

REPORT OF THE **HIGH-LEVEL
EXPERT GROUP** ON

The Impact of the Digital Transformation on EU Labour Markets



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EU LABOUR MARKETS**

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FOREWORD

Brussels, 8 April 2019

Digital transformation, including but not limited to advancements in Artificial Intelligence and automation, is having an impact on the way we live and work in Europe, but also globally.

We strongly believe that this transformation is a net positive for European citizens. But it would be naive to think that there are no downsides to it. We need to ensure that the benefits of transformation are fairly distributed between different economic sectors, businesses and individuals. We strongly believe that we can make the best of this opportunity, but only when we are prepared for it.

During our mandate, the European Commission has provided policy and legislative responses to these challenges in areas as diverse as privacy, cybersecurity, consumer protection, social protection, working conditions as well as competition, media pluralism and others.

The Digital Single Market strategy has put at the forefront the need to ensure Europe's competitiveness in the digital environment, while at the same time protecting EU citizens and businesses. With the proclamation of the European Pillar of Social Rights in November 2017, the EU highlighted the importance of the rights of its citizens in a fast-changing world.

The keyword here is change: we cannot realistically avoid it, especially in a globalised world of mutual interdependencies. But we can make sure we are ready for it, with a forward-looking and strategic approach rather than merely reacting to what others decide for us.

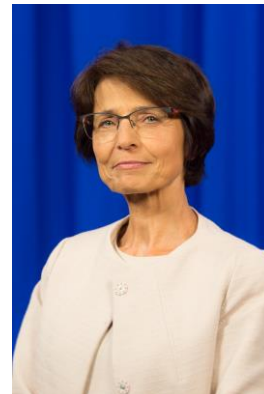
The recommendations of the High-Level Expert Group on the Impact of the Digital Transformation on EU Labour Markets, expertly chaired by Professor Maarten Goos, are a welcome contribution to an already rich debate on this subject. We hope they will spark further discussion on future solutions.

We can and we should steer this transformation – together. After all, the future of work is what we, all of us, will make of it. We owe it to our citizens and to future generations to make sure this future will become a reality we can all be proud of.



Mariya Gabriel

Commissioner for Digital Economy and Society



Marianne Thyssen

Commissioner for Employment, Social Affairs,
Skills and Labour Mobility

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EXECUTIVE SUMMARY

Digitalisation is driving rapid changes in the labour market influencing the nature, quality and productivity of work. European leaders face the challenge of making use of these developments to foster economic growth and employment - while at the same time ensuring decent working conditions, social protection and equal opportunities for all.

In light of these ongoing changes, the European Commission convened a group of ten High-Level Experts¹ to discuss these challenges from their respective fields of expertise and provide innovative policy recommendations on how to address and overcome them.

An overview of the report is presented in the graph on page 15. Going left to right, the figure shows interconnected ‘**trends**’: digitalisation, globalisation, the rising diversity of work arrangements and aging workforce.

These trends have ‘**implications**’ for labour markets. They include rising inequality, changing business models, job displacement, workers’ skill depreciation and rising skill gaps.

There are ‘**challenges**’ for policymakers from the implications. At the level of workers and human resource policies, these challenges mainly relate to workers’ skills to keep people employable in the future. At the level of businesses and labour relations, the challenge is to provide decent work by creating high-quality jobs and safeguarding worker well-being and a healthy work-life balance. Finally, at the most aggregate level of markets and their institutions, the challenge is to build a more inclusive society by preventing economic and social polarisation in labour markets.

The figure further shows ‘**policies**’ with specific innovative policy recommendations that result from these challenges².

Our policy recommendations are structured under three main categories: ‘**a skilled workforce**’; ‘**new labour relations**’ and ‘**a new social contract**’.

¹ Chair: Prof. dr. Maarten Goos, Utrecht School of Economics and co-director of the Future of Work hub at Utrecht University. Members: Morten Binder (Director at HK A-kasse); Katarina Ćurković (Head of Career Guidance and Counselling Division, Croatian Employment Service); Solveigh Hieronimus (Partner at McKinsey & Company); Prof. dr. Vassil Kirov (Institute for the Study of Society and Knowledge, Bulgarian Academy of Science); Prof. dr. Vili Lehdonvirta (Oxford Internet Institute, Oxford University and Alan Turing Institute); Dr. Karl McFaul (Strategist, City of Lund); Prof. dr. Maria Savona (University of Sussex, SPRU); Gary Shaughnessy (Chair, Z Zurich Foundation at Zurich Insurance Company); and Lucia Velasco (Advisor, Cabinet of the Prime Minister of Spain).

² More broadly, the figure also is a guiding framework for thought leadership about the impact of the digital transformation on EU labour markets.

A skilled workforce – ready to contribute to tomorrow's world of work

1. Enabling **digital skills personal learning accounts**, allows workers to acquire relevant skills throughout their careers in order to stay relevant in rapidly transforming, digital labour markets. The accounts would belong to the worker and would be portable from job to job. Details such as contributions, number of hours per year, top ups, eligible expenses, withdrawal processes and taxing schemes will be determined later.
2. Scaling up **career counselling** and creating **innovative learning environments** to enable better career choices and active pursuit of relevant training for all Europeans. Career counselling could be supported through establishing quality training standards and "digital literacy" for career counsellors at the European level. Communities of practice could foster informal group learning at workplace.
3. Supporting **labour market intermediaries to reduce structural skill gaps especially for women in Science, Technology, Engineering and Mathematics (STEM), workers at risk of automation and the low-skilled**. Intermediaries (such as public employment services, outplacement offices or temporary agencies) would invest in on-the-job training provided they can recoup the training cost from employers who on their turn will benefit from trained workers.

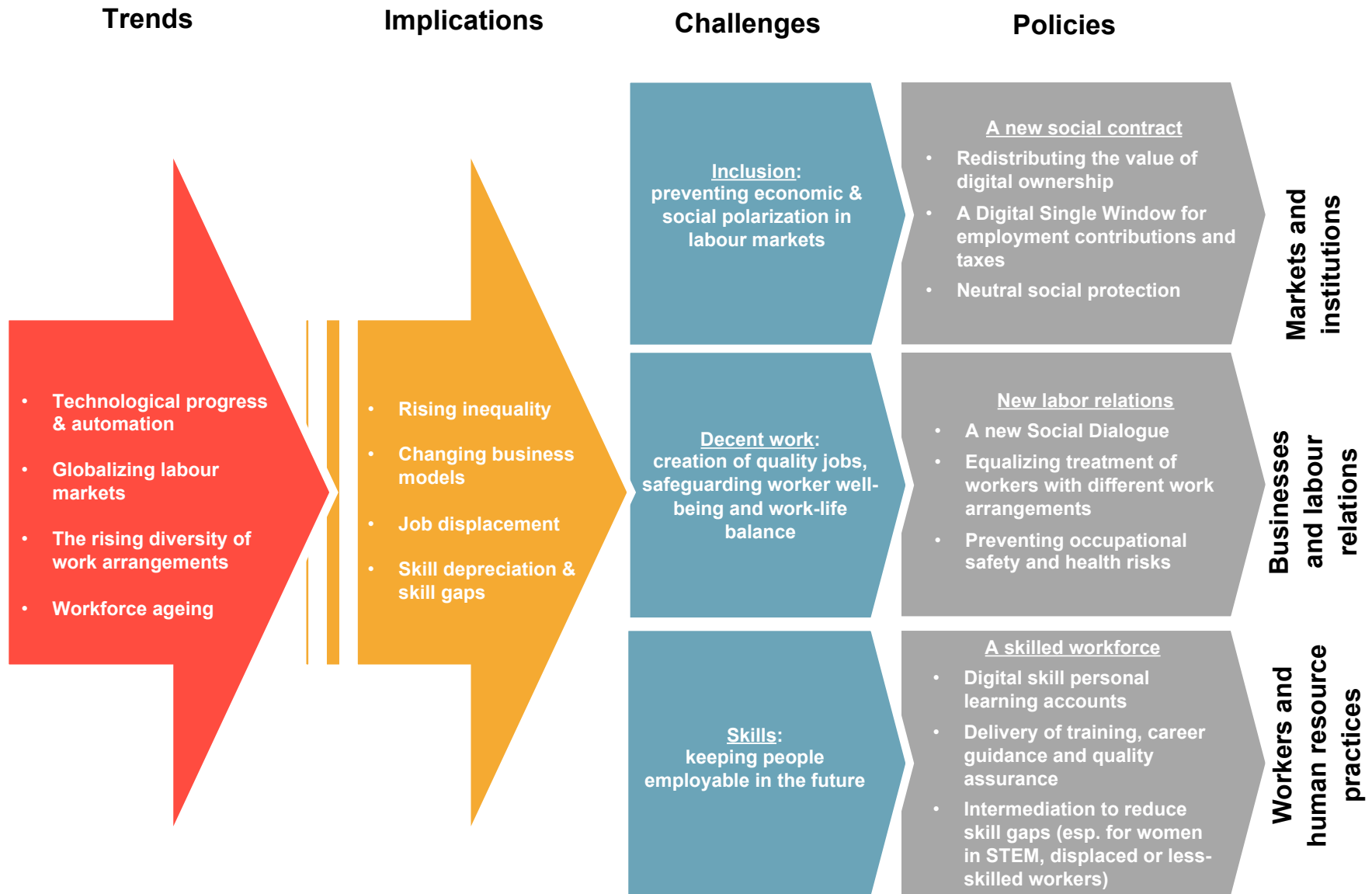
New labour relations – adapting structures to today's realities

4. **Preventing occupational safety and health risks** like mental health and stress related issues resulting from digitalisation and increased volatility in today's world of work, e.g. through an increased focus on prevention in employee assistance programs and improving uptake by increasing social acceptance through informed discourse and the delivery of personalised, cost-effective solutions enabled by technology.
5. **Equalising the (administrative) treatment of standard and non-standard work arrangements** e.g. by providing equal access to government services, credit lines and limited mobility of benefits regardless of employment status.
6. **Reinvigorating social dialogue** through intensified and better organised dialogue of workers and social partners especially in the platform economy; e.g. by allowing workers to discuss issues in a bottom up manner in dedicated, moderated online spaces (**Social Worknets**), and actively inviting both unions and employers as well as platform operators to participate in an ongoing exchange for improved collective outcomes (**Social Digilogue**).

A new social contract – upgrading the social fabric of our labour markets

7. Ensuring **neutral social protection** against unemployment, sickness and other life circumstances **independent of employment status**. The increasing number of Europeans with non-standard employment should have access to social protection e.g. through portable benefits attached to the worker rather than the job or the establishment of an ‘underemployment insurance’ to smooth out fluctuating incomes in the ‘gig economy’³.
8. Creating a **Digital Single Window** for employment contributions and taxes for self-employed working on online platforms for multiple and rapidly changing employers. Through a digital interface, automated reports from platform companies would allow collecting earnings data in a standardised digital format to reduce the cost of compliance.
9. Redistributing the **value of digital ownership**, e.g. through treating data as either capital, labour or intellectual property. To the extent that workers’ and consumers’ data are used to increase the firm’s value, this should be recognised and compensated accordingly.

³ Although there are different definitions of the term, ‘gig economy’ can be understood as a system in which temporary positions are common and organisations contract with independent workers for short-term engagements.



1 INTRODUCTION AND BACKGROUND

This section provides the general backdrop to the impact of digitalisation on labour markets as seen by the authors of this report and gives some background to process of writing this report.

