major elements of the industry 4.0 strategy. The product shift is done to respond also to new regulations on environmental protection and to enable the control emergent market niches.

The paper will contribute to answer the question: what are the expectable changes in work organization due to the introduction of digital transformation in the automotive sector and at new players in the automotive value chain in Portugal? Does the application of Industry4.0 concept in the sector impacted labour relations? Does the employment in the automotive sector change with the recent automation trends in Portugal? Are there signs of improvement of qualification with increased automation? Can we observe a clear increase of R&D investments in the automotive sector that brings new ideas for organizational innovation? We want to develop this framework of questions to collect new data and obtain results that will be based on case studies from the automotive cluster. We will use, as well, secondary statistical analysis.

We will focus on AI (cyber-physical systems, intelligent automation, robotics, IoT) as the most relevant emergent technology to understand the development of automation in this manufacturing sector (Moniz 2018). R&D investments in industrial processes in general may reflect productivity improvements derived from the increased automation process, but that may not be the general trend. Our empirical data are based until now on initial case studies from the automotive and components sector combined with database search by keywords that sign intelligence automation developments and AI applications selected from national R&D projects on robotics, machine learning, collaborative tools, human-machine interaction and autonomous systems, supported by European structural funds. The implications on industrial productivity and employment will be discussed in relation to automation trends in the automotive sector.

Dr. Rumiana Jeleva Institute of Philosophy and Sociology, Bulgarian Academy of Sciences

IT Sustainability Reporting, Company Performance and Their Value Relevance

This text discusses the IT sustainability and its impact on welfare, social security and societal development perspectives. There is significant diversity in the way different organizations and authors have defined IT sustainability. However, they all have in common the idea that IT sustainability is about minimizing the negative impact of information technology use on the social, economic and environmental aspects of sustainability; the other important aspect of the common ground of IT sustainability definition is the understanding of its use for helping solve (other) sustainability issues. Firstly, the study touches upon the relationship between corporate and IT sustainability. Secondly, it provides an overview of the IT industry in Europe and more specifically in Bulgaria. Special attention has been paid to the development, structure and practices of small and medium enterprises (SMEs) in the sector and on their practical experiences with IT sustainability related issues. Presenting this evidence based part and empirical material from interviews collected with managers and owners of IT companies

analysis centers on questions what sustainability accountings is and when and what the companies should report with regard to their sustainability related performance. Reporting of sustainability performance can either be mandatory, governed by laws and regulations, or voluntary, driven by "soft" institutional pressures or differentiation strategies. Such regulations have a long history, especially in Europe. At the same time only a few countries (e.g., Finland) have passed laws mandating sustainability. Since 2017 all large public companies in Europe are required to report certain Environmental, Social and Governance (ESG) information according to a European Commission Directive (2014/95) adopted on October 22, 2014. A number of organizations are developing sustainability reporting standards for firms with the goal of making external sustainability reports accurate, consistent, reliable, and comparable across time and across firms. This research uses as an illustration the practice of some German companies (some of them operating also in Bulgaria) and their reports due to the German Sustainability Code. Finally, the study results explain the motives/drivers for disclosing non-mandatory information on sustainability performance of companies and their managers/owners. The study also contributes to the practice of non-financial auditing by introducing a framework for the SMEs that can be used as guidance and practical tool for voluntary reporting on IT sustainability.

In the last two decades the pressure and demand for sustainability reporting and disclosure of non financial information by the companies arose as a result of growing societal concerns about the sustainability of people's environment and economic system as their rapid growth and instability began to test the "planetary boundaries" (Rockstrom 2009, 2019). Although it is questionable if companies' accounting systems will ever be able to address these complex system of sustainability concerns, non financial reporting appears to contribute to the concept of sustainable organisations. Only sustainable organisations can further develop and carry out effective environmental and/or social targets (e.g.,

reduction of carbon emissions to acceptable volume or the fight against corruption). The experience of the best among these companies can be a model for others and provide useful information for managerial decisions and for assessing company's contribution and efficiency to its own industry, economy as a whole and society it is operating into.

SESSION C.
WORK, ORGANISATION AND MANAGEMENT: WORKPLACE INNOVATION TO SUPPORT DIGITAL TRANSFORMATION

SESSION C1

Prof. Dr. Frank Pot European School of Social Innovation, **Dr. Peter Oeij** TNO

Introduction to Session C1, C2 and C3: Work, Organisation and Management: Workplace Innovation to Support Digital Transformation

Digital transformation can be both a threat and an opportunity. The threat, as suggested by Osborne and Frey, is a gloomy and massive loss of jobs and takeover of human functions and professions by machines, robots, and AI. The opportunity is found in innovation that leads to inspiring workplaces where people can learn and develop themselves while using and co-developing new information technology. Technology is not a deterministic factor; from the strategic choice literature we can learn that the way people and organisations apply technology, affects the quality and quantity of jobs. The consequence of such choices is, to put it into extremes, are either 'bad jobs' that signify the 'low road strategy' or 'good jobs' that are indicators of a 'high road strategy' (Rodrik & Sabel, 2019; Osterman, 2018; Sabel, 1995). Low road strategies follow the path of digital transformation targeting cost-efficiency without any attention for good quality jobs and a fair distribution of wealth, while high road strategies foster sustainability and employability in a longer-term. Workplace innovation represents an approach to guide the strategic choices for digital transformation towards a high road perspective, for which employee engagement and involvement is a key factor.

This session (3 subsessions) discusses the digital transformation related to approaches of work, organisation, and management that take workplace innovation seriously. We want to better understand such approaches from both a scientific and a practical stance, and welcome such contributions to this session

Prof. Ferry Koster Erasmus University

Organizations in the Knowledge Economy. An Investigation of Knowledge-Intensive Work Practices Across 28 European Countries

This paper addresses the question: Does the knowledge economy affect the work practices of organizations? And, more specifically it focuses on the question whether these practices become more knowledge intensive. Knowledge intensification in organizations refers to several dimensions, namely the production of knowledge, the development and distribution of knowledge, and the application of knowledge. These dimensions of knowledge intensity of work practices are treated in different strands of the literature: the dynamic capabilities approach, organizational learning theories and application of technology theories.

Based on these three theoretical approaches, hypotheses are formulated about how the knowledge economy (meaning the macrolevel shift towards knowledge-intensive provision of goods and services) affects the work practices of organizations (whether organizations apply work practices that are more knowledge intensive). Besides that, a general hypothesis is formulated stating that knowledge intensification of the economy positively relates to the application of knowledge intensive work practices.

To investigate whether the knowledge economy is related to the structure and governance of organizations (that is: that organizations adapt KIWPs), data of companies in 28 countries gathered through the fourth European Company Survey (ECS), which was held in 2019, are combined with country level data about the innovativeness of the economy. The multilevel analysis of that data shows

that there is a strong relationship between knowledge intensification of the economy and the application of KIWPs.

Dr. Ali Iftikhar Choudhary COMSATS University Islamabad, Lahore Campus,
Prof. Adela McMurray Flinders University, Australia

The Relationship Between Digital Transformation and Workplace Innovation in a Developing Country

Globalisation, digitalisation, intense competition and developing workplace innovation for achieving sustainable competitive advantage are challenges faced by Pakistani entrepreneurial ventures (Choudhary, 2020). Ethical, strategic, and design thinking are imperative for cultivating innovation at the individual, team, and organisational levels to improve the quality of working life and organisational performance. It is argued that the Pakistani entrepreneurial sector focuses more on earning impressive profits rather than focusing on the quality of work-life and the cultivation of innovation processes and strategies (Choudhary, McMurray & Muenjohn, 2021). New technologies and business models have the potential to transform the economy (Oeij et al., 2019) as Pakistan, the world's fifth-most populous country with a population exceeding 212.2 million (Shabbir et al., 2020), is one of the leading players in providing low-cost digital and IT services worldwide, earning more than $2 billion a year. Yet, local businesses and organisations lag in digital transformation because of human, organisational and technological issues (Hamid & Khalid, 2016).

The Ministry of Science and Technology introduced the "Digital Pakistan Policy 2018" for improving the country's business digitalisation, automation and human resource development. This study conducts a documentary analysis to ascertain whether Pakistan is moving towards digital transformation and if workplace innovation impacts the digital transformation process. Reviewing the key documents in Pakistan's digital policy, Higher Education Commission's (HEC) policy for Business Incubation Centres (BIC's), Global Innovation Index, Global Entrepreneurship Monitor (GEM) and OECD data. In addition, the study analysed the Small & Medium Enterprises Development Authority (SMEDA) reports, including the Chamber of Commerce newsletters and entrepreneurial magazines.

Workplace innovation is an essential internal resource capability of the organisation, defined as the implementation of new and combined interventions in the field of human resource management, supportive technologies, and the work organisation (Rus et al., 2019). Digital transformation is defined as an incremental change process focusing on the adoption of digital technologies and creating value addition (Henriette, Feki & Boughzala, 2016). Employee engagement and involvement is a rudimentary factor in implementing digital technologies and improving organisational processes. More than 70% of Pakistan's population is young and under the age of 35 and hold a high potential for being involved in the digitalisation process, which may, in turn, improve the country's overall economic condition. Finally, the article explains the current digitalisation context and identifies key challenges that Pakistani entrepreneurial ventures face. Suggested strategies to improve workplace innovation and its role in the digitalisation process are discussed.

Aline Lohse Dr. Ing. André Dettmann, Prof. Dr. A. C. Bullinger TU Chemnitz

Workplace Innovation in Times of Digitalization and Pandemic

Workplace Innovation (WPI) can help enterprises to raise their employee's motivation and productivity, create better working conditions, improve the enterprises performance as well as its ability to create new innovations and enhance their potential in the competition with others (Kesselring et al., 2014; Oeij et al., 2017). As the pandemic changes most people's working life, WPI processes in organizations need to be also adapt to the new circumstances. Therefore, they need to be digitalized as well.

