

SkillShift

Future-Proofing the Workforce

8:30 **Registration and Coffee**

9:00 **Welcome Address**

Moderator: Christian Odendahl (European Economics Editor at *The Economist*)
Michael Hinterdobler (Director of the Representation of the Free State of Bavaria to the European Union)

Christian Odendahl, European economics editor at *The Economist*, covers Europe's economic integration, monetary and fiscal policies and broader economic trends. He holds a PhD in economics from Stockholm University.

9:15–10:45 **TECH AND TALENT: BALANCING TECHNOLOGY ADOPTION AND EMPLOYEE SKILLS**

Emerging Digital Automation Technologies and the Future of Work. A Reappraisal

Maria Savona (University of Sussex and Luiss University)

A systematic review of the technical literature helps to unpack the characteristics of families of technologies and how they interact with humans, providing a fine-grained perspective of the relation between digital technologies and human tasks.

Automation technologies, including within the same family, are fundamentally heterogeneous in their design and the tasks they can execute. Robots, for instance, are designed more to substitute workers than to complement them, while data-intensive technologies are consistently more complementary to humans, and more pervasive in services than in manufacturing.

The number of sectors exposed to most digital automation technologies is still relatively small, but it is expanding. The evidence calls for policy to extend its focus from robots to other, more pervasive, forms of automation.

Maria Savona is Professor of Applied Economics at the Department of Economics and Finance at LUISS University, Rome, and Professor of Economics of innovation at SPRU, Science Policy Research Unit at the University of Sussex, UK. Her research focuses on the effects of technical change and innovation on employment, industrial policy, and the sectoral composition of economies. She also works on the economics and governance of data.

Employing AI Algorithms to Analyse Online Labour Market

Fabio Mercorio (University of Milan-Bicocca)

Today, algorithms that analyse complex phenomena and make decisions are embedded in many applications and services of our everyday life. This also applies to the online labour market, where machine learning is used to understand occupations and skills and predict future trends.

To this end, we used millions of Online Job Advertisements (OJAs) provided by the Cedefop Agency, related to France, Germany, Italy, the Netherlands and the UK, to derive insights into designing and implementing novel machine-learning and language models to predict the future pervasiveness of Soft, Hard-Non-Digital and Digital skills across occupations; to estimate the similarity among skills and quantify the proximity of novel skills to existing ones; and to identify novel technology-related jobs revealed by online labour market demand.



Fabio Mercurio is Associate Professor of Computer Science and director of Master in BI and Big Data Analytics at the University of Milano-Bicocca. He holds a PhD in Computer Science and Application from the University of L'Aquila. His research interests mainly include Artificial Intelligence and Data Science. He has been involved in many research projects on how AI and Big Data can support decision-making, especially as regards the labour market. In 2019, he received the first prize at the YoungTalentAward.

Automation, Productivity, and Skills:

Investing in Human Capital for a Technology-Driven Future

Tera Allas (Director of Research and Economics at McKinsey UK and Ireland Office)

Sluggish productivity growth, combined with an ageing population, is slowing down growth in many economies, especially in Europe. In this context, the potential for digital applications, automation, and AI to boost productivity growth is enormous. For businesses, this could mean both increased revenues—with products and services better tailored to consumers' needs—and reduced costs, as raw materials, intermediate products, labour, and capital are used more efficiently. Moreover, the latest generative AI technology appears to boost productivity most for lower-skilled individuals, with the possible prospect of reduced labour market polarisation.

However, many barriers still hinder productivity-enhancing investment and widespread technology adoption. Uncertainty about demand dampens risk-taking and long-term investment. Skills shortages, already acute, could get worse. Retraining and upskilling is likely required across both essential workforce skills as well as various knowledge and occupational specialisms. Incentives for individuals and organisations to invest more creatively in human and organisational capital need to be sharper. Better leadership and management skills—and ambition—could be a key to unlocking such investment.

Tera Allas is Director of Research and Economics at McKinsey's United Kingdom office. She leads McKinsey's research on the macroeconomic outlook, bringing together more than three decades of experience in strategy, corporate finance, economics, and public policy. She serves as chair of The Productivity Institute's Advisory Committee, trustee of the Royal Economic Society, and trustee of Be the Business. Previously, Tera was chief economist in the UK's energy, transport, and business departments and deputy head of the UK Government Economic Service. In 2018, she was appointed Commander of the Order of the British Empire (CBE) for services to economic policy.