1.1 The digital transformation and the labour market

Digitalisation is ubiquitous. Therefore, it changes the demand for and supply of labour. But digitalisation also influences the institutions on the labour market that determine how workers and employers find each other, and what kinds of relationships they form. The digital transformation also has important effects on social risks for workers (broadly defined as employers, employees, self-employed...) and has profound consequences for social protection systems. Finally, the digital transformation is also changing how its gains are being distributed among workers.

1.1.1 The digital transformation

It is important to define what we mean in this report by digital technologies, digitalisation, and the digital transformation⁴:

- *digitisation* is the conversion of an analogue signal conveying information to binary bits;
- *digital technologies* are electronic tools, systems, devices and resources that generate, store, process, exchange or use digital data;
- *digitalisation* is the application or increase in the use of digital technologies by an organisation, industry or country;
- *digital transformation* entails the pervasive adoption of digital technologies in production and consumption activities that rely on a significant dimension of data development and data analysis.

Digital technologies are considered to be General-Purpose-Technologies (GPTs)⁵. GPTs are characterised by a high potential for technical improvements and high pervasiveness, e.g. high potential to be used in a large number of applications. Given the potential of digital technologies, the digital transformation is ubiquitous and has important impacts on labour markets.

There are many ways in which the ongoing digital transformation and its impact is being described and there is a widespread discussion of the timing of the digital transformation in comparison to previous episodes of technological progress. As an illustration, Figure 1

⁴ OECD, Oslo Manual 2018 – guidelines for collecting, reporting and using data on innovation, 4th edition, October 2018, <http://www.oecd.org/science/oslo-manual-2018-9789264304604-en.htm>.

⁵ Bresnahan, T. and Trajtenberg, M., General purpose technologies ‘Engines of growth’?. *Journal of Econometrics*, 1995, 65(1), pp.83-108; Trajtenberg, M., AI as the Next GPT: A Political-Economy Perspective, National Bureau of Economic Research, January 2018, <https://www.nber.org/papers/w24245.pdf>.

provides one way to represent both the contents and timing of various episodes of technological breakthroughs and their impacts on workers, businesses as well as on wider organisational and societal characteristics such as markets, institutions and ecosystems.

1.1.2 Changes in labour demand

On the labour demand side, some jobs mainly involve doing routine tasks that can be codified and can increasingly be done by digital technologies. Consequently, these jobs will gradually cease to exist due to automation. Examples of such jobs are machine operators at car assembly lines or office clerks. But digitalisation, as of yet, cannot automate all tasks currently done by workers, is enhancing some workers in doing their jobs, and is even creating many new tasks for workers⁶. Examples of jobs that are created by digitalisation are computer engineers and other STEM jobs, but also last-mile jobs such as machine feeders or off-loaders and new wealth jobs such as personal coaches due to rising wealth following digitalisation⁷.

1.1.3 Changes in labour supply

Besides transforming the demand for labour, digitalisation also influences the supply of worker skills via multiple mechanisms. One such mechanism is the introduction of new online learning technologies and resources, such as massive open online courses (MOOCs), open university courseware, interactive e-books, and informal training videos and materials⁸. These technologies and resources are introduced by both traditional education providers such as universities and vocational schools, new 'EdTech' (Education Technology) start-up companies seeking to transform education, as well as individual practitioners and communities⁹.

Digitalisation also influences labour supply through the introduction of new technological intermediaries or 'platforms' that lower barriers to labour market entry and thus include more people in the market. For instance, many students use gig economy apps to access part-time work, while some retired professionals, people with caring duties and people with health problems use 'crowd work' or online labour platforms to occasionally work from their homes via the Internet¹⁰.

Labour supply is also expanded geographically, when online labour platforms allow for instance Western European technology firms to buy work from skilled software

⁶ Goos, M., Manning, A. and Salomons, A., Explaining Job Polarization: Routine-Biased Technological Change and Offshoring, *American Economic Review*, 2014, 104(8), pp.2509-2526.

⁷ Autor, D. and Salomons, A., New Frontiers: The Evolving Content and Geography of New Work in the 20th Century, mimeo MIT.

⁸ Littlejohn, A., & Margaryan, A. 2014. *Technology-enhanced professional learning: Processes, practices and tools*. London: Routledge.

⁹ Davies, C. and Eynon, R. 2015. *Education and Technology*. London: Routledge.

¹⁰ Barnes, S.-A., Green, A., and de Hoyos, M. 2015. Crowdsourcing and work: individual factors and circumstances influencing employability. *New Technology, Work and Employment*, 30(1), 16–31. <https://doi.org/10.1111/ntwe.12043>; Green, A., de Hoyos, M., Barnes, S.-A., Baldauf, B., and Behle, H. 2014. Exploratory Research on Internet-enabled Work Exchanges and Employability. *JRC Scientific and Policy Reports* EUR 26423 EN. <https://doi.org/10.2791/61531>

developers in Eastern Europe, or rural workers to ‘migrate virtually’ to urban labour markets¹¹.

1.1.4 Changes in labour market institutions

Besides influencing demand and supply, digitalisation also influences the institutions on the labour market that determine how workers and employers find each other, and what kinds of relationships they form. Early studies suggest that using the Internet to recruit and to search for jobs is cheaper than doing so by conventional means¹², has a small positive effect on wages¹³, and may reduce structural unemployment¹⁴. Studies have also found Internet use to increase worker mobility¹⁵ and employer-to-employer worker flows¹⁶. More recently, social media services such as LinkedIn have become means for workers in some occupations to market themselves to potential employers beyond their local markets. In a survey of European freelancers, almost a third said that they found work via social media platforms¹⁷.

Digital technologies are also associated with the growth of new forms of employment. In particular, digital technologies have made it economical for employers to disaggregate some jobs into individual tasks distributed via gig platforms¹⁸. Digital skills assessment and micro-certification schemes have emerged to complement and challenge publicly regulated qualifications that sometimes lag behind¹⁹. These changes in the institutional makeup of labour markets due to digitalisation are likely to promote inclusion, increase efficiency, help integrate markets across Europe, and reduce structural unemployment, but in some cases also undermine job quality and increase unpredictability and vulnerability to social risks for workers²⁰. Some changes also make it more difficult for workers to achieve collective representation, although technology also enables new forms of organising and campaigning²¹. The changes also mean that private digital intermediaries become important players in the functioning of European labour markets, with implications for public policymakers.

¹¹ Braesemann, F., Lehdonvirta, V. and Kässi, O. ICTs and the Urban-Rural Divide: Can Online Labour Platforms Bridge the Gap? SSRN Electronic Journal, 2018. <http://dx.doi.org/10.2139/ssrn.3271972>

¹² Freeman, B., The Labour Market in the New Information Economy, *Oxford Review of Economic Policy*, vol. 18, no. 3, 2002, pp. 288–305. JSTOR, www.jstor.org/stable/23606589.

¹³ Bagues, M. F. & Labini, M. S. 2009. Do Online Labor Market Intermediaries Matter? In: D. H. Autor (ed.), *Studies of Labor Market Intermediation*. Chicago: University of Chicago Press, pp. 127-154.

¹⁴ Kuhn, P. and Skuterud, M., Internet Job Search and Unemployment Durations. *American Economic Review*, 2004, 94(1), pp.218-232.

¹⁵ Bagues, M. and Sylos-Labini, M., *Ibid*.

¹⁶ Stevenson, B., The Internet and Job Search, NBER, 2008, <https://www.nber.org/papers/w13886.pdf>.

¹⁷ EFIP and Malt, Freelancing in Europe, 2019, <https://news.malt.com/wp-content/uploads/2019/02/FREELANCING-IN-EUROPE-2-1.pdf>

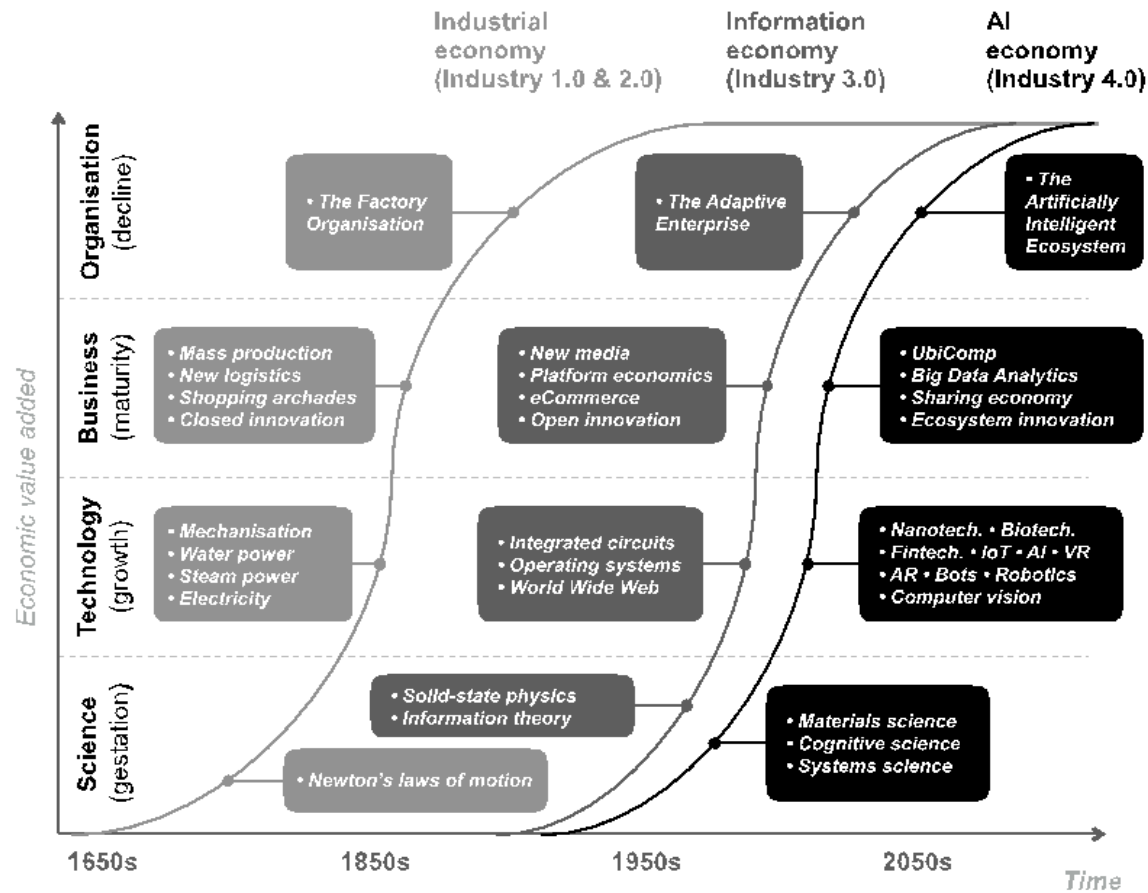
¹⁸ Meil, P. and Kirov, V., Policy Implications of Virtual Work, Palgrave Macmillan Ed., 2017. Pesole, A., et al. 2018. Platform workers in Europe: Evidence from the COLLEEM survey. *Joint Research Centre Technical Reports* EUR 29275 EN. <http://doi.org/10.2760/742789>

¹⁹ Kässi, O. and Lehdonvirta, V. 2019. Do digital skill certificates help new workers enter the market? Evidence from an online labour platform. *OECD Social, Employment and Migration Working Papers*, No. 225. <https://doi.org/10.1787/3388385e-en>

²⁰ Wood, A. J. et al. 2018. Good gig, bad gig: autonomy and algorithmic control in the global gig economy, *Work, Employment and Society* 33(1): 56-75. <https://doi.org/10.1177/0950017018785616>

²¹ Wood, A. J., Lehdonvirta, V., and Graham, M. (2018). Workers of the Internet unite? Online freelancer organisation among remote gig economy workers in six Asian and African countries. *New Technology, Work and Employment*, 33(2), 95–112. <https://doi.org/10.1111/ntwe.12112>

Figure 1: Economic life-cycles of innovation



Source: Meyer, C., Davis, S., It's Alive: The Coming Convergence of Information, Biology and Business. Crown Business, New York 2003. Adaption 2019 by Karl McFaul.