In a pre-pandemic study on WPI, the authors showed that the user-centered development of an information display for a machine, as a seemingly small change, has an impact on the design of work

and communication processes (Lohse et al., 2020). In the sense of demand-oriented inno vation of work processes, as described by the WPI, the changes had an improving effect on the employees in terms of time relief through less searching, faster reactions in case of disruptions as well as exact shift handovers. The study of the present work is based on the user-centered development of an information display for a machine but was carried out completely digitally. The focus is thus on the evaluation of a fully digital procedure of a WPI using the designing of an information display in the production as an example.

The study was conducted in a small and medium-sized enterprise (SME) with 190 workers in the textile producing sector. Digital focus group discussions were conducted with production workers, shift supervisors and management. While digital communication in the work environ ment is no longer a rarity for executives, even in SMEs, this is hardly the case at the level of 1 / 2 production workers. Video conferencing is therefore not part of any routines and thus represents an innovation in their field of activity.

All participants were asked about their affinity for technology before the interview (Franke et al., 2018). During the video conference, they were asked about their needs for an information display and its visual representation by means of guided interviews. In the follow-up, they evaluated the digital form of communication (Van der Laan et al., 1997) as well as the interview as part of the user-centered development and thus their involvement in the innovation process.

The results to this point show a high level of satisfaction and ease of use of the digital WPI process, even though technology affinity was average. Furthermore, the employees are optimis tic about the positive impact of the outcome. It is obvious that they can work purposefully with digital communication (communicating needs, discussing priorities, etc.) as well as feel in volved. After the test of the information display, the satisfaction of the employees is determined and changed work processes are recorded.

[The study will end in May 2021, but it already shows that the digital approach of a WPI can also be used advantageously in the SME environment. All results could be presented at the conference.]

Dr. Giverny De Boeck, Prof. Sharon Parker Curtin University

When Beliefs about Technology Clash: The Role of Institutional Logics in Workers' Experience of Automation and Work Redesign

Workers can experience technological transformation positively or negatively, depending on whether the transformation is perceived as an opportunity or a threat. To date, we know little about the organisational factors that influence the experience of technological transformation in people working as professionals. Drawing on interviews with managers (6) and professional workers (23) who have been involved in a unique automation process in the metal industry, we aim to develop a better understanding of the role of institutional logics in professionals' experience of this change and the redesign it caused to their work roles. Institutional logics refer to the organizing principles including the belief systems and practices that guide people's behavior and create unity within an organisational field (Reay, Goodric, Waldorff, & Casebeer; Reay & Hinings, 2009). Specifically, our analyses show that competing institutional logics between managers and professionals influenced the perceived legitimacy of the change and workers' engagement in the subsequent work redesign (Parker & Grote, 2020). At the same time, the technological transformation also prompted workers to contest organizational values by uncovering and/or magnifying contradictions with their own professional norms in the organization. Overall, our research contributes to the management literature by showing the importance of organizational level factors to understand workers' experience of technological change and work redesign, while also evidencing how the introduction of new technology can act as a catalyst for further disruption in organisations.

SESSION C2

Ine Smits, Prof. Ezra Dessers HIVA – KU Leuven
Sustainable Employment in the Age of Digitalisation: Unpacking the Organisational Level

The increasing use of digital technology influences our society on multiple levels. Digitalisation is traditionally described as the conversion of analogue information and tools into digital media (Peña-Cases, Ghailani, and Coster, 2018). Industry 4.0 refers more specifically to the fourth industrial revolution and is considered innovative because it combines production and information technologies into a network of machines that facilitates machine-machine and person-machine interaction (Vereycken, Ramioul, and Hermans, 2020). Digital technologies in Industry 4.0 can be divided into three categories: (1) measurement and recording technology; (2) automation technology; (3) interaction technology (Meylemans et al., 2020). This analysis focuses on the role of the organisational level in the relation between Industry 4.0 technologies and the sustainability of jobs. Regarding the organisational level, it is clear that the implementation of highly innovative technologies can have far-reaching effects on the organisational structure. The digital transformation creates an unstable work environment that is best accommodated in a flexible, organic organisational structure (Veile et al., 2019). However, the organisational level is not only affected by new technology, but also creates a certain path dependency by guiding the choice of new technology (Lall, Seim, Torvatn, & Knutstad, 2016). In addition to changes in the organisational structure, the use of new technologies also challenges leadership and HR policies, and implies changes in the job content and conditions of employees. To cope with new technologies, Veile et al. (2019) describe the need to adapt job design to adequately incorporate new tasks and responsibilities for employees. In the case of Belgium, it is expected that job content will mainly shift to control and monitoring as opposed to performing tasks (Delagrange and Notebaert, 2019). For example, Belgian analyses show that routine work is decreasing, data management is becoming more important and there will be more monitoring tasks in job packages that used to consist mainly of purely executive tasks (Bourdeaud'hui, Janssens, and Vanderhaeghe, 2019). The way in which these new jobs are organised is decisive for workability. The organisational level is a crucial link in this process. In the coming months, we will start case study research in Belgian organisations, using document analysis and interviews with employees, middle and top management to analyse how organisational choices determine how digital technologies do or do not lead to changes in employment sustainability.

Dr. Magdalena Parcheva Technical University of Varna
Innovative Potential of Digital Technologies and Systems With Artificial Intelligence For Transformation Of Work Processes In Specialised Translation Agencies

At the present stage, organisations are facing a number of challenges caused by the dynamics of environment, demographic change, shortened product life cycles, rapid development and application of information and communication technologies in various spheres of life, economic activity and public systems.

The COVID-19 pandemic has put the economy, health and social systems, public policies and business organisations in crisis. COVID-19 caused changes in industries, markets, supply chains, consumer behaviour and became the engine of accelerated digitalisation in healthcare, education, banking and insurance, administration, urban and regional development, business, not only high-tech but also from traditional industries. Anti-epidemic measures and restrictions have necessitated a rapid transition to a number of work activities and processes with the help of digital technologies and technical means. Telework has become a practice primarily for work tasks with high information intensity.

In this context, the issue of the impact of information technology and artificial intelligence-based technological solutions on professions, individual work tasks and processes, knowledge and skills of professionals in order to achieve higher productivity and protect the health and well-being of staff, acquires relevance [4; 5; 7; 8; 11; 12]. The issue of the potential of digital technologies for workplace innovations and the related changes in work, processes and staff competencies is a focus of growing research interest [1; 2; 3; 6]. Both technical and ergonomic issues of functionality, interface, "human – technological solution" interaction, usability, and socio-economic and managerial aspects of the digital transformation of labour such as productivity, the possibility of replacing human labour and individual work activities from computerised systems, psychosocial risk factors, quality of work, relation "computerised work processes – competitiveness of the organisation in the long run" are discussed.

The subject of research in the report is the innovative potential of information and communication technologies for transformation of work activities, processes and competencies of specialists in agencies for specialised translation into a foreign language.

The main *objectives* of the report are focused on the directions:

1. Analysis of theoretical and empirical research on the issues of social and managerial aspects of the impact of digital technologies and systems with artificial intelligence on labour activities and processes.
2. Highlighting specific manifestations of the impact of modern achievements in information and communication technologies on the professions in organisations with subject of activity "specialised translation" and the role of digitalisation for their development [9; 10].
3. Presentation of a model (framework) for research of the innovative potential of digital technologies for transformation of the labour activities, processes and competencies in the agencies for specialised translation.
4. Presentation of the results of an empirical study among specialised translation agencies from Varna district. The study is planned to be conducted among 20 agencies using the questionnaire and interview methods.
5. Formulation of conclusions and recommendations from the research.

Research methods: desktop study, questionnaire, interview.

Prof. Paul Osterman MIT Sloan

Sharing his ideas about the "High Road" perspective in the light of workplace innovation

Prof. Osterman will evoke some provocative thoughts on the following issue: "The digital transformation can be realized via the 'high road' or the 'low road' (see Osterman in his ILR article of 2018). Obviously, the high road provides a more inspirational future for companies and people. The question is, can workplace innovation be a helpful means to achieve the end of a high road society? As you know, workplace innovation largely aligns with the concept of high-performing work systems. Perhaps the main difference is that workplace innovation stresses the importance to integrate economic and social goals, which requires a systemic integration of economic, social, and technical functions in organisations. It is assumed that this integration is beneficial to both an inclusive society as good quality jobs." Prof. Osterman is invited to share his opinion on this issue and to participate in the discussion in this session.

SESSION C3

Ziagul Hosseini, Eindhoven University of Technology, **Dr. Paul Preenen** TNO,

An Ethical Framework for Evaluating Experimental Technologies in Logistics Workplace Settings

The logistics sector provides substantial revenue, employment, and innovation, making it essential for the Dutch economy. Currently, the Dutch logistics sector plays a crucial role in today's globalised economy. Its success is based on a combination of cutting-edge infrastructure, world-class service providers, and a coastal location at the heart of Europe. Specifically, the logistics sector is witnessing a wave of new technologies, such as automated picking tools, collaborative robots and advanced worker and warehouse management systems. These experimental technologies are revolutionising many types of work affecting jobs and employees. In implementing new technologies, this sector misses several opportunities regarding ethics, safety, sustainability and society. Public debate, and in line with this, scientific research on this topic is growing.

Yet, not enough attention has been paid to ethical concerns related to introducing such experimental technologies into the workplace and modern warehouse, which is the centre of the logistics networks. In contrast, new technologies have their inherent uncertainties and unintended consequences. Hence their introduction into workplaces can be conceived as a social experiment.

In this paper, we, therefore, aim to sketch a set of ethical guidelines for introducing new technologies into workplaces by presenting a conceptual investigation into the (morally acceptable) boundary conditions of new technologies in the workplace. We build on Van de Poel's general framework (2016) for evaluating experimental technology, and translate that framework into the more specific context of work. We discuss its five principles: non-maleficence, beneficence, responsibility, autonomy, and justice. Each of these principles is applied to workplaces in general, and specifically to a logistics warehouse setting as a case study. A particular focus is put on non-maleficence and beneficence in relation to experimental work technologies. By doing so, we uniquely synthesise and extend ethics and organisational psychological literature on the distinctive potential harms and goods of work.