Panel Discussion

10:45–11:15 **Coffee break**

11:15–12:45 **FROM LEARNING TO EARNING: WORKFORCE TRAINING AND RESKILLING**

Training and Automation Risk

Oliver Falck (ifo Institute)

How can training mitigate workers' exposure to automation and help workers adapt to technological disruptions? To shed light on this question, we used granular individual-level data on job tasks across 32 countries, including 17 European ones. A unique measure of automation risk at the individual-level unveiled substantial variation within occupations. Notably, even within narrowly defined occupations, workers who received training have a 4.7-percentage-point lower risk of being automated away, corresponding to a 10% reduction in the mean automation risk across the sample. Additionally, training increases wages by 8% and benefits both younger and older workers equally. These findings underscore the crucial role of training in enabling the workforce to adapt and thrive amidst evolving technological challenges.





Oliver Falck, Director of the ifo Center for Industrial Organization and New Technologies, holds a professorship in Economics, specialising in Empirical Innovation Economics, at the University of Munich (LMU). Additionally, he is the Scientific Program Director at the CESifo Research Network and is a member of the Commission of Experts for Technological Sovereignty at the German Ministry of Education and Research, and serves as the scientific coordinator of the Pillars consortium. His primary research areas encompass Innovation Economics, Economics of Digitalisation, Regional and Urban Economics, and Empirical Economics.

Skills of Early-Career Workers: Measurement and Labour-Market Returns

Simon Wiederhold (Halle Institute for Economic Research)

Vocational education, which typically imparts skills early in a person's career, can have a long-lasting positive impact on workers. Codification of skill type and duration of learning under the German apprenticeship system makes it possible to identify 13,000 narrowly defined skills imparted by apprenticeships, grouped into six categories: cognitive, social, digital, manual, management, and administrative. Merging this dataset with administrative labour market data covering almost three decades reveals the economic value of workers' early career skills over their working life.

Workers who start their career with higher cognitive, social, or digital skills earn significantly higher wages over long-run horizons, partly thanks to skill complementarities: workers who simultaneously acquire cognitive and social skills during apprenticeship are particularly valuable on the labour market, while skill-technology complementarities, i.e., workers with higher cognitive skills, tend to earn higher wages. These benefits have risen substantially over the past 30 years, evidencing the value provided by vocational education.

Simon Wiederhold is Professor of Labor Economics at the Martin Luther University Halle-Wittenberg and Senior Research Advisor at the Halle Institute for Economic Research (IWH). He also serves as ifo Research Professor and is affiliated with CESifo, IZA, and ROA. Simon's main research interests are labour, education, and behavioural economics. Lately, much of his work deals with inequalities in the education system and the future of the labour market. He is also engaged in policy consultancy work for the European Commission, government authorities, and several foundations in Germany.

Training and Reskilling in the Labour Market

Sandra McNally (University of Surrey)

Sandra McNally is a Professor of Economics at the University of Surrey and Director of the Education and Skills Programme at the Centre for Economic Performance, London School of Economics. She also heads the Centre for Vocational Education Research. Her research interests include economic evaluation of government policies in schools and further education, and labour market returns to education and training. She is a co-editor of the *Economics of Education Review*.

Starting with a short overview of the context in which training and re-skilling is needed (such as automation, digitisation, transition to Net Zero), discussion turns to what skills are in demand (including evidence on returns) and why government support may be needed to incentivise firms and individuals to invest in training. The presentation will also consider evidence on such policies and will include some reference to relevant Pillars research as well as to the wider international literature.