1.1.5 Changes in social risk, prevention and protection

Digitalisation also has profound consequences for social protection systems. The European workforce has experienced a rise in the diversity of work arrangements. However, today's social protection schemes continue to largely focus on standard, full-time work. In general, employment laws secure employer funding of benefits such as sick pay, holiday pay, pensions and parental leave for anyone on a permanent contract. This does not cover other workers, who often receive little or no benefit, not to mention financial advice or guidance. Women and minorities are likely to be disproportionately affected, as they are often in non-standard forms of employment. Meanwhile, as more people work into old age, the risk of losing the ability to work through health issues is increasing.

The disruption brought by digitalisation to job security, employee tenures and ways of working is also likely to increase stress and mental health issues – further increasing the risks for the workforce. For governments, vulnerable workers mean higher demand for welfare – including in later life – as well as lower tax contributions. All this at a time when public resources are already stretched and will likely be further strained by factors like ageing demographics. We must therefore ask whether these fragile social protection systems are fit to cover financial shocks in the future, or whether they must be rethought for a digital age.

1.1.6 Changes in the gains from digitalisation

The increasing appropriation of data by large companies has been facilitated by online data provision by users in terms of a barter, which exchanges consumption of online services against personal data, rather than data production, worth of remuneration. This might happen also within the firm and has led to standard practices of workers not being directly compensated for sharing their private data or producing data with firms. That workers are not directly compensated for their private data is contrary to what is usually referred to as 'labour', i.e. a worker's time (for which she directly receives an hourly or monthly wage) or a worker's skills (for which she receives a wage premium)²².

Within firms, data development and analytics, based on data management skills, and contributing to data stocks, are considered - and measured - as intangible assets or knowledge-based capital, alongside firm investments in items such as Research & Development (R&D), training, engineering and design, Intellectual Property Rights (IPR), marketing and branding, software. Innovation activities in firms are currently linked not only to R&D, but also to the accumulation of innovation capabilities related to digital technologies and data analytics²³.

An example relates to Artificial Intelligence (AI): workers' data increasingly feed AI algorithms that contribute to the intangible capital stock of firms (e.g. by allowing new business models) and increase firms' productivity and profits. To the extent that AI replaces some of the tasks that workers perform by using machine learning algorithms that are fed by the very same workers' data within the firm, workers and consumers contribute, unre-

²² Ibarra, I. A., et al., Should We Treat Data as Labor? Moving Beyond “Free”, American Economic Association Papers & Proceedings, 2018, Vol. 1, No. 1, <https://ssrn.com/abstract=3093683>.

²³ See the Oslo Manual (2018).

munerated, to the stock of intangible capital that will at some point replace their manual or intellectual labour²⁴.

Another example relates to workers' and consumers' data. The framing of the issue as a barter (free consumers of online services are, albeit unaware, data providers) rather than a contract (users releasing data while 'consuming' a digital service) has contributed to the process of appropriation of large stocks of data from companies that has never been properly regulated, until the attempt represented by the European General Data Protection Regulation (GDPR)²⁵. While new regulations should empower actors over the choice of the data they release, the academic and policy discussion has not yet fully reflected on the recognition and attribution of value creation and value extraction in the case of data and the distribution of data ownership²⁶.

1.2 The scope of the report

Due to digitalisation, changes in the labour market are occurring rapidly, influencing the nature, quality and productivity of work. European leaders face the challenge to make use of these developments to foster economic growth and employment, while at the same time ensuring decent working conditions, social protection and equal opportunities for all.

Accordingly, the European Commission created the High-Level Expert Group on the Impact of the Digital Transformation (the HLG) in order to gather expert input and independent advice on how to shape the digital transformation for what concerns its impacts on the world of work; what framework conditions to be put in place to make it smooth and human-centric; and develop appropriate policy responses.

The European Commission has already proposed a number of strategic measures, such as the Digital Single Market strategy and the European Pillar of Social Rights, meant to address the double challenge of increasing Europe's competitiveness and rising social standards across the continent, including for the digital economy. Yet, fresh thinking and bold ideas are needed. Therefore, the HLG deliberately focused on more radical outside-the-box policy instruments in this report.

The HLG, chaired by Professor Maarten Goos of Utrecht University, was composed of ten members, all of whom acted independently and in the public interest, expressing their own personal views. The HLG met five times in Brussels and engaged with a number of stakeholders, including representatives of the social partners, in order to produce policy recommendations²⁷.

The EU Commissioners for the Digital Economy and Society, Ms Mariya Gabriel, and for Employment, Social Affairs, Skills and Labour Mobility, Ms Marianne Thyssen, met with the HLG and provided political guidance as to the overarching objectives of the group,

²⁴ Savona, M., R&D, Employment and Wage Distribution. *Plus ça change, plus c'est la même chose?* Presented at the HLEG on The Impact of Digital Transformation on EU Labour Markets, 10th October 2018, 2018a; Ciarli T., Marzucchi, A., Salgado, E., Savona, M., The Effect of R&D Growth on Employment and Self-Employment in Local Labour Markets, SPRU Working Paper Series 2018-08, SPRU - Science Policy Research Unit, University of Sussex Business School, 2018a.

²⁵ The EU General Data Protection Regulation, adopted in April 2016 and enforceable starting on 25 May 2018, has superseded the 1995 European Data Protection Directive.

²⁶ Savona, M., Ibid.

²⁷ For more details on the composition of the HLG, including the selection process, as well as minutes of the meetings, see the Register of Commission Expert Groups and Other Similar Entities, <http://ec.europa.eu/transparency/regexpert/> (group number: E03606).

while ensuring its full independence and autonomy in its discussions and deliberations. The services of the European Commission²⁸ provided the secretariat for the HLG and, upon request, background data and clarifications on EU policies.

²⁸ DG Employment, Social Affairs and Inclusion; DG Communication Networks, Content and Technology.

2 SOME IMPORTANT FACTS

This section puts forward some important facts about the impact of the digital transformation on EU labour markets. These facts will help define policy strategies and policy recommendations in subsequent sections.

2.1 Net job creation but also job polarisation

The impact of the digital transformation on jobs is an issue at the forefront of academic reflection, policy discussions and political debates across the world²⁹. Although this broad interest is welcomed, it is also fair to say that at least some of the early discussions on this topic were based on questionable conceptual and methodological assumptions, which sometimes caused unnecessary attitudes of fear and panic. It is essential to keep the debate about the impact of the digital transformation on jobs based on facts and strictly anchored to a realistic and not unduly pessimistic view of the consequences of innovation and digitalisation.

Popular fears that upcoming technologies may make labour redundant in an increasing number of occupations have been fuelled recently by studies, which claim that up to half of U.S. jobs are automatable within the next two decades. For example, Frey and Osborne³⁰ claim that 47% of U.S. workers are at risk, meaning that the typical tasks of those jobs could likely be done by new machines. However, as Arntz et al³¹ have shown, such occupation-level studies severely overestimate automation potentials, because they neglect that workers already adjust their tasks to new technologies at the job level. They show that the share of U.S.-workers with high automation potentials declines to only 9% when taking into account the variation of tasks within occupations across jobs. This has been confirmed

²⁹ As a non-exhaustive sample covering just the past year, see e.g. PwC, Will Robots Really Steal Our Jobs? An International Analysis of the Potential Long-Term Impact of Automation, February 2018; European Parliamentary Research Service, The Impact of New Technologies on the Labour Market and the Social Economy, February 2018; International Labour Office, The Future of Work: A Literature Review, March 2018; European Political Strategy Centre, Global Trends to 2030: The future of Work and Workplaces, May 2018; EUROFOUND, Automation, Digitalisation and Platforms: Implications for Work and Employment, May 2018; McKinsey Global Institute, Skill Shift: Automation and the Future of the Workforce, May 2018; World Economic Forum, The Future of Jobs Report 2018, September 2018; OECD, The Future of Social Protection: What Works for Non-Standard Workers?, November 2018; OECD, Good Jobs for All in a Changing World of Work, December 2018; Berterlsmann Foundation-Information Technology & Innovation Foundation, The Future of Work – A Guide for Transatlantic Policymakers, December 2018; European Group on Ethics and Science and New Technologies (EGE), Future of Work, Future of Society, December 2018; ILO Global Commission on the Future of Work, Final Report: Work for a Brighter Future, January 2019; OECD-European Commission, Policy Responses to New Forms of Work, March 2019.

³⁰ Frey, C. and Osborne, M., The future of employment: How susceptible are jobs to computerisation?. Technological Forecasting and Social Change, 2017, No. 114, pp.254-280.

³¹ Arntz, M., T. Gregory and U. Zierahn, The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis, OECD Social, Employment and Migration Working Papers, 2016, No. 189, OECD Publishing, Paris. <http://dx.doi.org/10.1787/5jlz9h56dvq7-en>.

by a recent study from Nedelkoska and Quintini³². Arntz et al. report comparable figures for other OECD countries, ranging from 6% in Korea to 12% in Germany and Austria³³.

Automation potentials do not necessarily lead to net employment losses. Rather, employment effects depend on the interaction between several macroeconomic adjustment mechanisms. Therefore, several studies have examined the relationship between digitalisation and changes in aggregate employment. Although these studies differ in their levels of analyses (e.g. with firm- and sector-level studies neglecting adjustment processes between firms or sectors), in the scope of the technologies that they address (e.g. some focus on very specific technologies such as robotics, whereas others address digitalisation or automation more broadly), a general result from the existing literature is that technological change does not lead to significant negative, but instead mostly even to positive effects on net aggregate employment once adjustment processes between firms and sectors have been taken into account.

Net job creation depends on changes in both the demand for and supply of labour resulting from digitalisation, as well as on labour market institutions. Much of the effectiveness of this potential channel of job creation is linked to the multiplier effects of job creation in specific sectors, and to the skill complementarities among different types of workers in different sectors or occupations³⁴. However, a sustained labour demand depends on the state of economies: crucially, sustaining demand and reducing prior income inequality, besides being a policy objective *per se*, is able to support these dynamics that compensate job loss, facilitate job and skills complementarity and support innovation diffusion in society.

Digitalisation also changes the composition of employment across jobs ranked by their required skill level or wage. Routine work that can be automated is heavily concentrated in the middle of the skills distribution, whereas non-routine work that cannot be automated is concentrated in either the most skilled jobs (e.g. computer engineers) or the least skilled jobs (e.g. waiters or cleaners). Consequently, digitalisation is leading to job polarisation: middle-skilled jobs are automated by computers, while digitalisation augments the productivity of the most skilled jobs and the least-skilled jobs survive because they cannot be automated nor greatly benefit from new technologies³⁵.

2.2 The rising diversity in working arrangements

Digitalisation also coincides with an increase in new and non-standard forms of employment that differ from standard full-time employment. Part-time and temporary employment increased from 12.5% to 15.8% in the European Union since 2002³⁶. Self-employment grew significantly over the same period in some member states, such as the Netherlands

³² Nedelkoska, L. and Quintini, G., Automation, skills use and training, OECD Social, Employment and Migration Working Papers, 2018, No. 202, OECD Publishing, Paris. <http://dx.doi.org/10.1787/2e2f4eea-en>.

³³ Arntz, M., T. Gregory and U. Zierahn, Ibid.