This paper is part of the Dutch SHAREHOUSE Living Lab, which stimulates a sustainable collaboration among logistics companies, technology suppliers, educational organisations, researchers and (regional) policy makers public-private partnerships. Besides presenting the paper a short introduction of SHAREHOUSE Living Lab will be given.

Dr. Se Ri No Korea Labor Institute, **Dr. Kyoung Won Park** Hanyang University, **Prof. Young Jin Nho** Seoul National University of Science and Technology

Smart Technology and Workplace Innovation: Focused on Smart Factory in Korean Manufacturing Firms

Smart technologies can not only make better work environment, but also increase corporate productivity in small and medium sized business. In other words, smart technologies can be opportunity for small and medium sized firms. Unfortunately, a previous study has limit to discuss what conditions are needed to use smart technologies. In prior studies, they have emphasized on adoption of smart technologies for technical changes in organizations. However, in reality, the firms have difficulties to use of smart technologies. Application of smart technologies is not easy because in order to use smart technologies, work contents and knowledge and skills of workers must change. According to socio-technical systems design theory, Workplace innovation that is innovation of social relations can help change of work based on participation of workers. In other words, workplace innovation help application of smart technologies by changing work and workers. To discuss the role of workplace innovation in use of smart technologies, we investigated the relationship among smart technologies, workplace innovation

and work. To investigate the effect of workplace innovation on the use of smart technologies and the changes in work contents, and knowledge and skill requirements for workers, we used a dataset containing 308 small and medium sized manufacturing companies. The vast majority of sample companies adopted smart technologies in 2016 and afterwards. The OLS results were three-fold. First, workplace innovation was significantly associated with the higher use of smart technologies. Second, the use of smart technologies was significantly associated with simplified work contents for both maintenance and production workers, and with higher knowledge and skill requirements for their jobs simultaneously. Third, controlling for the use of smart technologies, workplace innovation was significantly associated with higher knowledge and skill requirements for their jobs. The study's findings suggest that smart technologies have a tendency to simplify workers' job contents through the process automation, but such tendency can be mitigated by workers' participation in workplace innovation.

Prof. Tuomo Alasoini, Arja Ala-Laurinaho, Marja Känsälä
Finnish Institute of Occupational Health

Driving High And Low: Finnish Logistics Workers in Digital Transformation

The "Digitalization for All" (2020-21) research project examines what kind of digital divides have emerged among Finnish employees, who are "digital winners" and who have fallen into the gaps. The study also looks for causes of exclusions and suggests ways to prevent the divides. Based on our analysis on Statistics Finland's 2018 Quality of Work survey, we distinguished five employee usage groups of digital applications at work. About half of the employees were grouped as "skilled users" who do not have special challenges related to their way of use. For the other groups, the analysis highlighted three types of societal challenges. They concerned employees' shortcomings of digital skills, the high intensity of the use of digital applications at work and the routine nature of use. Among those facing the last challenge, there was a clear over-representation of blue-collar workers with low education. The routine nature of use does little to promote the accumulation of employees' digital skills or the development of their work. Though most "routine users" can cope with their current tasks with their current skills, they are on the outer perimeter of digital transition, lacking most of its benefits and in danger of falling off the ride of digitalization in the longer term.

In the second phase of the study, we deepened our view on the causes and nature of the above challenges through qualitative analysis. To highlight the special challenges related to routine use, we made 16 semi-structured interviews in two companies in road maintenance and waste collection respectively, targeting to the work of their logistics workers, in these cases truck drivers and their supervisors. We were especially interested in the information systems that workers use at work, what new elements in the form of skills requirements, learning opportunities, means of control etc. the systems have brought in their work, and how their way of using digital applications at work relates to their leisure use of digital applications. The analysis reveals that our stereotypical view of logistics workers as routine users is too simple in many ways. The analysis also highlights that resorting too heavily on rough statistical analysis in making far-reaching conclusions on the dynamics of digital transition at work may lead to flawed policy conclusions.

Tuomo Alasoini is Research Professor at FIOH and Adjunct Professor at the University of Helsinki, specialized in sociotechnical transition of work in digital transformation.

Arja Ala-Laurinaho is Senior Specialist at FIOH, interested in organizational change, new forms of work and digitalization, and collective development of work.

Marja Känsälä is Specialized Researcher at FIOH and PhD in Economics, specialized in technology-mediated work, new forms of work and digitalization.

Michiel Bal CeSO, KU Leuven

Explaining the Use Of A Digital Technology In Context.

Head-worn displays (HWDs) are promising devices to support order-picking practices in logistics. To date, ample attention has been paid to their design, yet hardly to their actual use in real-life settings. Evidence about their functioning in practice is essential to learn whether or not their potential is realized. To explain why the HWD is used in practice, we compare order-pickers' use of two fairly identical HWD-applications in two most-similar order-picking cases. Remarkably, the use of the HWD was soon discontinued in the first case, yet persisted in the second, where it was used more intensively than initially anticipated. The explanation for this sharp contrast is twofold. In the first place, the features of the HWD may or may not match the order-picking logic. In the second place, order-pickers may or may not be given room to share their suggestions to improve the functioning of the HWD as well as the order-picking practice as a whole.

Zsófia Riczu University of Miskolc, Agricultural and Labour Law Department

Workplace Innovation With Digital Technical Support

The development of the world is a significant process from prehistory to the present day. This long, complex process of development has changed the lives of mankind from time to time, in the light of which many studies have dealt with developmental science and the concept of innovation in the fields of technology, informatics, economics, organizational science and law. One thing is for sure: innovation is part of our daily lives, from the very beginning, technical innovation, renewal, has been present in our lives. In my study, I want to present the workplace aspect of innovation, in addition to exploiting the potential of digital work, it also touches on certain legal aspects. Technological development naturally brings the development and transformation of social relationships; it transforms interpersonal relationships, which has the most significant effects in the employment relationships even nowadays. From these, I would like to highlight the subjects of digital innovation in workplaces. I would like to direct the focus to employer. I would put the leagl situation of the employer and the rights of command, direction and control at the center of my research, I would like to explore this by combining theory and practice.

SESSION D.
CHANGE OF TECHNOLOGY AND THE NEED FOR ON-GOING CHANGE FOR THE DEMAND OF SKILLS.

SESSION D1

Dr. Christina Ambareva
Institute of Philosophy and Sociology, Bulgarian Academy of Sciences

Which Competencies Are Important To Teach In The Light Of The Digital Transformation of Knowledge?

I will present work-in-progress research from the collective project "Rethinking Bulgarian education for the 21 century" (REFORM, IPS-BAS). It will extend the research on the digital transformation of knowledge (presented at this conference by Nevena Ivanova, PhD), towards a discussion on digital competencies in the context of the multi-literacy principle.

Multi-literacy is a concept of literacy based on the relevance between communication technology, a certain type of literacy, and a certain concept of truth. Multi-literacy means a complex of abilities to create, meaningfully use and interpret the content created by all major forms of communication technologies.

Historically, each new type of literacy has been related to the development of specific "tools" for achieving truth: formal logic and categories followed the invention of writing; induction, deduction, hypothesis building (scientific thinking) followed the printing press; critical thinking followed media studies; the digital age has brought forth the importance of being able to distinguish truth from untruth. All these abilities in their relevant time have been considered the most reliable tools/carriers of knowledge.

From this historical and comparative perspective, the presentation will analyze the digital competencies which are important to teach in the light of the digital transformation of knowledge. As teaching and education are part of a bigger system – of the state, of the political order, of the global order, they are also considered as a part of the "apparatus" which unites technology, business, human needs, and political power (Marcuse 1941, Хоркхаймер&Адорно 1999, Foucault&Rabinow 2002, Deleuze&Guattari 1983, Althusser et al. 2014). The teaching of the relevant for the digital age competencies will be discussed in a twofold way: as a practice to adjust a person to the truths of the "apparatus" (its "best interest") and as cultivation of critical thinking. The best interest defines the criteria of truth and the key abilities (values, attitudes, and skills) to extract meaning from reality. The criterion which values, attitudes, and skills will apply to the work environment of the future will come from looking for the best interest ("truths") of the "apparatus" and this is how the uncertainty about the future of the job market can be managed.

Elżbieta Prucnal-Tumasz University of Wrocław

What Professional Competences Do Employers Expect From An 'Ideal' Candidate For The Position Of SAP Consultant? The Case of the Professional Job Market in Poland

Working as a SAP consultant seems to be a dream job these days. It is perceived as a high-quality job (Holman, 2013), giving prestige and a sense of agency. This concerns an elite group of IT specialists – modular analysts and programmers – creators of digital reality. This profession is perceived in this way owing to high remuneration offered to these specialists, which is confirmed by the payroll reports of HR consulting companies and numerous job offers 'guaranteeing' employment for SAP experts and indicating a high demand for their skills (increasing the sense of security and efficiency in the labour

market). Analogous information indicating the high quality of this job (flexible work organisation, the possibility of developing professional competences, high autonomy) is presented in job advertisements and on the websites (in the career tabs) of companies employing SAP consultants. They 'promise' high-quality jobs for the best professionals, which are said to contribute to a high level of job satisfaction and employee well-being (Kalleberg 2011, 2018; Holman 2013). Consequently, there is great interest in professional development in this area. However, it is not easy to enter the professional labour market of these experts. One of the reasons is the high requirements set by employers regarding professional competences and business experience as well as experience in project implementation, which are verified at the stage of the recruitment process and then during project cooperation with consultants. In my presentation, I focus on the description of the competences of SAP consultants – technical (programmers) and modular consultants – that are sought by employers in the Polish professional labour market. The units of analysis are the professional competences (digital and technical, cognitive, social), qualifications (certificates), work experience of SAP consultants at the general, junior, mid and senior levels. I present the results of the preliminary analysis of existing data from selected organisations – digital documents published by employers hiring SAP consultants. These recruitment advertisements contain, among others, a list of expected competences, descriptions of expectations and 'model' competences described on company blogs in the career tabs.