Panel Discussion



12:45–13:45 **Buffet Lunch**

13:45–15:15 **MECH TO TECH: AUTOMATION AND THE REDESIGN OF THE EUROPEAN LABOUR MARKETS**

Exposure of Industries and Occupations to Emerging Automation Technologies. Implications for the Future of Work

Tommaso Ciarli (UNU-MERIT, United Nations University and University of Sussex)

Identification of emerging digital automation technologies is critical to understanding the changing patterns of work, firm and industry organisation, and labour demand, and thus formulating policies to mitigate risks while harnessing their benefits. Analysing a large corpus comprising millions of patents and scientific publications related to automation technologies, we identify emerging technologies and propose a methodology to combine machine learning methods with state-of-the-art sentence transformers from the field of computational linguistics. In this way, we identify six patterns of technological and scientific development that provide a better understanding of which digital automation technologies are likely to emerge in the near future, and which have matured.

Next, we combine expertise from hundreds of sources to make predictions about which automation technologies will become prevalent by 2030, which tasks they will perform, and what skills they will replace. Then, using the semantic connection between patents and publications documenting emerging digital automation technologies and descriptions of industries and occupations, we find that technicians and professionals are also highly exposed to digital automation technologies, with managers positioned in the middle of the exposure distribution.

Tommaso Ciarli, Senior Researcher in Economics of Innovation at UNU-MERIT, United Nations University, and SPRU, University of Sussex, focuses his research on economic growth, innovation, and technology-driven change, and their effects on employment, productivity, and sustainable development. He has led research on a wide range of associated topics, ranging from computational models of economic development, structural change and inequality through modelling sustainable transitions to estimating the impact of violent conflict on economic activity. He has advised governments and international organisations and holds a PhD in Economics and Industrial Development from the University of Birmingham and the University of Ferrara.

Future Regional Labour Markets in Europe: Automation, Global Value Chains and Skill Dynamics

Deyu Li (University of Utrecht)

The increasing penetration of artificial intelligence and robots is likely to have a massive impact on regional labour markets, with the skill portfolios of occupations changing as a result of their exposure to such technologies, along with the types of work arrangement. Many empirical studies offer mixed evidence of such an impact. We argue that regional capabilities play a crucial role in the capacity to cope with the challenges of these technologies. The new skills and jobs that require such skills are more likely to emerge in regions with complementary skills and occupations, which are more likely to seize the opportunities brought by automation, whereas regions without such capabilities will likely experience slow or even negative employment and wage growth, and high risk of unemployment. These results have important policy implications for achieving inclusive regional development in Europe.

Deyu Li is an assistant professor at the Department of Human Geography and Spatial Planning of Utrecht University, and an affiliated research fellow at the University of Cambridge Centre for Environment, Energy and Natural Resource Governance (C-EENRG). His research focuses on digital transitions and their impact on green and inclusive regional development, with an interdisciplinary approach. He has been working on the Pillars' Pathways to Inclusive Labour Market project as a postdoctoral researcher since January 2022. He became an assistant professor in October 2023.

Good Practices of Inclusive Labour Market Policies in Europe

Tatjana Guznajeva (Technopolis)

Policymakers need to address three labour market factors simultaneously—job creation, job displacement, and job transformation—to ensure inclusive labour markets during technological transformation. This calls for a comprehensive, coherent and inclusive employment strategy, the success of which relies on leadership at the levels of policy design and policy implementation.

Policy approaches differ across regions, based on levels of economic development, but all instruments for job creation involve collaborative frameworks that stimulate synergies, connectivity and inclusion. Technology-enabled job creation may enhance short-term inclusion of vulnerable groups in the labour market, but it rarely leads to long-term inclusion unless it is closely related to upskilling/reskilling. This calls for a transformation of the education and training system, and development of evidence-based, forward-looking active labour market policies. It also requires effective tripartite co-operation between trade unions, employers' organisations and the government.

Tatjana Guznajeva is a senior consultant at Technopolis Group, an international public policy consultancy. She specializes in the analysis and evaluation of policies in the fields of education, skills, and employment. Tatjana provides advice for international, national and regional public bodies in the EU and beyond, and leads the “Higher Education and Skills” business development group at Technopolis (Amsterdam office). Previously, Tatjana worked for the British Red Cross and the International Labour Organization. Tatjana holds a MSc in Public Policy and Human Development from the United Nations University and Maastricht University.

Panel Discussion

15:15–15:30 **Closing Remarks**

Oliver Falck (Pillars Coordinator and CESifo Programme Director)

15:30 **End of Conference**