³⁴ Ciarli T., Marzucchi, A., Salgado, E., Savona, M., The Effect of R&D Growth on Employment and Self-Employment in Local Labour Markets, SPRU Working Paper Series 2018-08, SPRU - Science Policy Research Unit, University of Sussex Business School, 2018a.

³⁵ Goos, M., Manning, A. and Salomons, A., Job Polarization in Europe. American Economic Review, 2009, No. 99(2), pp.58-63.

³⁶ Rhein, T. and Walwei, U., Forms of Employment in European Comparison, <https://www.iab-forum.de/en/forms-of-employment-in-european-comparison/>.

and the United Kingdom³⁷. Platform-mediated work is also increasing and is now the main source of income for as many as 2% of adults across 14 EU member states, according to European Commission survey data³⁸. This includes transport, delivery, care, and other on-location work mediated by ‘gig economy’ apps, as well as software development, translation, data entry, and other knowledge work delivered remotely via online labour platforms. Although in absolute terms European employers are not hiring very actively on online labour platforms, their use of such platforms is growing faster than world average (Figure 2). At the same time, the share of people in standard employment in the European Union has remained at roughly 40% from 2002 to 2018³⁹. The increase in non-standard work has thus apparently not been at the expense of standard work, but rather reduced unemployment and inactivity, though significant national differences exist.

Many possible factors could be contributing to the increased diversity in working arrangements. Firm or ‘demand-side’ factors include the fact that digitalisation allows firms to outsource jobs more easily, due to better virtual collaboration, standardisation of job tasks, enhanced monitoring and the dissemination of information on worker reputation. Furthermore, thicker markets⁴⁰ for non-standard work increasingly mean that firms may reap efficiency gains and cost savings from contracting specialised workers for non-core activities (such as janitorial services, food services, information technology, accounting, and legal services) rather than managing such activities in-house. At the same time, rising wage inequality at the workplace together with fairness norms and morale considerations may have increased incentives for firms to contract out low-wage work and to segregate high- and low-wage workers into different organisations⁴¹.

Worker or ‘supply-side’ factors include shifts in workforce composition to groups with a greater preference for alternative work arrangements or increased desire for workplace flexibility. For example, alternative work is more common among older workers and more highly educated workers, and the workforce has become older and more educated over time. Increased concerns about work-life balance may also have contributed to the trend⁴². Thanks to digital services such as e-commerce and online labour platforms, the barriers to offering goods and services to international markets are significantly lower today, opening up new opportunities for skilled individuals to start micro-businesses⁴³.

In other words, increases in non-standard and novel forms of work are likely to be partly attributable to both ‘push’ and ‘pull’ factors. In a recent survey of European freelancers, 77% of respondents said that they were freelancers by choice (43% found work through online labour platforms)⁴⁴. Others turn to atypical work to cope with precarity and dismissal from standard employment. For instance, self-employment in the United Kingdom has

³⁷ Ciarli, T., et al., *Ibid.*

³⁸ Pesole, A., Urzì Brancati, M.C, Fernández-Macías, E., Biagi, F., González Vázquez, I., *Platform Workers in Europe*, Publications Office of the European Union, 2018, <https://bit.ly/2N2TciX>.

³⁹ Rhein, T. and Walwei, U., *Ibid.*

⁴⁰ A ‘thick market’ has a high number of buyers and sellers.

⁴¹ Katz, L. and Krueger, A., *The Role of Unemployment in the Rise in Alternative Work Arrangements*, *American Economic Review*, 2017, No. 107(5), pp.388-392.

⁴² Mas, A. and Pallais, A., *Valuing Alternative Work Arrangements*, *American Economic Review*, 2017, No. 107(12), pp.3722-3759.

⁴³ Lehdonvirta, V. et al. 2019. *The Global Platform Economy: A New Offshoring Institution Enabling Emerging-Economy Microproviders*. *Journal of Management*, 45(2), 567–599. <https://doi.org/10.1177/0149206318786781>

⁴⁴ EFIP and Malt, *Freelancing in Europe*, 2019 <https://news.malt.com/wp-content/uploads/2019/02/FREELANCING-IN-EUROPE-2-1.pdf>

been labelled as ‘hidden unemployment’⁴⁵, as outright joblessness is partly replaced with gig work and ‘zero-hours’ contracts yielding insufficient and unpredictable incomes⁴⁶. New forms of work opened up by digitalisation could therefore generate both winners and losers, leading to a deepening of the polarisation of the labour market unless suitable policy responses are adopted.

2.3 Worker well-being and work-life balance

While digitalisation is a great enabler of improved work-life balance and choice for parts of society, for others it creates increased change and pressure, and this can be reflected in mental health conditions. A combination of factors is also increasing the challenge for individuals to avoid both physical and mental health conditions exacerbated by work and to manage them subsequently. This includes longer working lives - average retirement age amongst men is now 64.28 years across the EU, increasing from 62.57 in 2009⁴⁷.

There has also been a transfer of financial responsibility onto the individual – defined benefit pension schemes are now the majority in the private sector in every one of the EU Member States, for example. The growth of non-standard work has also played a role, with a related reduction in access to employer sponsored health and wellness programmes. Across the OECD on average, 16% of all workers are now self-employed, and a further 13% of all dependent employees are on temporary employment contracts⁴⁸.

Mental health and physical health issues often correlate with particular impact on diet and behavioural issues that tend to be more preventable and reversible if managed effectively early on. One in six working EU citizens experience some form of mental health issue (84 million people), one in five people aged 15 years or older reports heavy episodic drinking at least once a week. Diabetes is now an increasing issue as almost 10% of the population have type 2 diabetes and 53.1% of adults across the EU are suffering from overweight and obesity⁴⁹.

It is becoming increasingly clear that mental health and stress at work comes at a significant cost. Recent estimates from the Lancet Commission in the United Kingdom show that, between 2010 and 2030, mental health problems will cost the global economy USD 16 trillion if the current trend growth continues⁵⁰. Likewise, recent OECD research suggests the current annual cost to the Eurozone at EUR 600 billion. Part of the cost goes towards spending on health care, about 1.3% GDP or EUR 190 billion, and social security programmes (1.2% or EUR 170 billion)⁵¹.

⁴⁵ Blundell, R. , Crawford, C. and Jin, W., What Can Wages and Employment Tell Us about the UK's Productivity Puzzle?, *The Economic Journal*, 2014, No. 124: 377-407, <https://onlinelibrary.wiley.com/doi/full/10.1111/ecoj.12138>.

⁴⁶ Bell, D. and Blanchflower, D., Underemployment and the Lack of Wage Pressure in the UK. *National Institute Economic Review*, 2018, No. 243(1), pp. R53-R61.

⁴⁷ <https://tradingeconomics.com/european-union/retirement-age-men>

⁴⁸ OECD Employment and Labour Market Statistics, https://www.oecd-ilibrary.org/employment/data/oecd-employment-and-labour-market-statistics_ifs-data-en

⁴⁹ OECD, *Health at a Glance – Europe 2018*, November 2018, <http://www.oecd.org/health/health-at-a-glance-europe-23056088.htm>

⁵⁰ <https://www.thelancet.com/commissions/global-mental-health>

⁵¹ OECD, *Ibid.*

Figure 2: Employers' use of online platforms



Source: Kässi, O., and Lehtonvirta, V. 2018. Online labour index: Measuring the online gig economy for policy and research. *Technological Forecasting and Social Change* 137: 241–248. The time series for Europe excludes the United Kingdom. Data for the United Kingdom show a similar pattern although somewhat less strong trend growth after 2017. <https://ilabour.oii.ox.ac.uk/online-labour-index/>

However, the largest economic impact is due to lower employment and productivity of people with psychological disorders. The annual cost in this area goes up to 1.6% GDP or EUR 260 billion. Meanwhile, replacing an average employee costs 120-200% of the salary of the position affected. Insurance data indicates insurance claims for stress-related industrial accidents cost nearly twice as much as non-stress-related industrial accidents⁵².

To summarise, conditions related to stress, due to employment uncertainty and changes related to technology, are likely to have an increased impact on already disadvantaged or less flexible groups. In 2015, the European Commission recognised the increasing scale of mental health impacts and gave priority to policy recommendations to help combat the issue, particularly through fairness of access to all citizens⁵³.

2.4 Rising wage and income inequality

Digital technologies are mostly skill-biased, leading to rising relative demand for high-skilled workers. As the rising demand for high-skilled workers is not accompanied by a rapid expansion in the supply of worker skills, the wage premium of high-skilled relative to low-skilled workers and, therefore, wage inequality increases. In many advanced economies, including European countries, the process of job polarisation has contributed to rising inequality⁵⁴. Most recently, an interest has emerged in the evolution of the labour share. Whereas the labour share in many advanced economies was stable before about 1980, it started to decline afterwards resulting in increasing income inequality⁵⁵.

However, there are also important differences in the level and evolution of wage and income inequality between countries. These differences in part reflect that country-specific institutions and policies mediate the labour-market consequences of digitalisation⁵⁶. Powerful unions, heavy payroll taxes, high minimum wages and generous unemployment benefits compress the wage structure and may hamper the creation of a low-wage sector. Hence, the growth of the low-wage sector was stronger in countries where this sector is relatively unsheltered from market pressure, such as the United Kingdom, and less strong

⁵² Perkins, A.: Saving money by reducing stress. *Harvard Business Review*, 1994, 72(6), 12.

⁵³ The OSH Framework Directive 89-391/EEC creates a legal obligation for employers to protect workers from all workplace risks, including those of a psychosocial nature. The EU Strategic Framework on Health and Safety at Work 2014-2020 identified "Improving the prevention of work-related diseases by tackling existing, new and emerging risks" (including stress, in particular linked to changes in work organisation) as one of the three main challenges in the area of occupational safety and health (OSH).

⁵⁴ Acemoglu, D. and Autor, D., Skills, Tasks and Technologies: Implications for Employment and Earnings, *Handbook of Labor Economics*, 2011, Volume 4b, <https://economics.mit.edu/files/5571>; Acemoglu, D. and Restrepo, P., Demographics and Automation, National Bureau of Economic Research, March 2018, <https://www.nber.org/papers/w24421.pdf>.

⁵⁵ See, for example, Acemoglu, D. and Pascual Restrepo, Automation and New Tasks: How Technology Displaces and Reinstates Labor, forthcoming in *Journal of Economic Perspectives*, March 2019.

⁵⁶ Fernández-Macías, E. (2012). Job Polarization in Europe? Changes in the Employment Structure and Job Quality, 1995-2007. *Work and Occupations*, 39(2), pp.157-182; Fernández-Macías, E. and Hurley, J., Routine-biased technical change and job polarization in Europe *Socio-Economic Review*, 2016, Volume 15, Issue 3, pp.563-585; Hurley, J., Fernández-Macías, E., & Storrie, D., Employment polarisation and job quality in the crisis: *European Jobs Monitor 2013*, 2013, Dublin: Eurofound; Oesch, D. and Rodríguez Menés, J., Upgrading or polarization? Occupational change in Britain, Germany, Spain and Switzerland, 1990-2008, *Socio-Economic Review*, 2011, Volume 9, Issue 3, pp.503-531; Tåhlin, M., Class clues, *European Sociological Review*, 2007, No. 23, pp.557-72.

in countries with a more compressed wage distribution such as Germany, Spain or Switzerland⁵⁷.

⁵⁷ Oesch, D. and Rodríguez Menés, J., *Ibid.*

3 A FRAMEWORK FOR THE IMPACT OF THE DIGITAL TRANSFORMATION ON EU LABOUR MARKETS

This section identifies policy challenges from the digital transformation for EU labour markets. These policy challenges are identified based on the trends and their impacts discussed in the previous two sections, but also taking into account forecasts and scenarios to ensure that the policy challenges identified are future proof. Policies we implement today will affect Europe's innovation capacity and its impact on labour markets in the landscape of the 21st century economy.