Lise Meylemans, Prof. Ezra Dessers, Lise Szekér HIVA - KU Leuven

Empowering Workers With The Skills They Need For Tomorrow: Evaluation Of The Futurefit Training Program In Belgium

Through rising trends of digitisation and emerging new technologies at the workplace, companies will need employees who are able to adapt to evolving methods and new digital approaches (Strack et al., 2017). The recent covid-19 pandemic may even have accelerated this need for digital skills, both at work and in private life. To strengthen digital competences in the workforce, lifelong learning through adult education and employee training programs will be key (Hughes et al., 2019).

FutureFit is a training and research project led by Nesta and supported by Google.org aimed at reskilling and upskilling workers and testing innovative learning methods. The FutureFit program is running in several countries.

The objective of the Belgian FutureFit project was to gain more insight in the learning motivation of employees to encourage them to participate and to successfully complete training regarding digital skills and knowledge. The training trajectory was set out in three Flemish companies. A first survey measured the employees' digital literacy and digital needs. To motivate employees to participate in training, a digi-fair was organised in which they were introduced to new technologies and digitalisation in an informal way. The digi-fair was evaluated through a second survey. In a third phase employees could participate in digital trainings in which a third survey was carried out, measuring employees' motivation and desired outcomes of training. Each phase was complemented by in-depth interviews.

The Self Determination Theory (SDT) of Ryan and Deci (2000) provided the framework for examining the factors which may influence participation and learning among employees. SDT differentiates between autonomous and controlled motivation, which stand as opposite ends of a continuum. Autonomous motivation is linked to better learning outcomes for the individual than controlled motivation. The company level provides the social context in which the learning trajectory takes place, which can be a controlling or an autonomy supportive context. At the employee level sociodemographic factors, job characteristics and personality traits can influence motivation.

Analyses will be finalised by mid-May 2021, so the full results will be available for presentation at the conference. Some preliminary results: More than half of the respondents believes their job will change over the next 5 years and would like to receive more training on digital skills. As expected, participants who evaluated the digi-fair positively showed on average higher intentions for future learning about

digital skills than participants who did not enjoy the digi-fair. Positive learning experiences could thus motivate employees to engage in future learning activities. The results will help to generate evidence about what works, to provide practical solutions that can boost skills across the workforce at scale (Nesta, n.d.).

Fanni Tamasi University of Stirling

Technology Adoption and Skills Development in Scottish Manufacturing SMEs

Technological change has accompanied human progress throughout history. Our current era is no different. New technologies - if they are adopted - cause significant changes within organisations and jobs, and can alter the skill requirements of jobs. For successful technology implementation, employees must possess or be able to develop the right skills. The overarching aim of this study is to understand the impact of new technology adoption on skills requirements in Scottish manufacturing small and medium enterprises (SMEs). The research follows Dhondt et al. (2019)'s argument on the need for a more nuanced view on technologies when we examine the impact of technological transformation on organisations and skill requirements. To have a better understanding on the differing effects, the study will compare the implementation of three different kinds of technologies and their consequent effects on skill requirements in manufacturing SMEs. Namely, an Enterprise Planning System that can be classed as a new management system; a new digital Factory Acceptance Test system that improves quality management of the production process; and hard automation to improve the efficiency of the production procedures.

The originality of the study lies in its in-depth, qualitative case study approach to examine the varying effects of new technologies' implementation on skill requirements. This approach offers rich insights into the technology adoption processes, the intended and unintended effects of new technologies, and the consequent changes to the skill requirements in the case organisations in the context of small and medium manufacturing enterprises.

The research draws on three broad streams of literature: literature on the effects of technological change on work, literature on technology adoption in SMEs, and the literature on skills development in SMEs.

Data collection for this study will commence in August 2021. Since the empirical part of the research is work in progress, only the initial findings can be presented on the conference poster. Data collection will involve interviews, focus group discussions and observation. The sample of the study includes the owner-managers of the case organisations; line managers; workers, whose work tasks were influenced by the new technologies; and human resource staff, who are responsible for training and skills development in the organisations.

Overall, the study aims to contribute to discussions on skills development initiatives in the face of Industrie 4.0 in the manufacturing sector, with a unique focus on small and medium enterprises. From a policy perspective, the research will identify sectoral best practices and inform current sectoral skills development initiatives on the unique needs of small and medium enterprises.

The proposed poster based on this study will contribute to the conference's stream on 'Change of technology and the need for on-going change for the demand of skills'.

Marine Franssen, Frederic Naedenoen University of Liège

When Digital Transformations Causes Restructuring the Role of A Qualitative Social Dialogue

Two main research fields can be identified in the debates surrounding restructuring. On the one hand, the role of social dialogue in the conduct of restructuring. From the end of the 1990s onwards, the question of the anticipation of restructuring occupied all the debates (Beaujolin Bellet et al., 2012). More recently, the 2008 crisis has rekindled the scientific world's interest in these social dialogue mechanisms, aiming at analysing their capacity to manage the consequences of the latest global financial shock (Bergstrom 2019; Eurofound, 2016). At the company level, much work highlights the potential role of social dialogue throughout the entire process of corporate restructuring (Boni, 2009; Gautié, 2020). It aims at identifying several 'good practices' that can explain the success of collective approaches to organizational change (Eurofound, 2016) or particular features that social dialogue should have when a company is undergoing restructuring (Lambotte et al., 2015). On the other hand, papers question the impacts of digital transformations on occupations restructuration. Based upon the classifications identified by Degryse (2016), we highlight four different types of issues that are discussed. First, the extent to which occupations could be destroyed by digital transformations (Frey and Osborne, 2013). Second, the creation of jobs with these transformations (Davenport & Kirby, 2015, Miller & Atkinson, 2013). Third, how occupations change with technological tools, focusing on the tasks level (Autor et al., 2003). Fourth, the effects of digitalisation on the shift of employment status through to the phenomena of externalisation and platform economy (Srnicek, 2017).

Our paper aims at connecting those research fields by analysing how digital transformation and its organizational impacts can be shaped by the quality of social dialogue observed within companies. Stemming from the results of a European survey undertaken as part of the DIRESOC project, we construct an indicator of the quality of social dialogue. We confront this independent variable with respondents' perceptions on how digitalisation is considered as a subject of social dialogue, and with their perceptions on the restructuring effects of digitalisation.

Our results show that social relations based on mutual trust, regular exchange of information and the signing of agreements lead to positive perception on both the way digital transformation is perceived as a subject of social dialogue and the waysrestructuring resulting from digitalisation are handled. Our results originally demonstrate that digitalisation and its organisational effects are closely connected to the role that social dialogue can play within an enterprise. Our paper highlights the relevance of considering those two research fields not as separate entities but as two aspects of the fundamental question of how to deal with organisational changes within the companies.

Dr. Mariana Todorova
Institute of Philosophy and Sociology, Bulgarian Academy of Sciences

The Digitalization of Education, the Role of Digital Technologies and Artificial Intelligence in Building of New Soft and Hard Skills

Undoubtedly, narrow artificial intelligence, 3 and 4 printing, virtual and mixed reality, robotics and gameficiation of educational content will contribute to the acquisition of better school and university education. The effect of so-called smart classrooms and academic classrooms, where software artificial intelligence is applied, is already being observed. It contributes to the effectiveness of teaching, strengthens the personal approach, responding to the unique needs of students, administers. All these new methods help teachers and university professors to have enough time and freedom to focus on understanding and adapting students' new knowledge.

It was recently reported that reading books from Amazon on the Kindle device accumulate information about how the reader reacts to the reading. For example, which passages read quickly and which read slowly, which is of particular interest because it has been re-read many times, etc. The same is expected

from educational platforms, which in the future will be able to read even facial emotions so that they can predict whether the content is understood and adapted to the level of intelligence of everyone who uses them.

This type of platform will become universal classrooms or academic / scientific disciplines that can be used by everyone, at an ever-decreasing price or for free. On the one hand, this will contribute to equality of access (even children who do not know languages will be able to use the functions of an instant translator) and will strengthen the perception of the Internet and technology as an era of (free) abundance. But on the other hand, it will strengthen the already started tendencies for the disappearance of the classical forms of education, especially the university one. Fewer and fewer students are physically present in the classrooms and their expectations of the lecture course are becoming more digital. Thus, however, students are deprived of the discussion element, improvisations and brainstorming in the acquisition of new knowledge. Even more valid will be this argument for school education, where the institution has a socializing role and the acquisition of flexible skills, including emotional, cultural intelligence and others.

The new "hard" skills are already:

- STEM
- Entrepreneurship
- Self-initiative
- Reinvention
- Combinatoric

The paper will discuss further what trends will bring "soft skills" to the forefront, which will give new meaning and content to education according to some case studies in American Schools.

SESSION D2

Prof. Mark Levels, Per Bles Maastricht University, **Giampiero Passaretta,** European University Institute, **Reinhard Pollock** Bamberg, **Nora Muller** GESIS Leibniz Institute for Social Sciences

Schools, Educations Systems and the Acquisition of Skills Relevant to the Future of Work.

Technological innovations such as AI and robotization change task composition in occupations in many sectors of the economy. Machines are increasingly able to autonomously perform tasks that were long thought to be exclusively reserved for humans, including reading, writing, recognizing patterns, strategizing, and complex decision-making. Consequently, the task content of many jobs will change and technological innovations will lead to a shift in skills demands on the labor market. It is not completely clear yet which skills today's youth need to acquire to be productive on the labor market of tomorrow, but proficiency in skills that allow future workers to work with, build, or complement machines, are generally assumed to contribute to their productivity and employability. The question remains how such skills are best taught, and what roles schools and education systems play. In this paper we analyze the relationship between education systems and the acquisition of skills that are relevant for one's employability during the Fourth Industrial Revolution. We assess the extent to which education systems and schools in European countries effectively support the acquisition of relevant skills, including (a) information processing skills, (b) creative problem-solving skills, and (c) computer skills. Analyses of these different aspects of skill acquisition, enhancement and utilization in times of accelerated technological change will also address inequality by gender, family context, and ethnic groups. We

examine cross-national inequalities in the acquisition of computing and problem-solving skills by parents' socioeconomic status, ethnicity, and gender. We analyze data from PISA and the International Computer and Information Literacy Study (ICILS), and PIAAC using random slope multilevel analyses with cross-level interactions.

Dr. Nevena Ivanova
Institute of Philosophy and Sociology, Bulgarian Academy of Sciences

Paradigm Shift in Cognition and Education in the Era of Automatization

This presentation is the initial step of a three-year collective project named "REthinking Bulgarian education FOR the 21st century: concepts, Methodologies, practices, players (REFORM)," which investigates the paradigm shift in education due to the advent of digital technologies. In order to understand that shift in depth, this study takes a close view at the historical development of the concepts of cognition and education from their origin in Ancient Greece up to the present day. The historical perspective is considered in light of the evolution of the so-called 'soft technologies' (Serres), namely, the technologies of information and communication, which according to philosophers such as Gilbert Simondon, Michel Serres, Bernard Stiegler and others have direct influence on the processes of individuation (becoming a human) and transindividuation (human institutions and collectivities). Starting with the invention of writing through the invention of the printing press and up to today's digital ICTs, we can recognise fundamental transformations in the principles, according to which knowledge has been produced, verified, recorded, communicated and transferred between generations. Hence, we follow three main paradigm shifts in the theories and practices of cognition and pedagogy. According to Plato's Phaedrus the invention of writing leads to the development of apodictic and universal knowledge, expressed in the Platonic ideas and Aristotle's method of deductive logic. Writing allows memory to open towards eternity (anamnesis) but it is also a pharmakon, which used by the wrong minds can lead to a loss of memory and understanding. Consequently, in Plato's Academy pedagogy serves as a therapeutic practice treading the fine line between mythological initiation and sophists' superficial mastery of the 'techniques of persuasion'. Instead, the Socratic dialogue is a rigorous search for truth grounded in the demonstrative power of geometry (writing) and rational reasoning. Next revolution in cognition comes with the invention of the printing press, which allows the expansion of knowledge and the paradigm shifts of the Renaissance and the Reformation. The result is the new scientific method of induction and experimentation established by Francis Bacon as well as a pedagogy based on the ideas of the Enlightenment and Kantian 'cognitive faculties'. With the printing press we see also the emergence of what Weber has identified as the 'instrumental reason' where contemplative logos turns into industrial technologos. With the advent of digital technologies the technologos reaches its apogee with unprecedented levels of automatization and objectivization of all human cognitive faculties. If writing exteriorizes and augments predominantly the faculty of memory, algorithmic operationality exteriorizes and augments all sensorial and cognitive faculties such as memory, imagination (preemptiveness), perception (computer vision, pattern recognition), and logical reasoning. As the cognitive faculties are transferred to machines, the human being turns into "a man without faculties" (Serres), which opens many pedagogical questions and unrealised cognitive possibilities. These educational questions, possibilities and potential risks are the focus of our project and this presentation. The theoretical framework of the study draws on the ideas of Bernard Stiegler, Katherine Hayles, Michel Serres and Andy Clark.

Prof. Valentina Milenkova South-West University "Neofit Rilski"

Challenges to Digital Education in Contemporary Society

The present paper aims to examine the state of mobile learning in Bulgaria, presenting the policy framework in which the education processes take place, and also to show the various platforms and software products that form the basis of mobile learning and connect individuals regardless of distances or situations. The analysis shows that mobile learning has a place in Bulgarian education and its quality is at relatively high level. Its specifics are related to the technological security, the technical

and methodological training and qualification of teachers, as well as the responsibility of families. A specific case is analyzed - the situation with Covid-19 and how the Bulgarian education system is being restructured in the direction of mobile learning under the influence of the new pandemic conditions. The theoretical and methodological framework is under the national project "Digital Media Literacy in the context of "Knowledge Society": state and challenges", № КП-06-Н25/4, 2018, funded by National Science Fund - Bulgaria.

The main conclusion is that Covid-19 puts Bulgarian education in a situation that requires comprehensive and universal mobile learning, which is in line with the modern knowledge society.

Dr. Michael Kohlgrüber, Clara Behrend
TU Dortmund University, Social Research Centre

Understanding Future Skills for the Digital Transformation

Digitalisation is expected to permeate the entire world of work with far-reaching effects on jobs and work tasks. From a social sciences perspective, it can be assumed that a significant transformation of the world of work will occur and, with changing task composition, demand for skills is deeply changing. The availability of digital and complementary transversal skills, such as social and personal skills, is considered a bottleneck for exploiting the potential of the digital transformation. Early anticipation of future skill demands and improving responsiveness of VET systems is key to tackle the challenges of providing needed skills for the digital transformation.

This paper presents results from a literature review on the demand and supply side of future skills. Based on a BEYOND4.0 conceptualisation of skills for the digital transformation, we show the demand for skills in different categories. These insights have been deepened by interviews with company representatives and stakeholders of regional ecosystems. The same exercise has been done for the supply side of skills, so that current and future gaps between skill demands and skills supply have been identified. Policies related to digitalization in education have been analysed at EU, national, sectoral and regional level and put into context with the identified gaps between skill demand and supply.

The paper presents current policy thinking which is focused on two levels: First, at 'system level´, with overarching targets, strategies, initiatives and programmes in place to mitigate skill gaps, to encourage innovations in education and training, and to address inclusive education. Second, at the ´classroom level´ and ´workplace level´, where individual teachers/trainers, learners and (vocational) schools implement measures to provide the skills needed for the digital transformation. Bridging these two levels, an intermediary level which transfers overarching concepts to the classroom and workplace is often missing or not sufficiently effective.

The paper sketched here outlines policy recommendations to tackle the challenges of digital transformation to improve the responsiveness of VET systems to the changing skill requirements of employers. The role of regional (skill) ecosystem is well reflected here to mitigate gaps between skills demand and supply and thereby contribute to an inclusive education which is currently questioned by obvious risks of digital exclusion.

Svetlomir Zdravkov
Institute of Philosophy and Sociology, Bulgarian Academy of Sciences

Online education and digital inclusion. How different EU countries and their citizens are adapting to the technological change in education?

Every day more and more EU citizens are becoming part of the vast internet networks of knowledge. This process democratizes the access to information, making the non-formal learning a major educational force (Romi & Schmida, 2009). Large ecosystems of digital platforms are making even the

highly specialized knowledge accessible to the general public, students and professionals (Tan, 2013). They are an affordable and a convenient way to obtain new skills, allowing us to keep up with the technological change. As important informational infrastructure, these networks already are having a strategic place in the EU's knowledge economy and information society. Furthermore, such online educational opportunities are considered a way to reduce the educational inequalities between different social groups (Journel, 2007). Online courses and other educational resources are mostly free, which eliminates the financial barriers. They are also asynchronous and could be attended at any given time from the comfort from one's own home. They are anonymous, so no one can be discriminated against, etc.

Nevertheless, the nature of digital space seems to be more suitable for some people and less suitable for others (especially in the context of COVID-19 crisis). Therefore, technological change will affect different social groups and even different societies in a different way (Emanuel, 2013). Due to the uneven rate of adoption of innovations, the introduction of new technologies often leads to an increase of social inequalities (Rogers, 1995). Especially vulnerable to exclusion from digital education are older people, uneducated, emigrants, working manual jobs, etc. (Helsper, 2016).

The aim of the proposed paper is to measure how different social and demographic groups in the EU are (ex)included from/into the digital education in a comparative cross-national perspective. The main research questions are: which socio-economic and demographic groups are adapting slower and which faster to the rapid digitalization of modern education? Do digital technologies are widening or decreasing educational inequalities? How different countries in the EU are managing to include the vulnerable groups into digital education?

To answer these questions, the proposed paper relies on the data from Eurostat's Digital Economy and Society for the period of 2011-2020. The data will be analysed via descriptive statistics, correlation analysis and with more sophisticated statistical methods such as multilevel regression modelling. Considered dependent variables are "doing online courses", "using online learning materials", etc. The scientific analysis and interpretation of the statistical data will be conducted from the perspective of the sociology of education, internet and innovations.

SESSION E.
PLATFORM ECONOMY

Prof. Andrey Shevchuk, Denis Strebkov National Research University – Higher School of Economics, Russia

Digital Platforms And The Changing Freelance Workforce In Russia: A Ten-Year Perspective

This paper traces the development of the online labour market in Russia and across the wider post-Soviet space. The study utilizes the unique data of four online surveys (2009, 2011, 2014 and 2019) conducted on the leading general-purpose platform for creative and knowledge work, operating in the Russian language. The common methodology for collecting and analysing data provides an opportunity to shed light on the dynamics of key indicators over the ten years. The results suggest the diffusion of online freelancing as a novel work model among the wider population, increased the importance of labour platforms, and a subtle trend for the legalisation of largely informal freelance work. The paper discusses the reasons and potential policy implications of these findings for the future development of online platform work in Russia.

Prof. Cecilia Manzo, Prof. Ivana Pais Università Cattolica del Sacro Cuore

Digital Platforms in Welfare Systems: Towards A Typology

The emergence of digital platforms is contributing to thorough transformations in every sector of the economy, as well as other societal domains such as – to name but a few – education, energy, the media and personal services. The birth of several ad hoc notions like “platform logic” (Schwarz, 2017), “platform society” (van Dijck et al., 2018), “platform capitalism” (Langley & Leyshon, 2017; Srnicek, 2017) or, perhaps most aptly, “platform economy” (Kenney & Zysman, 2016; Stark and Pais 2020) is a signal of the novelty of the emerging socioeconomic coordination (Grabher & Konig, 2020).