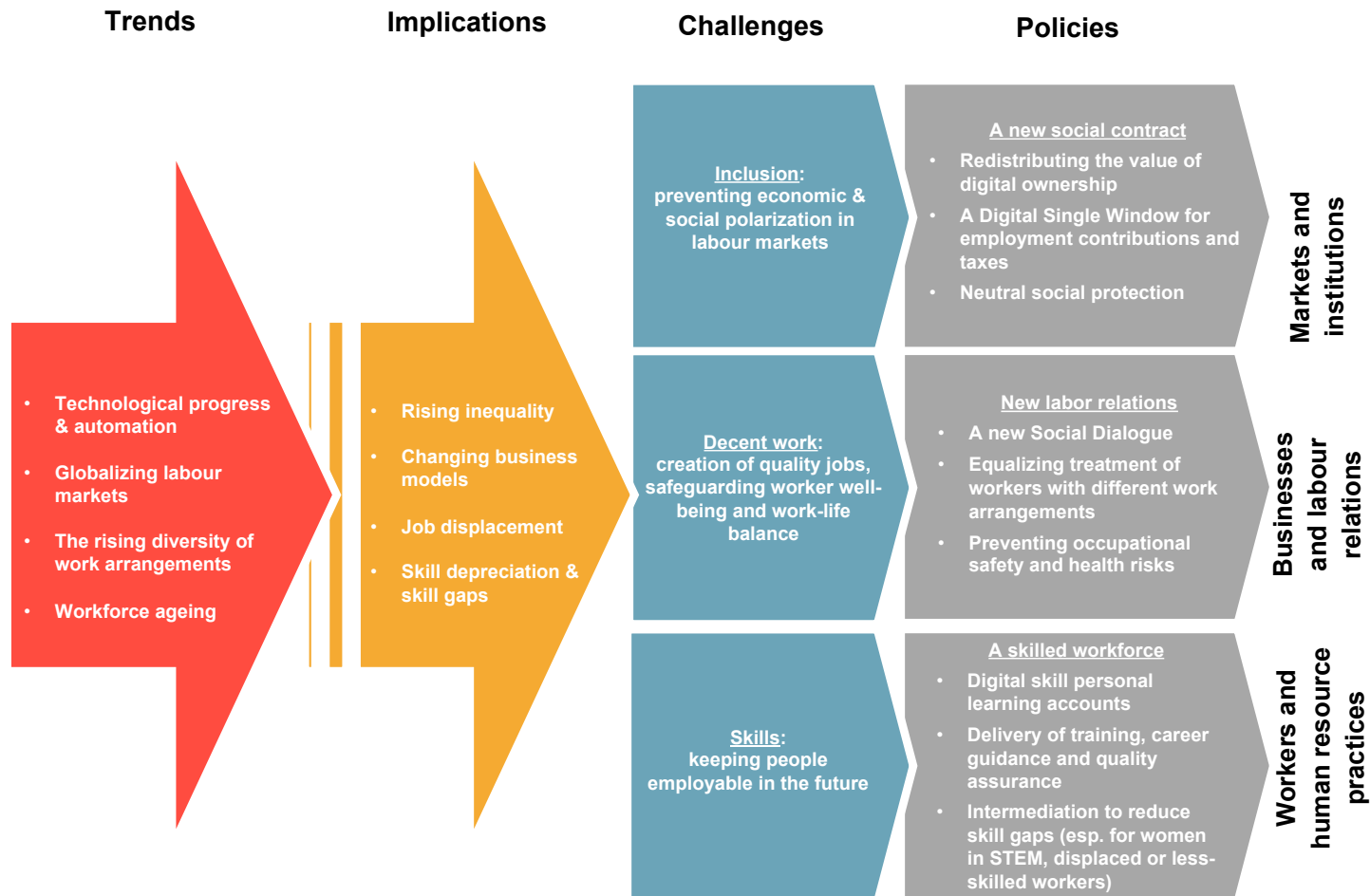
Figure 3 provides a framework to analyse the impact of the digital transformation on EU labour markets. It starts from overarching 'Trends' that are interconnected, such as digitalisation, globalisation, the rising diversity of work arrangement and workforce aging.

The figure then shows what the broad 'Implications' of these trends are for labour markets. These implications include rising inequality, changing business models, job displacement and workers' skill depreciation and rising skill gaps.

Figure 3 further illustrates how these trends and their implications for labour markets pose several 'Challenges' for policymakers. At the level of workers and human resource practices, these challenges mainly relate to workers' skills to keep people employable in the future. At the level of businesses and labour relations, the challenge is to provide decent work by the creation of high-quality jobs and safeguarding worker well-being and a healthy work-life balance. Finally, at the most aggregate level of markets and their institutions, the challenge is to build a more inclusive society by preventing economic and social polarisation in labour markets.

Finally, Figure 3 also illustrates how trends, their implications for labour markets and the challenges these pose for policymakers can result in concrete 'Policies'. The specific policy recommendations in Figure 3 will further be discussed in Section 4.

It is important to note that Figure 3 is not only a graphical summary of this report. More broadly, it could also serve as a guiding framework for thought leadership about the impact of the digital transformation on EU labour markets. Alternatively, it could be a roadmap for policymakers to come to other relevant policies that are not discussed in this report. For example, this report does not explicitly discuss policy recommendations for improving the work-life balance of those who combine employment (often in temporary or part-time contracts) with family care for children or elderly and the implications this has on gender inequality or how digital technologies could help reduce such inequalities.



4 POLICY RECOMMENDATIONS

This section translates the policy challenges from digitalisation for labour markets identified in the previous section into more concrete policy recommendations. In doing so, the HLG focused on new and more radical innovative policy ideas and instruments.

4.1 A skilled workforce supporting digitalisation

The digital transformation is rapidly changing the demand for workers' skills and task competencies. This way, the digital transformation is contributing to skill mismatch and shortages that require investments in employee training. In light of these challenges, several actors, including the CEDEFOP, the European Commission, the OECD and EU Member States, have focussed on the question of how to achieve a better alignment of skill supply and demand, with a focus on: i) understanding how countries collect and use information on skill needs; ii) investigating cost-effective training and labour market policies to tackle skill mismatch and shortages; iii) studying the incentives of training providers and participants to respond to changing skill needs; iv) setting up a database of skill needs⁵⁸.

Despite the extensive focus on collecting survey data to measure different versions of skill gaps, evaluating existing training policies and collecting survey data, several important challenges remain. One such challenge is how do we define 'skills' in the digital economy.

One definition of a worker's skills is the formal education that a worker received during full-time education before entering the labour market. Given this definition of skill, one can then think of how technological progress has changed the demand for workers with more relative to less full-time education⁵⁹.

However, a more precise view would be that digitalisation is changing the demand for tasks that workers do on-the-job because some tasks can be automated, but others cannot. Consequently, digitalisation will change the demand for workers with different levels of formal education only indirectly through changes in on-the-job task requirements for workers⁶⁰.

This decoupling between workers' formal education levels and their task competencies poses the question of how to define skills when thinking about the impact of the digital transformation on labour markets⁶¹. In part due to this decoupling, many different classifications of skills (e.g. years of schooling, occupational or sector experience, tasks done in an occupation and soft skills such as personality traits) have been developed and are used to measure skill gaps.

Although the various existing measures of skill gaps are informative about skill shortages and abundancies for the labour market as a whole, they are less informative for individual

⁵⁸ OECD, Getting Skills Right: Assessing and Anticipating Changing Skill Needs", Chapter 4, 2016.

⁵⁹ This was the consensus thinking in the academic literature until recently. See, for example, Goldin and Katz, The Race Between Education and Technology, Harvard University Press, 2009.

⁶⁰ Acemoglu, D. and Autor, D., Skills, Tasks and Technologies: Implications for Employment and Earnings, Handbook of Labor Economics, 2011, Volume 4b, <https://economics.mit.edu/files/5571>.

⁶¹ Goos, M., Manning, A. and Salomons, A., Explaining Job Polarization: Routine-Biased Technological Change and Offshoring, American Economic Review, 2014, 104(8), pp.2509-2526.

workers, each with their specific formal education, task experiences and soft skills as well as for individual employers, each with their specific workplaces and related skill needs.

One solution to this problem would be to use big data and machine learning techniques to better inform individual workers about their specific skill set and help them find jobs that better match their skill set. Similarly, such a tool could be used to help employers find workers that better fit their skill requirements, thereby reducing skill gaps⁶².

The remainder of this subsection discusses digital skills personal learning accounts (4.1.1); policies focused on the delivery of training, career guidance services and quality assurance (4.1.2); and policies to support intermediaries to help reduce skill gaps (4.1.3).

4.1.1 Digital skills personal learning accounts

Enable **digital skills personal learning accounts**, which allows workers to acquire relevant skills throughout their careers in order to stay relevant in rapidly transforming, digital labour markets. The accounts would belong to the worker and would be portable from job to job. Details such as contributions, number of hours per year, top ups, eligible expenses, withdrawal processes and taxing schemes will be determined later.

It is clear that jobs that are anticipated to grow in employment in the next decade will need digital skills because of the characteristics of such jobs. With technologies such as artificial intelligence or machine learning increasing their presence in the workplace, workers will not only need to acquire new skills but constantly update them. The European skills and jobs survey⁶³ (ESJS) shows that about 85% of all EU jobs need at least basic digital skills. There is an important need of digital education (from literacy to proficiency) among the European citizens. Policies should ensure that workers are equipped with the right skills.

As explained in previous sections, part-time and temporary employment increased from 12.5% to 15.8% in the European Union since 2002⁶⁴. Self-employment grew significantly over the same period in some member states, such as the Netherlands and the United Kingdom⁶⁵. Platform-mediated work is also increasing and is now the main source of income for as many as two percent of adults across 14 EU Member States, according to European Commission survey data. Most of this platform-mediated work is believed to be performed by self-employed as well. It is expected that more of these working arrangements will take place in the future for several reasons including the economical aspect, modifying the duration of contracts as well as the relationship with the employers who will be less committed to employees' development.

The challenge for governments is to support individuals in this reskilling pathway to migrate to growing jobs or industries, offering realistic and specific reskilling and upskilling opportunities. Lifelong learning will be a must for all, including those self-employed, vulnerable workers (workers at risk of automation, women in Science, Technology, Engineer-

⁶² For an example of such a tool, see <https://www.media.mit.edu/posts/how-skills-affect-your-job-trajectory-and-their-implications-for-automation-by-ai/>, although this algorithm is not (yet) programmed to reduce skill gaps.

⁶³ <http://www.cedefop.europa.eu/en/events-and-projects/projects/european-skills-and-jobs-esj-survey>

⁶⁴ Rhein, T. and Walwei, U., Forms of Employment in European Comparison, <https://www.iab-forum.de/en/forms-of-employment-in-european-comparison/>.

⁶⁵ Ciarli, T., et al., Ibid.

ing and Mathematics or STEM, older, lower-educated, unemployed or inactive) or under new forms of employment who usually face more barriers than the rest.

One-size-fits-all policies are unlikely to be effective, whereas it is arguable that taking measures to reduce skill mismatch starting by certain targeted groups can result in sizeable efficiency gains. Evidence from previous experiences shows that personal learning accounts could play an important role in increasing participation in learning among European citizens, resulting in higher qualification, skill levels and ultimately in a more competitive economy flexible enough to adapt to the new digital challenges ahead.

Initially, the targeted population of this proposal should be low skilled self-employed, dependent self-employed and low-skilled with occupations at high risk of automation. After the correspondent impact evaluation, the program can be progressively extended to different education level individuals within the same working conditions until the whole population is reached.