The rise of platforms initially involved mostly the tourism and transport sectors. More recently, this process has begun to spread into other sectors. and welfare is among them. Yet, the impact of platform on the provision of welfare services is relatively unexplored. This paper address the problem looking at whether welfare platforms present specific elements in interface design, work organization and user involvement compared to platforms operating in other sectors. Our hypothesis is that the platform is not neutral with respect to goods/service they intermediate. In particular, we aim to show that the provision of welfare services has specific features that require the construction of organizational models at least in part ad hoc for the sector (Flanagan 2019; Ticona, Mateescu 2018; Dupret 2017). This requires to move away from the isomorphic logic: development of welfare platforms does not have the same characteristics have been defined in other sectors. Rather, we need to investigate the capabilities of the sector in building its own platform model according to a careful consideration of how platforms intersect with the key specificities of the sector, and namely defense of public values (van Dijck et al 2018). Welfare platforms offer a novel type of welfare service governance and provision that does not replace the ones we know, but how it can support and integrate them, triggering services redesign, and restructuring of organization, and governance.

The paper presents the first results of the WePlat research (Welfare systems in the age of platforms: drivers of change for users, providers and policy makers), focusing in particular on the identification of a typology of welfare platforms.

Denis Strebkov, Prof. Andrey Shevchuk, Alexey Tyulyupo National Research University - Higher School of Economics, Russia

The Geography of the Digital Freelance Economy in Russia and Beyond

The advent of information and communication technologies has fueled the digital freelance economy with millions of independent contractors (freelancers) from all over the world, working for distant clients through online labour platforms. This chapter observes how the Russian language and specific socio-economic factors facilitate a distinct online labour market, that operates across the vast territory of the former Soviet Union and beyond. The data from a leading Russian-language online labour platform shed light on the complex geography of the digital freelance economy in Russia, and some important trends over an almost fifteen-year period. The study contributes to the emerging literature on the geography of the digital labour in the globalizing world.

Mathilde Abel, Prof. Patrick Dieuaide Sorbonne Nouvelle University

Workplace, Socio-Spatial Effects and Algorithmic Management. A Perspective from The Mobility Service Platforms

In the “click economy”, an irreducible part of each person’s work time, activity and leisure time is dedicated to producing and exchanging information. This segment is included in D. Cardon and A. Casilli definition of the Digital Labor (DL). DL is "an eminently cognitive work that manifests itself through an informal activity, captured and appropriated in a market context and relying on tasks mediated by digital devices" (Cardon, Casilli, 2015, p.31, emphasis added).

This contribution proposes to reconsider the meaning and significance of this mediatization dimension attached to the notion of digital labor (DL). The dimension is too often ignored in debates on the impact of digital technologies on the organization and management of labor relations. Indeed, DL is often considered independently, i.e., as an activity carried out by a single user in front of a screen (computer, smartphone etc.), who would work and/or consume services from a digital platform. This approach tends to underestimate the importance of the relationship of "remote co-presence" that underlies DL.

Given that DL is unconcerned by the forms of organization that harbour it and that it can be exercised in a variety of places (public, domestic or professional), the question arises as to how and under what conditions this relationship of "remote co-presence" is mediated and managed by digital platforms.

To discuss the topic, we will use the work of the "labor geography" school, which places great emphasis on the socio-spatial effects of the arrangements initiated by algorithmic governance. We will also mobilize survey material, monographs and field analyses to shed light on the singularity of e-management practices and the behaviors of so called “digital laborers”. These theoretical and empirical approaches will be combined and applied to a case study: the mobility service platforms, such as Uber.

This work aims to understand how the notion of "workplace" is redefined by the temporal and spatial dynamics imposed by algorithmic governance. The aim is to understand how the tension between the formation and management of the customer/driver relationship by the platform algorithm and the specific conditions in which the mobility service is produced and carried out locally is regulated. This approach sheds light on the phenomenon of 'platformization'. First, it reveals a duality in the representations of the platforms' activity that frames a two-poled customer/driver relationship: one 'virtual' and the other one in the field, which is 'real or actual'. Then, it highlights the need for regulation of the socio-spatial effects of this particular functioning mode. A multi-level regulation is suggested for both algorithms and drivers' activity.

Tina Krell, Dr. Nicolas Friederici
Alexander von Humboldt Institute for Internet and Society

"One Strategy Does Not Fit All" – The Role of Foundational Positioning In Platform Competition

While early literature on platform competition emphasized the importance of network effects and winner-take-all strategies, recent studies have highlighted opportunities for differentiation in certain platform markets (McIntyre et al. 2020, McIntyre & Srinivasan 2016, Täuscher & Rothe 2020). In this literature, differentiation is achieved by offering distinct value propositions to users, varying product quality, identity or content/complementor assortments. However, this perspective ignores the political economy that contemporary platform strategy is embedded in. Taking that into account, there seems to be specifically a lacking understanding on competition realities of European platform organizations, and on how they persist and establish themselves in the market. We therefore seek to build theory on how European platform companies incorporate political and societal pressures into their strategy. We analyze the strategies of 10 platform organizations with varying market positions, from various sectors, and with varying emphasis on social sustainability from seven European countries. For that, we employed a longitudinal comparative case study. Over the course of a year, we conducted multiple interviews with each of the platform organizations and analysed secondary data on them. We find that companies adhere to one of three distinct strategy templates: alternative-by-design, social growth, and the reformer. Each template tries to reconcile business and social outcomes but differs in its understanding of viable and desirable scaling paths and stakeholder relationships. Overall, our findings suggest that platform firms' differentiated user-facing value propositions are partially a result of a more foundational positioning in favor or in defiance of the platform capitalist archetype. Thus, we contribute to the platform competition literature, literature on social entrepreneurship, and the broader literature of the platform economy in the management and organisation studies.

SESSION F.
WORKING CONDITIONS IN THE CONTEXT OF DIGITAL TRANSFORMATION

Dr. Gábor Mélypataki, University of Miskolc

How Can The Human And The Collaborative Robots Work Together? – Legal And Theoretical Aspects

New technologies are changing classic relationships. In this field, the direction of technological change and the protection measures ordered due to COVID-19 point to the same direction. Technological changes primarily strive for the replacement of human manpower, and the measures due to the virus primarily promote people to stay at home. It is possible that a conditional reflex will develop in people till the disappearance of the virus, if it will ever disappear, and it will be related to the increase of personal distance (in space and time as well).

One of these technologies is robotization and automation. Most of the industrial sectors are significantly building on robot work. Nowadays, the functions of robots are only auxiliary functions. Robots function as such tools that perform certain processes alone, making the employees' tasks easier. The role of robots will be more and more important in the economic system. In my opinion, robotized working activities will be extended to a greater part of the labour market. Using robots is primarily typical in industrial sectors in order to help or replace physical work. Robots are changing not only the relationship between the classic employee and employer, but the whole labour relation and labour market as well. One main effect of robotization and automation will be collective reductions. This process can be expected even if those analyses become right which say that the expansion of employment can be expected by using AI and robotization.

Two significant directions of the automation of certain jobs could be distinguished. In one case, using cooperative robots will strengthen the systems created by the harmony of mechanic and human manpower within a short term. In the other case, the aim will be the real automation to create such systems that are closed working processes without humans. The first process will primarily influence the labour law issues, the second one will primarily influence the processes on the labour market. On this basis, I would like to analyse the legal and social frames of automation of work through the glasses of one of the greatest and most influencing events of our lives nowadays. Nevertheless, I would like to point it out that this study does not contain the name of the virus defining our days with an impact hunter aim, but because, in my opinion, it will really influence the robotization and automation of work

In my paper I would like to highlight the role of the collaborative robots. As Freeman emphasizes: "Robotization, like past technological changes, can be a very good thing, relieving the workload of humans while helping overcome the many challenges the world faces." Nevertheless, it can have effects on humans as well, sharing societies. In this shared society, the owners of the robots are on one side and employees competing with robots are on the other.

One of its aspects is the relation and collaboration between cobots and human manpower, which should be examined in the light of Freeman's statements. Collaborative robots and employees are not just cooperative mates, but they are competitors from a certain point of view as well.

Methodology: The use of robots and cobots has already been implemented by several employers. We can therefore highlight existing examples in the research. I would also like to look at the legal design within the framework that has been developed. I will also try to give an answer and analyse the situation.

Chantal Cucchi Fuhrer Université de la Réunion, **Ludivine Martin** Center for Research in Economics and Management, **Dr. Laetitia Hauret** Luxembourg Institute of Socio-Economic Research (LISER)

Digitally Transformed Work from Home Impacts on Job Satisfaction, Job Stress and Job Productivity. COVID-19 Findings

The pandemic lockdown has shaken the relationship to work, in time, space and form, for an important part of workers. The main adaptation to this shock was working from home (Adams-Prassl et al., 2020; Alipour et al., 2020; Dingel and Neiman, 2020). The definition of working from home adopted for this research involves working away from the traditional office, with the help of computers or other technological facilities to maintain a link to the office (e.g. Bélanger and Allport, 2008; Hopkins and McKay, 2019). If studies on working from home antecedent and outcomes are numerous (e.g. Barrero et al., 2020; Felstead and Reuschke, 2020), research shows little on how its use and appraisal take place. In this paper, we aim to understand the impacts of a digitally transformed work from home on the evolution of employees' subjective well-being (job satisfaction, job stress) and job productivity between before and during the first lockdown of spring 2020.

We do an empirical analysis based on the first wave of the 'COVID-19 Socio-Economic Impacts (SEI) survey' conducted by LISER and the University of Luxembourg with the support of the Luxembourg National Research Fund. The data were collected between the end of May and the beginning of July 2020 with questions regarding before, during and after the lockdown induced by the COVID-19 health crisis in spring 2020. Our sample covers around 450 employees of the luxembourguish labour market.

We start by identifying profiles of teleworkers according to the evolution of their use of four collaborative and communication digital tools comparing before and during the lockdown. The studied digital tools are those that were adopted to compensate for the lack of face-to face interactions: web conference, instant messaging, platform for documents sharing (groupware) and process automation tools (workflow). In order to classify teleworkers usages, we use a multiple correspondence analyses (MCA) followed by a hierarchical cluster analysis. Second, we investigate, by conducting an ordered Logit model, the relationships between the digital profiles of teleworkers and the evolution of employees' subjective well-being (job satisfaction, job stress) or job productivity induced by the lockdown.

Our main results show that the most satisfied and the less stressed profile of teleworkers is the one that daily use web conference that appears so to compensate for the absence of face-to-face interactions. On the contrary, a daily use of the four studied collaborative and communication digital tools during the lockdown seems to generate too much information to deal with and the teleworkers may be subject to information overload and work interruptions that reduce their job satisfaction. Our results have theoretical and managerial implications for the future of the digitally work from home.

Dr. Luuk Collou, Milan Wolffgramm MSc, Koen Nijland, MSc, Tom Tijink, MSc, Ronald van den Hoek, PhD Saxion University of Applied Sciences

The Challenge of Joint Optimization. Human Centered Technology Implementation in SMEs

Human-centered implementation of industry 4.0 technologies, in which joint optimization between the social and technical system is achieved (Johnson, 2014; De Sitter, Den Hertog, & Dan, 1997), is an important prerequisite to increase the production flexibility and productivity of SMEs (Frank, Dalenogare, & Ayala, 2019). However, several implementation challenges emerge. Industry 4.0 technology affects the required employee skills and approach to employee management (Longo, Nicoletti, & Padovano, 2017). In addition, industry 4.0 technology creates the need to redesign production processes (Koh, Orzes, & Jia, 2019). Furthermore, technological readiness of SMEs seems

limited (Mittal et al., 2019). Modern social technical systems theory (De Sitter, Den Hertog, & Dan, 1997) and workplace innovation literature (Rus, Oeij, Pot, & Totterdill, 2019) provides input to increase technology implementation effectiveness such as enabling decentralized employee decision and design latitude. Nevertheless, implementation in SMEs remains slow.

Here, we explore and specify those technological, social and production challenges apparent to SMEs implementing industry 4.0 technology. We do so by using two samples: (1) a set of 10 SMEs with ambitions to implement industry 4.0 technology, and (2) a set of 13 SMEs that started implementing specific industry 4.0 technology (collaborative robot arms). A qualitative semi-structured interview method was applied in both samples.

Results verify the apparent social challenges; while SMEs with ambitions to implement new technology acknowledge the importance of decentralized employee decision latitude, this decision latitude was limited in SMEs implementing technology as, for example, engineers and managers decided over the task allocation between operator and the collaborative robot arm. In addition, needed employee skills change; employees increasingly need technical and digital skills and require a more holistic understanding of the production process. Furthermore, operators perceived their work to be more complex once new technology was implemented while training to work with this new technology was limited. The perceived challenges in production varied as some respondents did not expect major changes while other did foresee restructuring of, for example, the physical layout of the production floor. In addition, perception of technological challenges showed that readiness for industry 4.0 technology is limited, as for example, the data needed for the creation of augmented reality applications is not readily available within these companies.

As SMEs struggle to reap the benefits of industry 4.0 technology given the social, technological and production challenges, and the need for human-centered implementation, we present a systematic framework for human-centered technology implementation in SMEs that addresses those challenges based on the results of this study and prior research.

Dr. Olga Chesalina Max Planck Institute for Social Law and Social Policy

From the Right to Disconnect To Mental Health and Wellbeing at Work in the Digital Age

Digitalization has a strong effect on how work (salaried but also independent) is organized and fulfilled. Advanced digital technologies have contributed to blurring boundaries between working time and rest time, intensification of workload, long working hours and work-related stress. The EU seeks to address this challenge in different initiatives.

The goal of this paper is threefold: to analyse existing legal regulations and non-binding policies as well as the recent legislative proposals concerning the regulation of working conditions, psychosocial risks, mental health and wellbeing at work; to find out whether a systematic approach concerning working conditions, including prevention of work-related stress already exists at the EU level and when not – to define gaps in the regulative framework und to elaborate proposals in the field of labour and social law in order to address the challenges of technology-related stress. The paper takes an interdisciplinary approach focusing on the interrelation between labour and social law taking into account numerous empirical studies on this issue.

The starting point of the paper is the Resolution of the European Parliament with recommendations to the Commission on the right to disconnect which was adopted on 21 January 20021. Among measures implementing the right to disconnect the proposed Directive mentions health and safety assessment, including psychosocial risk assessments. However, the proposed Resolution seeks to regulate only one aspect of working conditions – the length (limitation) of working time. The Resolution does not address other challenges posed by the application of digital tools, including ICT, for work purposes, namely

intensification of work, discrimination and (long-term) surveillance by means of digital tools, isolation due the use of digital technologies and remote work. The Framework Directive 89/391/EEC on Safety and Health of Workers at Work that asks employers to ensure workers' health and safety in every aspect related to work, does not explicitly mention the terms 'psychosocial risk' or 'work-related stress'. The European Pact for Mental Health and Wellbeing of 2009 called on the European Commission to issue a proposal for a Council Recommendation on Mental Health and Well-being which was not elaborated until now. It seems that European legislation until now lacks a holistic approach concerning prevention of technology-based work-related stress and a uniform concept concerning psychosocial risks and mental health in employment relations.

CV: Olga Chesalina graduated in 1998 from the Law Faculty of the Belarusian State University; in 2002, she completed her doctoral thesis; in 2005, she received the academic title of "Associate Professor". From 1998 to 2006, she taught at the Law Faculty of the Belarusian State University. Since 2008, she has been working at the Max Planck Institute for Social Law and Social Policy, Department of Foreign and International Social Law. She has authored over 90 articles in English, German and Russian and gave presentations at numerous international conferences. Her research interests are focused on labour law, social law and comparative analysis. She was co-editor of the book "Die Verantwortung des Arbeitgebers für den sozialen Schutz in Russland [Employers Responsibility for Social Protection in Russia] and of the book "Social Law 4.0: New Approaches for Ensuring and Financing Social Security in the Digital Age" published by Nomos in 2018 and 2021.

Dr. Gabriele Wolff University of Applied Sciences Koblenz, **Patrick Thill Luxembourg** Institute of Socio-Economic Research (LISER)

Assessing the Psychological and Social Impact by Applying Human-Centered Approaches to Implementing Digital Technologies in Companies: A Comparative Study of the Industry Sector Germany and Luxembourg

The objective of the research is to study critically the implementation of digital tools (e.g. exoskeletons, 3D glasses) and their impact on working conditions and employee welfare in the industry sector in Germany and Luxembourg. Technological change, digital transformation and the emergence of new forms of work have increased over the last years (Meil and Kirov, 2017; Frey and Osborne, 2017) in tandem with enhanced and intricate daily human-machine interaction. In this context, a range of new possibilities have emerged to make workflows safer, less exhausting and resistant to external and unpredictable developments (e.g. pandemics and economics crises). The introduction of digital tools due to increased efforts to respond to a growing demand for human-machine interaction has led within companies of the industry sector to either increased replacement of employees in their jobs, to support employees through assistive technology and to the amendment of human capabilities by complementary technology. In contrast, companies have already mobilised prevention strategies such as participative and collaborative tools (e.g. model psychological safety) to create understanding and acceptance of these technologies among their employees (Rock, 2008; Petry, 2019; Edmondson, 2020; Wolff, 2021).

Based on empirical evidence from a total of 40 semi-structured interviews with employees of different strategic and hierarchical levels in 10 larger and smaller companies in Germany and Luxembourg, we examine the psychological and social impact of the proactive and transparent introduction of digital tools and their long-term acceptance by employees within the studied companies. We assess if an early active involvement of employees in the decision process is perceived either as a negative experience (e.g. stress, pressure) or if it is rather felt as an improvement entailing a learning process for employees. We argue that an anthropocentric approach enhances a socially embedded and anthropomorphic technology, which increases employee welfare at the company level. Willingness for the acceptance of change for both employers and employees should therefore be proactively fostered. Finally, we provide recommendations and establish a conceptual framework of how employee welfare and working conditions can be improved in the longer run by applying human-oriented measures based on psychological and neurobiological research (Hüther, 1997, 2009; Liebermann, 2013).

SESSION G.
ECOSYSTEMS AND DIGITAL TRANSFORMATION

Antonius Schröder TU Dortmund University

Sectoral Skills Alliances and Strategies: Industry 4.0 needs Work 4.0

The European Twin Transformation (digital and green) and Industry 4.0 development needs to be aligned with the short-termed adjustment of new skills demands. Furthermore, the focus has to be switched from the technological to a human-centred perspective (Industry 5.0). Economic and technological developments, as well as increasing energy efficiency and environmental demands, present the European (and global) Process Industry with many challenges, not least of which is to continuously update the qualification, knowledge and skill profile of the workforce. Based on the empirical results of two large scale Erasmus+ funded sectoral Blueprints (Steel Industry: ESSA www.estep.eu/essa ; Industrial Symbiosis: SPIRE-SAIS, www.spire2030.eu/sais) within the New Skills Agenda of the European Commission, industry driven, sustainable and coordinated proactive skills adjustment strategies and alliances address the aforementioned challenges in immediate and enduring ways. This is done in a social innovation process involving a broad range of about 40 key stakeholders in each of the two Blueprints: companies, education and training providers, research institutions, social partners (European and national sector associations and trade unions) - establishing a movement from the sector for the sector. Presenting the results of technological foresight and skills assessment surveys, new European-regional training approaches and tools are leading to Blueprint Prototypes so far (e.g. by combining Online and Regional Training Ecosystems). Industry skills demands and challenges, focused particularly on the workforce, are combined with new training frameworks, government structures and alliances, integrating also possible support structures of different VET systems (Germany, Italy, Poland, Spain, and UK). The core objective is the foundation of a sustainable industry driven and run Skills Alliance and Blueprint Strategy to develop human-centred approaches necessary to sustain a competitive industry, which is digitally upgraded, environmentally responsible and promotes sustainable growth, innovation and the creation of highly skilled jobs.