The accounts are conceived as a mechanism for individual learners that draw together different elements. This **Digital Skills Personal Learning Account (DSPLA)** can be used at any time by the account holder. It is a personal right to the owner to attain training in digital skills. The DSPLA will be complemented with an electronic passport where the track record of the attained individual digital skills should be kept and accessed everywhere by all stakeholders.

DSPLAs can be used to pay education or training and related expenses and, depending on the concrete circumstances, they will imply a subsidy to ensure the individual is able to have a stable income while learning. The recommended formal structure is the one of an account, voucher or credit card charged with the determined amount of money. These accounts belong to the worker and will be portable from job to job. Details such as contributions, number of hours per year, top ups, eligible expenses, withdrawal processes and taxing schemes should be determined in further developments.

Once the individual decides to make use of the available amount, they should go through a guidance process where a first assessment of digital skills will be done to establish the baseline and initial record of digital qualification. This first assessment will be recorded in the digital skills passport.

The guidance and counselling process can be provided by a third party or by the public employment services who should have been specifically trained for this. Given the innovative approach and the intended high impact of the program, trainers will all hold recognised innovation quality standards and share a common codification of future digital skills that will ensure the transition towards a skill-based system.

Training programs will also need to meet a combination of different elements. They should be based on an ‘ecosystem mindset’, ensured by the participation of public-private cross-country partnerships to ensure the skills are those demanded by the market. These partnerships should be composed of businesses, cutting edge educational institutions, Non-Governmental Organisations and the ‘Education Technology’ community, community learning providers and non-conventional training providers as well as on-the-job learning (including platform jobs as an option). The approach should be practical, with job placement and freelancing as part of the training; and provide innovative content such as coding bootcamps, and other new training initiatives that often are excluded from any official benefits since they do not fit into preexisting school categories.

A DSPLA program can be funded by European funds, national government, companies’ contribution and other support measures such as reduced taxes as well as a payment of

different proportions by the participant. The program could also include a small contribution required from individuals to ensure commitment.

4.1.2 Delivery of training, career guidance services and quality assurance

Scale up **career counselling** and creating **innovative learning environments** to enable better career choices and active pursuit of relevant training for all Europeans. Career counselling could be supported through establishing quality training standards and "digital literacy" for career counsellors at the European level. Communities of practice could foster informal group learning at workplace.

Today we have many different opportunities and channels for the individual to acquire and develop relevant skills and competences for the labour market. In the future, taking into account the progress of training opportunities online, possibilities of training will become even more diverse, as well as opportunities for jobs and careers. In such a complex context and changing labour market, individuals are faced with the challenge of constant adaptation to new circumstances, changing organisations, jobs and positions, choosing training, education and different career routes.

In such a demanding environment, the need for career guidance services for individuals in different stages of life becomes more important than ever. Despite significant efforts and progress that public services and other career guidance institutions at the labour market are making, this need is not fulfilled and does not fully respond to the growing needs of different target groups.

There is also high number of indecisive pupils and students not knowing or having inadequate awareness of their own self and career identity, as well as opportunities of trainings and jobs. Career choices are often made without proper information or awareness of all the possibilities, aspirations, competences, interests and abilities. On the other hand, public and private organisations that deliver career guidance services have inadequate financial and human resources, as well as tools and techniques to provide a quality service for all those who need it.

Policies for training to support effective and efficient transitions into and through the labour market should take into account that workers in the current economic circumstances increasingly need additional skills, knowledge and understanding of the labour market. In addition to the specific work-related knowledge and transferable soft skills essential to be competitive in the labour market, policies also need the ability to take into consideration deeper psychological constructs that drive people to change, learn and grow. These include emotions, cognitions, values, beliefs, attitudes, prior experiences and behaviours, as well as acknowledging the aspirations of the individual. This is true for career practitioners who support individuals entering and progressing into and through the labour market, as well as the citizens who are making their way in labour markets across Europe.

Training within educational systems, as well as at the workplace, should be enriched with the new psychological and pedagogical approaches to learning (such as for example theory

of professional identity transformation⁶⁶). In new learning and in the processes of delivering new skills to employees, organisational and contextual factors should also be taken into account, since barriers for growth exists not only on the individual level but also in the organisational cultures and norms, which are invariably very challenging to change. Some research results indicate that the use of Information and Communication Technology (ICT) could be helpful in supporting people in their transitions to new occupational and professional roles and responsibilities⁶⁷.

Providing support for transforming individual workers' identities should become a primary focus in training and new learning. Moreover, taking into account financial obstacles to training provision and changing priorities of different organisations and countries, **an examination should be undertaken of new approaches to learning that try to achieve cost effective ways of delivering knowledge and support for individuals.**

One example is to foster and encourage development of communities of practices in the workplace, across organisations, hierarchies and countries. Communities of practice in general represent the idea of informal learning that occurs in groups of individuals who interact regularly in sharing knowledge, ideas, questions, experiences and solutions, on a topic of their interest. In this way, individuals learn together, without the help of supervisor/trainer and develop/improve both their own practice, but also that of their profession. Communities of practice tend to develop naturally among employees in many organisations and professions but could be even more powerful if their creation is approached in a more systematic way, by supporting and encouraging their development, for example, by using ICT to establish them and foster their growth.

For the effective delivery of career guidance services, high quality, comprehensive national policies are essential, together with well-educated and experienced career guidance professionals. Current training routes and qualifications for careers practitioners across Europe are very diverse, with different systems, different professionals, different types and levels of knowledge.

Establishing quality standards for the training of the career guidance professionals at the European level would be very beneficial to societies and their citizens. Investing more resources, which could result in the creation of additional opportunities for developing competences and skills of career guidance practitioners (existing practitioners and new ones) would be an asset for the labour market and benefit to employers. It is important that this training (no matter on what educational level they are) include activities that will support the transformation of the professional identity for each individual learner.

⁶⁶ Bimrose, J. et al., Transforming identities and co-constructing careers of career counselors. *Journal of Vocational Behavior*, Available online 3 August 2018, In Press, Accepted Manuscript, 2018, DOI: <https://doi.org/10.1016/j.jvb.2018.07.008>.

⁶⁷ See for example the EmployID project, <https://employid.eu/>.

4.1.3 Intermediation to reduce skill gaps

Support labour market intermediaries to reduce structural skill gaps especially for women in STEM, workers at risk of automation and the low-skilled. Intermediaries (such as public employment services, outplacement offices or temporary agencies) would invest in on-the-job training provided they can recoup the training cost from employers who on their turn will benefit from trained workers.

The digital transformation is contributing to skills mismatches and shortages that require investments in employee training. As mentioned above, several actors, including CEDEFOP, the European Commission, the OECD and EU Member States, have focussed on the question of how to achieve a better alignment of skill supply and demand.

However, several important challenges remain to reduce skill gaps. A first challenge is to better understand why there is underinvestment in training. Underinvestment in on-the-job training is often explained by temporary misalignments between demand and supply, in large part driven by the business cycle. However, given the persistency of skill gaps across countries and over time, it is likely that there are other and more fundamental reasons why there is underinvestment in training.

The increasing diversity in forms of work towards shorter contract durations, such as temporary help agency workers, on-call workers, contract workers, and independent contractors or freelancers. This implies that workers and firms cannot credibly commit *ex ante* to share in both the initial costs as well as the later benefits of training, they will be reluctant to invest in training. In other words, coordination problems between workers and firms lead to a market failure in skill acquisition, and **policies involving third party intermediaries that share in the costs and benefits of training are required to increase training and reduce skill gaps especially for women in Science, Technology, Engineering and Mathematics or STEM, workers at risk of automation and less-skilled workers.**

For example, temporary help agencies have an incentive to invest in on-the-job training if they can recoup their training costs from employers by charging a wage premium for trained workers⁶⁸. Employers are willing to pay this wage premium because they are no longer faced with the uncertainty about a worker's skills (given that they now exactly know what training these workers received from the temporary help firm). Finally, workers do not have to invest in their own training and receive part of their increased productivity in terms of higher wages.

There are several ways in which intermediaries can be supported in investing in workers' skills to reduce skill gaps. Examples include:

- Public Employment Services (PES) can offer STEM training to increase the participation of women in STEM, an important cornerstone of Europe's Digital Single Market program⁶⁹.
- Outplacement offices, funded by companies that mass lay-off workers, assist displaced workers in finding new jobs. When such events occur, outplacement offices can also receive support from European Union funds. This support from EU funds can be made

⁶⁸ Autor, D., Why Do Temporary Help Firms Provide Free General Skills Training?. The Quarterly Journal of Economics, 2001, 116. 1409-1448. 10.2139/ssrn.259912.

⁶⁹ See <https://ec.europa.eu/digital-single-market/en/women-ict> and <https://ec.europa.eu/digital-single-market/en/women-digital-scoreboard>

to give stronger incentives to outplacement offices to also provide training to displaced workers.

- Many temporary help agencies have specialised in finding jobs for workers for whom it is particularly difficult to find jobs. These workers are typically less-skilled workers who are otherwise unlikely to participate in the labour market. Temporary help agencies can be publicly funded (as some already are, at least in part) to also invest in the skills of less-skilled workers who would otherwise not participate in the labour market.

4.2 Managing new labour relations

This section discusses policies that affect businesses and new labour relations. The policies discussed are preventing occupational safety and health risks (4.2.1); equalising the (administrative) treatment of non-standard work arrangements (4.2.2); and a new Social Dialogue (4.2.3).

4.2.1 Preventing occupational safety and health risks

Prevent occupational safety and health risks like mental health and stress related issues resulting from digitalisation and increased volatility in today's world of work, e.g. through an increased focus on prevention in employee assistance programs and improving uptake by increasing social acceptance through informed discourse and the delivery of personalised, cost-effective solutions enabled by technology.

As the 2019 WEF Global Risk Report⁷⁰ points out, in many ways, the mental health issues employees face are similar to the physical health and safety challenges of the 19th century as industrialisation changed the nature of work. Increased monitoring of workers, 24/7 availability, frequent job changes and the management of work by algorithms can raise levels of workers' stress. For insurers, mental health claims are rising fast both in terms of volume and value and are becoming one of the largest commercial claims in both these criteria across many European countries.

Employers have a key role to play and many, including multinational companies, are stepping into this gap, particularly for those in 'traditional' working structures. Businesses are beginning to build mental health well-being into company culture including offering preventative medical check-ups and training staff to recognise and address stress in colleagues. This has led to the rise of Employee Assistance Programs (EAP) offered to help employees navigate challenges at work and in their personal lives. Many employees can access early support related to topics like marital challenges, anxiety, and stress – thus providing an early-stage prevention approach that has proven to be very cost effective for employers. Aside from improving morale within firms, studies show that for every euro of investment in Employee Assistance Programs, companies save five euro through increases in productivity and reductions in absenteeism/presenteeism costs⁷¹.

⁷⁰ <https://www.weforum.org/reports/the-global-risks-report-2019>

⁷¹ See D. McDaid, Making the Long-term Economic Case for Investing in Mental Health to Contribute to Sustainability, IMPACT project, 2011 (and references therein), https://ec.europa.eu/health/sites/health/files/mental_health/docs/long_term_sustainability_en.pdf

Developing services that help individuals and companies manage mental health issues more proactively are clearly key. However, unlike many physical conditions, mental health conditions can be denied for a long time by the individual both to themselves and to those around them including the employer or sponsoring company. In the United Kingdom, for example, only 36% of those with common mental health problems receive treatment. Young people aged 16-24 in the United Kingdom were found to be less likely to receive mental health treatment than any other age group⁷².

Digitalisation plays an important role in both the accelerating problem of occupational safety and health risks as well as in potential solutions that deliver in a personalised, cost effective and accessible manner. We therefore recommend three areas of policy focus: policies to enhance public awareness and reducing workplace discrimination; **policies to increase the focus on prevention whilst improving recovery and management services; and policies to ensure access to these services for all.**

To enhance public awareness and reduce workplace discrimination, we would strongly recommend policymakers to promote actively public health campaigns with the aim of demystifying mental health issues, so that a proper informed dialogue and discourse can emerge in society to address this issue properly. Whilst rates are improving, at present most of those affected by mental health problems do not receive treatment. More specifically, policies should be targeted to three areas:

- reducing the stigma of mental health conditions and the low level of those with mental health conditions currently seek support;
- reducing discrimination against those with mental health conditions where currently individuals are more likely to experience bias when applying for roles and discrimination or abuse when in roles;
- focussing on disadvantaged groups not supported as strongly through traditional employment structures such as carers and gig economy workers.

For **policies that focus on the prevention of occupational safety and health risks,** we recommend detailed evaluation including:

- mindset: policymakers should consider proposing policies that either set strong financial incentives or make it mandatory for employers to understand the stress and mental well-being of workers and provide access to services aimed to prevent and remedy mental health issues. This would include detailed verification of the financial benefit.
- early identification: provision of support solutions to help their people identify and manage mental health issues confidentially.
- transparent reporting by companies of their results along with related key indicators, particularly those relating to inclusion.

To ensure all workers are protected from occupational safety and health risks, policies can extend access from those with high levels of current support through either traditional employment structures or personal wealth to those either with low access levels currently, negatively impacted in this respect by the move to more flexible and non-standard work models or where service cost is a particular barrier. To do this, we recommend:

- that policymakers extend the employer obligation to provide services to independent individuals working regularly or significantly with an employer;

⁷² Lubian, K., Weich, S., Stansfeld, S., Bebbington, P., Brugha, T., Spiers, N., ... & Cooper, C. (2016). Chapter 3: Mental health treatment and services. In S. McManus, P. Bebbington, R. Jenkins, & T. Brugha (Eds.), *Mental health and wellbeing in England: Adult Psychiatric Morbidity Survey 2014*. Leeds: NHS Digital

- a detailed evaluation of a pan-EU digital platform using personalised well-being, health risk and health tips to support wider access at low cost and to signpost more substantial actions and interventions. The service might well build on free services available to consumers through the private sector and use public-private partnerships to engage as wide an audience as possible and link to non-digital access points;
- free access to technology related prevention and assessment tools;
- mandatory enrolment for self-employed workers into a ‘pooled’ income protection plan provided through either the State or private enterprise but without extensive underwriting.

4.2.2 Equalising the treatment of standard and non-standard work arrangements

Equalise the (administrative) treatment of standard and non-standard work arrangements e.g. by providing equal access to government services, credit lines and limited mobility of benefits regardless of employment status.

There is a mismatch between the rise of diverse new working arrangements and a society built around the notion of standard employment. This causes significant and unnecessary administrative hurdles and risks for people engaged in non-standard forms of work. This may disproportionately affect women and minorities, who are often in non-standard employment. In a recent survey of European freelancers, 63% of respondents felt that ‘freelancers should be better recognised and supported by policymakers’ and 37% identified simplifying administrative procedures as one of their top two concerns⁷³.

There are many examples of administrative hurdles that workers face due to not being in standard employment. For instance, registering as a taxpayer, filing taxes, and getting an insurance is often much more complicated for self-employed workers than it is for standard employees. Self-employed workers are often treated as firms, even though they lack the dedicated administrative resources and know-how of a firm. People engaged in new forms of work also face hurdles in proving their income level for purposes such as obtaining a mortgage, as they are unable to present standard salary slips. Platform workers with significant work experience may struggle to prove their experience to a regular employer or educational institution, because they are unable to provide a conventional reference from a line manager.

All this is likely to cause people in non-standard working arrangements, many of whom are already less well off, to face an additional **‘non-standard work penalty’ consisting of costs and hurdles, reduced access to government services and credit, and reduced mobility to regular employment. Policies should address this diversity penalty.**

This diversity penalty should be addressed by ensuring that governments, financial institutions, and employers provide equally accessible services to all workers regardless of their form of employment or self-employment. These organisations should build administrative processes that account for the divergent characteristics of new forms of work, making the treatment of non-standard workers ‘standard’ within their organisations.

To help achieve this, the European Commission and other policymakers in dialogue with social partners should fund research on and develop a **guidebook that enumerates new**

⁷³ FEFIP and Malt, Ibid.

and non-standard forms of work and showcases best practices for addressing them in government institutions and the private sector. This could be coupled with a public awareness campaign to improve employers', government officials', and citizens' understanding of new and non-standard forms of work, to ensure all workers are treated as first-class citizens.

Labour market intermediaries, such as platforms, should build it into their processes to provide workers with all the necessary documentation, such as certificates of experience and income, as a matter of course. They should consult with government and financial institutions where necessary on the form of the documentation.

4.2.3 A new Social Dialogue

Reinvigorate social dialogue through intensified and better organised dialogue of workers and social partners especially in the platform economy. For example, workers could discuss issues in a bottom up manner in dedicated, moderated online spaces (**Social Worknets**), while unions, employers, as well as platform operators should participate in an ongoing exchange for improved collective outcomes (**Social Digilogue**).

We believe that continuing the social dialogue is crucial as Europe strives to combat the rise of inequality that threatens social cohesion. Unions have had a significant equalising effect on wage inequality, negotiating wage *premia* especially for less-skilled workers⁷⁴. But in most advanced economies, union activity was at its peak in the 1950s, 1960s and 1970s. Union activity has generally declined since 1980s.

One reason for this decline is the process of employment deindustrialisation, and the difficulties of trade unions to organise workers in new establishments in particular. The 'gig economy' has also emerged as a small but mostly non-unionised sector, despite significant efforts and some successes by unions to organise gig economy workers. Structural changes in the labour market, in part associated with digitalisation, are thus challenging the social dialogue in many EU Member States. At the same time, new working arrangements are shifting the balance of power away from workers towards employers or, in the case of the 'gig economy', towards platform makers.

We believe that digitalisation should be seen not only as a threat, but also as a resource in reinvigorating social dialogue. Social partners should (and in many cases have already started to) **review and revise their organisational models, participatory processes and campaigning repertoires in line with what is possible and necessary in today's environment**.⁷⁵ Today's workers are used to social media, smooth user interfaces, always-on services, and participation in real time; unions must adapt to these changing preferences and re-launch mobilisation efforts using digital tools.

In addition, we believe that collective worker voice could be strengthened across EU labour markets via new '**Social Worknets**' where workers discuss issues in a bottom-up manner, and '**Social Digilogue**' in which workers, employers and third parties engage in informal real-time social dialogue. For instance, many workers, including platform work-

⁷⁴ Farber, H. S., et al., Unions and Inequality Over the Twentieth Century: New Evidence from Survey Data, Working Paper 24587. National Bureau of Economic Research, 2018, <https://doi.org/10.3386/w24587>.

⁷⁵ For an example, see Pasquier, V. and Wood, AJ, ETUI Policy Brief, European Economic, Employment and Social Policy, N° 10/2018. ETUI: Brussels, 2018.

ers, have self-organised into informal social media groups in which they support each other and formulate collective responses to workplace issues⁷⁶. In these groups, even non-unionised short-term gig workers' voices are expressed, and such groups have already had demonstrable impacts in some gig economy disputes in European cities⁷⁷.

With investments into technology, such informal worker voices can be further strengthened. For instance, Coworker.org is a platform that allows people who work for a given company to form a 'network' together. Some networks have tens of thousands of members. Any member can start a campaign to advocate for changes in their workplace, and others can sign their petition. Workers use the platform to campaign on diverse issues, from corporation-wide pay policies to improvements to the local break room. The companies range from large multinational corporations to local firms and gig economy platforms, and participating workers range from standard employees to temporary and 'gig' workers. Many campaigns have been successful in starting a dialogue with the employer and achieving significant changes. The platform is maintained by a US-based non-profit organisation.

We recommend that **unions start to support such 'social worknets'**: digital spaces in which workers of all types, regardless of the form of employment or self-employment, can develop collective voices in an informal and bottom-up manner. Social worknets should be inclusive to all workers regardless of union membership, though a successful social worknet could turn into a powerful recruitment channel for a union. Union support would add value by ensuring that the spaces are not dependent on employers and social media companies, and by contributing expertise into the discussion.

We moreover recommend that **employers and third parties start listening to the voices emerging from social worknets**, and that they join the workers in informal social dialogue, or 'social digilogue' taking place over digital media. Social digilogue is not a substitute to formal institutionalised social dialogue, but instead complements it with more direct, real-time and granular dialogue on the level of individual firms and labour market intermediaries. Thanks to its digital and informal nature, social digilogue can also cross national boundaries, complementing or facilitating European Works Councils that tackle transnational social dialogue in bigger companies.

At the same time, **EU Member States should ensure that there are no legal barriers to formal collective representation of workers in new forms of work**, such as platform-based work. Platforms create a triadic economic relationship, where the worker is often simultaneously a legitimate independent contractor towards the client, whilst at the same time being to varying degrees dependent on the platform⁷⁸. While competition law forbids cartels between independent contractors against clients, it should not prevent collective representation towards the platform.

⁷⁶ Wood, A.J., Lehdonvirta, V. and Graham, M., Workers of the Internet unite? Online freelancer organisation among remote gig economy workers in six Asian and African countries, *New Technology, Work and Employment*, 2018, Vol. 33 No. 2, pp. 95-112.

⁷⁷ See for example Johnson, H. and Land-Kazlauskas, C., Organizing on-demand: representation, voice, and collective bargaining in the gig economy, ILO Working Paper, *Conditions of Work and Employment Series* n. 94, March 2018, [https://www.ilo.org/travail/whatwedo/publications/WCMS_624286/lang--en/index.htm](https://www.ilo.org/travail/whatwedo/publications/WCMS_624286/lang-en/index.htm)

⁷⁸ Wood A. J. and Lehdonvirta, V. 2019. The shape of labor relations to come: structured antagonisms, collective action and the gig economy. LERA: Cleveland 15th June 2019.

4.3 A new social contract

This section discusses policies that affect or regulate markets and institutions. The policies discussed are social protection that is neutral to the type of contract (4.3.1); a Digital Single Window for employment contributions and taxes (4.3.2); and different ways to redistribute the rising value of digital ownership (4.3.3).

4.3.1 Neutral social protection

Ensure **neutral social protection** against unemployment, sickness and other life circumstances **independent of employment status**. The increasing number of Europeans with non-standard employment should have access to social protection e.g. through portable benefits attached to the worker rather than the job or the establishment of an ‘underemployment insurance’ to smooth out fluctuating incomes in the ‘gig economy’.

Social protection in case of unemployment, sickness, accident, old age, becoming a parent, and other life circumstances is a fundamental part of the European social model. Protection is provided through means such as social insurance and social assistance, details varying between EU Member States. However, the schemes tend to assume that a person is either in standard employment or unemployed. As a result, people engaged in new and non-standard forms of employment often fall between the cracks. In a recent survey of European freelancers, 89% of the participants felt that social security should be improved for freelancers⁷⁹.

For instance, self-employed workers are typically individually responsible for enrolling to and paying for sufficient unemployment insurance, disability insurance, and pension. Many younger workers lack awareness of how weakly they are protected, and firms are incentivised to hire independent contractors over regular employees as it reduces their overhead costs. Older workers tend to be more concerned, but potentially too late to act. For workers with fluctuating incomes, contribution payments can moreover be so inflexible as to constitute a financial risk in themselves.