Dr. Kars Mennens Maastricht University, **Dr. Paul Preenen** TNO

A Conceptualization of Public-Private Learning Communities for technological transformations and beyond

Various global trends and developments, such as technological breakthroughs and digital disruption, demographic shifts and the current challenges as a result of the COVID 19 pandemic, affect the Future of Work. These poses a major challenge to both public and private stakeholders in terms of how employees can be enabled to work, learn, and innovate to prepare for the Future of Work. To cope with this challenge, public and private stakeholders increasingly have to collaborate and exchange knowledge.

However, little is known about how such interorganizational collaboration can be organized. In this paper, we build on constructs related to situated learning theory to define and conceptualize Public-Private Learning Communities as a promising organizational form in which public and private partners can collaborate to prepare employees for the (digital) Future of Work. Specifically, we build on and extend constructs such as Communities of Practice, Professional Learning Communities and Innovation Networks to introduce the concept of Public-Private Learning Communities, which we define as *a public-private alliance with a certain structure, culture, and process, consisting of members who regularly interact to achieve a common goal in the context of learning, work and innovation*. Next to this, we propose an explorative, overarching conceptual framework of its building blocks through combining concepts from various scientific disciplines related to social learning systems and innovation communities.

By constructing this novel conceptual framework, we make several contributions to theory and aim to inspire researchers to further investigate the concept. Besides offering contributions to theory, we also provide practitioners and policymakers with hands-on support in designing, preserving and developing Public-Private Learning Communities that help to prepare employees for the challenges related to the Future of Work.

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Gabriel Möwis, Dirk Stegelmeyer Frankfurt University of Applied Sciences,
Bieke Struyf, Paul Matthyssens Antwerp Management School,

Leveraging ecosystem partnerships for Industry 4.0-enabled value creation: A Delphi-study

The goal of this study is twofold: 1) to boost understanding in how manufacturer's ecosystems can be leveraged for Industry 4.0 enabled value creation and 2) to enhance insight into the characteristics of relationships that make up Industry 4.0 ecosystems.

A Delphi study was used in which academics, industry experts and practitioners reflected on the current and desired future 1) role of ecosystems for Industry 4.0 enabled value creation, 2) characteristics of Industry 4.0 ecosystem relationships.

Intermediary results show that ecosystems can facilitate the implementation of Industry 4.0 technology in the back end and the front end of organizations. In the back end, ecosystems support digitalization of production- and supply-oriented processes, whereas in the front end, they facilitate the development of customer-centric processes and the provision of new digitally enabled offerings to customers. It also appears that ecosystems actors form close alliances based on trust.

The developed and tested typology on Industry 4.0 ecosystems can be used by ecosystem researchers for future studies to further explore how the different types of ecosystems emerge, evolve, and collaborate. Additionally, they may facilitate cross-case comparisons, something which has been significantly hindered in the past following the fuzzy nature of the ecosystem concept and the lack of specification of partners involved in ecosystem case studies. Practitioners may benefit from our insights to learn about different strategic options to create and capture value for their customers with digital solutions and how to manage the emerging partnerships.

Mirella Schrijvers University of Utrecht

Entrepreneurial Ecosystems: Metrics, Configurations and Outcomes

Despite the popularity of the entrepreneurial ecosystem approach in science and policy, there is a scarcity of credible, accurate and comparable metrics of entrepreneurial ecosystems. This is a severe shortcoming for both scientific progress and successful policy. In this paper, we bridge the entrepreneurial ecosystem metrics gap. We operationalize the elements and outputs of entrepreneurial ecosystems for 273 European regions using various sources of statistical data and novel data collected with web scraping. The ecosystem elements show strong and positive correlations with each other, confirming the systemic nature of entrepreneurial economies and the need for a complex systems perspective. Our analyses show that physical infrastructure, finance, formal institutions, and talent take a central position in the interdependence web, providing a first indication of these elements as fundamental conditions of entrepreneurial ecosystems. The measures of the elements are used to calculate an index that approximates the quality of entrepreneurial ecosystems. This index is robust and performs well in regressions to predict entrepreneurial output, which we measure with novel data on productive entrepreneurship.

After creating robust metrics of entrepreneurial ecosystem elements, we apply Qualitative Comparative Analysis to study the configurations of successful entrepreneurial ecosystems in Europe. We test two rivalling causal logics: one stating that all entrepreneurial ecosystem elements need to be present and the weakest link is the most important constraint, and the other arguing that elements are substitutable. Our findings indicate that high entrepreneurship outputs can be realized with different entrepreneurial ecosystem configurations. However, focusing on regions with the highest entrepreneurship outputs, our results point at the importance of an all-round entrepreneurial ecosystem. The entrepreneurial ecosystem approach and the metrics we present provide a lens for public policy to better diagnose, understand and improve entrepreneurial economies.

Finally, we reflect on the output and outcomes of the entrepreneurial ecosystem. Entrepreneurial output was measured with the number of innovative new firms, a measure of productive entrepreneurship which is strongly linked to economic growth. Economic growth has however been criticized as a measure of welfare. Therefore, we propose to focus on the contributions of firm to wellbeing instead, building on a stakeholder capability approach. This raises the question whether firms that create economic growth also create societal value and provides important directions for future research. The answers could inform policymakers looking to steer on wellbeing goals instead of GDP.

Clare Hildebrand, Prof. Hans Christian Garmann Johnsen
University of Agder

Beyond the Human-Machine Dichotomy: Dialogical development in the age of digital transformation

In a world that expects progression and development, as well as demands sustainability and efficiency, industry is desperately dependent on innovational solutions. Some mega-trends seem to drive this process. In particular, new digital technology plays an important role. The workplace is being increasingly altered by the digitalization of communication and daily tasks, meaning that the need for effective knowledge development processes is apparently essential for the achievement of industrial innovation excellence. The hegemonic focus of innovation discourse considers technological and business innovation, tending to forget that the human and social elements are central to the optimal utilization of digital and entrepreneurial solutions.

In this conceptual paper, we will investigate how the dialogical concept of industrial workplace development can assist the consideration of the human side of innovation. For this purpose, we present a typology of approaches to the Human-Machine Dichotomy, looking at workplace innovation from a phenomenological as well as a positivistic perspective. We argue that in order to acknowledge the potential for dialogue-based development it is essential to establish a framework that allows to understand how the all-encompassing nature of new digital technology can be reconciled with organizational and managerial practices, subsequently creating industrial innovation excellence.

CONFERENCE ORGANISERS

INSTITUTE OF PHILOSOPHY AND SOCIOLOGY – BULGARIAN ACADEMY OF SCIENCES

The Institute of Philosophy and Sociology at BAS (IPS-BAS) – former Institute for the Study of Societies and Knowledge at BAS (ISSK-BAS) was founded in July 2010 by decision of the General Assembly of the Academy as the successor of the Institute for Philosophical Research, of the Institute of Sociology, and of the Centre for Science Studies and History of Science.

The Institute conducts complex theoretical and empirical, fundamental and applied, philosophical, sociological, and science-studies-related research on knowledge, values, Man and society, in accordance with the academic, national, and European criteria and world trends in science, and trains highly qualified specialists in the academic disciplines of philosophy, sociology, science studies, and their sub-divisions. This is a unique institution, the priorities of which are research and analysis and interpretation of research, combined with post-graduate training (provided by the Institute alone or jointly with similar university departments), popularizing of ideas and results, continuance and further development of the analysis of classical and topical fields of social knowledge, such as epistemology and history of philosophy, philosophy and sociology of social structures, and many other fields of major significance for the sustainable development of Bulgarian society, for social progress and for the enhanced prosperity of society.

BULGARIAN ACADEMY OF SCIENCES

The Bulgarian Academy of Sciences is the leading scientific, spiritual and expert center of Bulgaria. It conducts research, training and activities of national and international importance and solves problems related to the development of Bulgarian society and state.

The Academy has a consistent policy for the development of science and innovation as a condition for economic progress in the country. It is an active participant in the European Research Area.

Today, BAS comprises 42 autonomous scientific units and is an organization governed in accordance with democratic principles. The Academy employs about 3,000 scientists, accounting for about 15% of those engaged with science in Bulgaria. BAS produces about half of the scientific output in the country.

EUWIN

The European Workplace Innovation Network (EUWIN) was created in 2013 at the request of the European Commission (DG GROW). It was initially led by TNO and Workplace Innovation Limited (now Workplace Innovation Europe CLG).

The network's aim since then has been consistent: to promote the concept of workplace innovation throughout Europe as a way of enhancing capacity for product, service and process innovation, increasing business competitiveness and creating better working lives for our citizens.

EUWIN grew rapidly as did its impact, reaching over ten thousand people and companies through conferences and workshops. Hundreds of thousands found inspiring cases, articles and evidence on the Knowledge Bank curated by Workplace Innovation Europe CLG. Hundreds of experts and collaborators pushed the message across to thousands of companies all over Europe. EUWIN also guided the development of major new policy initiatives for workplace innovation in the Basque Country, Scotland and elsewhere.

European Commission funding ran out at the end of 2017 but since then EUWIN has functioned as a network run by its partners, supporting activities in several countries and promoting the further development of workplace innovation in European policy frameworks.

EUROPEAN SCHOOL OF SOCIAL INNOVATION

The European School of Social Innovation was founded in October 2011 in the aftermath of the first global scientific conference on social innovation: Challenge Social Innovation, held in Vienna, 19-21 September 2011. The conference adopted the Vienna Declaration on the most relevant topics of social innovation research. In its introduction the declaration stipulates:

"The tracks of international research on innovation demonstrate that the technology-oriented paradigm – shaped by the industrial society – does not cover the broad range of innovations indispensable in the transition from an industrial to a knowledge and services-based society: Such fundamental societal changes require the inclusion of social innovations in a paradigm shift of the innovation system."

Based on this assertion, the European School of Social Innovation was formed to assist and enhance a holistic concept of innovation: The predominant economic values of innovations in business and technology, revaluated by accounts on their social dimensions regarding origins and impact, shall become associated with societal values of social innovations in public, business and civil society sectors."

ORGANISING COMMITEE

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Sofia, September 2021