As a result, human capital is lost as workers encounter risks unprotected. Public finances take a hit if ageing workers eventually fall on safety nets. In some cases, skilled freelancers working through online platforms maintain part-time service sector jobs on the side just to qualify for social protection, resulting in friction and skills mismatch.

We recommend moving away from social protection that hinges on a person's employment status and towards social protection that is neutral with regards to the technology and forms of employment and self-employment. This could involve portable benefits attached to the worker rather than to the job, ‘underemployment insurance’ or social insurance that addresses fluctuating and episodic income, and universal (as opposed to means-tested) benefits offset with steeper tax progressions.

Neutral social protection should benefit all workers including self-employed equally and should seek to equalise the overhead costs across forms of employment and self-employment. While details will vary between EU Member States, this is a major policy undertaking that should be planned and agreed to on a European level.

⁷⁹ EFIP and Malt, Ibid.

4.3.2 A Digital Single Window for employment contributions and taxes

Create a **Digital Single Window** for employment contributions and taxes for self-employed working on online platforms for multiple and rapidly changing employers. Through a digital interface automated reports from platform companies would allow collecting earnings data in a standardised digital format to reduce the cost of compliance.

New and non-standard working arrangements complicate the collection of taxes and social security contributions. In the worst case this could undermine the financial basis of the European social model. But if handled correctly, digitisation could have the opposite effect, reducing compliance costs and increasing collection coverage.

For instance, freelancers working through online platforms typically work for multiple rapidly changing employers, who are frequently located abroad⁸⁰. The compliance rate of such employers with contribution schemes that rely on employer reporting is likely to be low. The compliance rate is also likely to be low for schemes that rely on worker reporting, especially when the platform work is only a casual source of income⁸¹. A European Commission survey suggests that around 8% of European adults obtain casual income from platforms with some frequency⁸², and even many full-time freelancers find compliance burdensome⁸³.

To reduce compliance costs and increase coverage, governments and insurers should obtain earnings data from platform companies and other labour market intermediaries. Instead of workers having to file manual reports, the data should come automatically from platforms in a standardised digital format, slashing the total cost of compliance. Since a large part of what used to be informal employment (e.g. unlicensed taxis) is now likely to take place through platforms, such a system could increase coverage even beyond pre-platform levels.

A handful of EU Member States have already created arrangements to receive data directly from platforms. However, it is important to avoid creating a situation where platforms must report to numerous different institutions in as many member states as workers are signing up from. Such fragmentation would hold back European start-ups and favour large global platforms. Instead, the European Union should seek to achieve a harmonised Digital Single Market also in digitally delivered labour services.

To this end, the European Union should create a Digital Single Window for reporting employment contributions and taxes. This would consist of a machine interface for receiving automated reports from platform companies and other European companies that wish to cut reporting costs. Income data on each worker would be forwarded to the worker's national institutions for calculating and collecting liabilities. The system could also optionally withhold contributions on behalf of participating national institutions. An additional human-readable web user interface would allow convenient reporting also by self-employed people themselves and by start-up companies with workers across Europe.

⁸⁰ Kässi, O. and Lehtonvirta, V., Ibid.

⁸¹ Wood, A. et al. 2019. Networked but Commodified: The (Dis)Embeddedness of Digital Labour in the Gig Economy. *Sociology*. <https://doi.org/10.1177/0038038519828906>

⁸² Pesole, A. et al., Platform Workers in Europe: Evidence from the COLLEEM Survey, JRC Working Papers JRC112157, Joint Research Centre (Seville site), 2018.

⁸³ EFIP and Malt. 2019, Ibid.

Use of the Digital Single Window would be entirely voluntary: it would be a convenience ‘wrapper’ around national systems, thus not infringing on EU Member States’ competences in social protection (see⁸⁴ for a similar proposal). However, the system could be used to introduce EU-wide voluntary minimum standards, which platforms would need to comply with in order to enjoy the convenience of the Digital Single Window. Local authorities could also choose to make compliance with the Digital Single Window a licensing condition for ‘gig’ platform firms wishing to operate in their markets.

4.3.3 Redistributing the value of digital ownership

Redistribute the value of digital ownership, e.g. through treating data as either capital, labour or intellectual property. To the extent that workers’ and consumers’ data are used to increase the firm’s value, this should be recognised and compensated accordingly.

The increasing appropriation of data by large companies has been facilitated by a shared and, so far, unquestioned view of online data provision by users in terms of a barter, which exchanges consumption of online services against personal data, rather than data production, worth of remuneration. On the one hand, therefore, data produced and treated within the firm has led to standard practices of workers not being directly compensated for sharing their private data with firms. On the other hand, data sets, data development and analytics and data management skills are included and accounted for as intangible assets of firms, contributing to the knowledge-based capital in national accounts, alongside Research & Development (R&D), Intellectual Property Rights (IPR), training, software, engineering and design, marketing and branding, as their gathering, accumulation and treatment entail investments from firms.

These developments pose a number of important questions.

Who creates the value associated to data and owns it? Data generators or data capitalists?

Does the issue of value associated to data ownership boil down to ‘Data as Capital’ (which should be subject to general taxation) versus ‘Data as Labour’ (which should be remunerated through a wage premium for workers creating and treating data)?

Does this resolve the issue of the value created by consumers – a much larger category of data owners than workers – and appropriated by firms?

The answers to these questions determine how policies should redistribute the value of digital ownership and make the gain of digital transformation more equally distributed. Data owners create value individually, that is extracted by data capitalists through investments in digital infrastructures, organisational and human capital that allow data collection and accumulation, data treatment and analysis. How to redistribute the gains of digitalisation by rewarding data-value creators and/or taxing data-value extractors?

One way is to consider **Data as Capital (DaC)** and to rely on supranational public institutions that create the (so far missing) market for data⁸⁵, and design an adequate system of

⁸⁴ Weber, E., Setting out for Digital Social Security, ILO Working Papers 995008793202676, International Labour Organization, 2018.

⁸⁵ Ibarra, I. A., et al., Should We Treat Data as Labor? Moving Beyond “Free”, American Economic Association Papers & Proceedings, 2018, Vol. 1, No. 1, <https://ssrn.com/abstract=3093683>; Ibarra, A. et al., Ibid. Posner, E. A. and Weyl, E.G., Radical Markets: Uprooting Capitalism and Democracy for a Just Society, Princeton, NJ: Princeton University Press, 2018.

taxation of current data owners, similarly to what has been proposed over thirty years ago with the ‘bit tax’⁸⁶, and more recently with the ‘robot tax’, as proposed to the European Parliament from the Committee of Legal affairs⁸⁷. European Union law on the protection of personal data, including the European General Data Protection Regulation (GDPR) already aims to shift the rights of data (value) creation to the users that generate them. This proves that a concerted government action can play an important role towards building a new regulatory framework that deals with the (market) failure of a missing market for data. The fact that data are included as intangible assets in firm balance sheets could facilitate the practical implementation of a data-related tax on intangibles assets by fiscal authorities. The very nature of data would however make the role of supranational fiscal institutions more appropriate, in a context of increasingly undermined traditional national tax base.

Another way is to treat **Data as Labour (DaL)**, worth of remuneration. There are several possible advantages of treating private data as labour. First, directly compensating workers for their private data may increase the productivity of Artificial Intelligence systems. Second, treating private data as labour encourages entrepreneurship and innovation by individuals, leading to an increase in the quality and quantity of data. Third, rewarding workers for their private data can be a source of self-esteem. Fourth, paying workers for their private data would reduce the need to redistribute income by imposing a corporate tax on income from digital activities, as illustrated earlier.

A third, novel, and more inclusive way to tackle the issue of redistributing value from data ownership that we propose in this report is to treat workers’ and consumers’ **Data as an Intellectual Property, worth of being protected by an IPR (DaIPR)**. Data generated by both workers (within a firm/labour contract, and in the process of working) and by consumers (outside the firm but in the process of consuming services and appropriated by a firm) are owned by them and therefore can be treated as an intellectual property. This might (or might not) contribute to the (intangible) capital asset of the firm, which, through investments in infrastructures, organisational and human capital, proceeds to data collection, accumulation, treatment and analysis.

To the extent that workers’ and consumers’ data are used by the firm to increase its intangible assets, they should be recognised and paid an Intellectual Property Right (IPR) for the use of these data. This changes the nature of the contract (it would not be an employment contract, but an exchange of the basis of an intellectual property right) and aligns better to the nature of the exchange: a licence to use an intellectual property, owned by the worker or consumer and used by the firm, who pays a license to use it. The stock of data becomes an intangible asset of the firm, which would be subject to usual capital taxation, alongside other intangible and tangible assets.

A condition for a DaIPR framework to work is that the licence should be tax-free for the consumer and workers, to avoid undermining the redistribution rationale of the policy recommendation. The duration and the dimension of the licence fee should be the object of specific analysis to design this.

There are some advantages of an approach based on DaIPR over the others. For example, it could reduce the infrastructural burden to administer a digital tax or change digital ownership; avoid that dismissed workers lose their rights on data ownership once they are out of the labour contract; reduce the likelihood that certain workers miss being paid a wage

⁸⁶ Soete, L., Kamp, K., Taxing consumption in the electronic age, *Intermedia* 25/4, August 1997.

⁸⁷ http://www.europarl.europa.eu/doceo/document/A-8-2017-0005_EN.html. See also for a response R. Viola, Robotics will be a key driver of economic growth, *The Parliament Magazine*, December 2017, <https://www.theparliamentmagazine.eu/articles/opinion/robotics-will-be-key-driver-economic-growth>

against the use of their data; last, not least, make sure that firms keep paying an IPR to consumers who have completed/exhausted their consumption transactions and yet they have already provided data that keep contributing to the intangible asset of the firm.

5 IMPLEMENTATION CONSIDERATIONS

The policy recommendations provided in Section 4 are deliberately holistic, diverse and innovative in nature. While all of them require further analyses and detailing to develop more concrete, individual proposals that can potentially be implemented – all of them will be enabled through four main levers:

- a) **Funding:** e.g. enabling Digital Skills Personal Learning accounts or the upgrading of career counselling at scale in light of the digital transformation of EU labour markets.
- b) **National regulation:** e.g. standardising the treatment of non-standard work to reduce the additional "diversity penalty" consisting of costs and hurdles, reduced access to government services and credit, and reduced mobility.
- c) **European Union regulation:** e.g. establishing quality standards for the training of the career guidance professionals at the EU level or introducing a Digital Single Window for employment contributions and taxes.
- d) **Renewed collective action:** e.g. strengthening of Social Worknets through intensified dialogue of workers and social partners in the platform economy.

In order to get from recommendations to potential actions, the following table provides an initial overview of which actor or combination of actors are needed to primarily advance each of these recommendations as a next step.

Table 1: Policy actors involved in the policy recommendations

		European Union	Member States	Employers	Workers	Intermediaries	Social Partners
4.1	A skilled workforce						
4.1.1	Digital skills personal learning accounts	X	X	X	X	X	
4.1.2	Provision of relevant career guidance	X	X	X			
4.1.3	Supporting intermediaries to reduce skill gaps			X	X	X	
4.2.	Managing new labour relations						
4.2.1	Preventing occupational safety and health risks	X	X	X	X	X	X
4.2.2	Equalise treatment of non-standard work arrangements	X	X	X			X
4.2.3	A new Social Dialogue			X	X	X	X
4.3	A new social contract						
4.3.2	Neutral social protection	X	X	X		X	X
4.3.3	A Digital Single Window	X	X	X		X	
4.3.4	Redistributing value of digital ownership	X	X	X			

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