



Impact of digitalisation and the on-demand economy on labour markets and the consequences for employment and industrial relations

STUDY



European Economic and Social Committee



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Final Study

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Abstract*

Digitalisation is transforming business landscapes and the world of work, and redefining the boundaries of production, consumption and distribution. This has created tremendous opportunities, as new products, processes and techniques have emerged, but has also created threats, as new ways of employment pose new challenges to employers and employees. The overall consequences on labour markets are, however, still highly uncertain, which is reflected in the wide variation in the outcomes of the existing research. The initial government responses appear to be reactive rather than proactive, and targeted towards mitigating the side effects of digitalisation instead of aiming to reap its potential benefits.

This study focuses on the impact of digitalisation and the on-demand economy on employment and industrial relations. Traditional businesses and industries as well as new forms of work in the on-demand economy are assessed. For both, job creation and destruction, interaction with customers and workers/employees, labour relations in terms of both the organisation of work and industrial relations as well as government responses, with a specific focus on labour conditions, taxation and social security, are discussed. The study emphasises in particular aspects relevant to employers.

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Table of Contents

List of Abbreviations	4
Executive Summary	5
1. Introduction.....	8
2. Impact of digitalisation on employment	11
2.1 Traditional businesses and industries.....	11
2.2 On-demand economy	16
3. Impact of digitalisation on enterprises	26
3.1 Interaction with customers	26
3.2 Interaction with employees	30
3.3 Level of digitalisation in the EU	33
4. Impact of digitalisation on labour relations	37
4.1 Traditional businesses and industries.....	37
4.2 On-demand economy	44
5. Government responses to digitalisation	49
5.1 Traditional businesses and industries.....	50
5.2 On-demand economy	52
5.2.1 Organisation of platform work.....	53
5.2.2 Taxation	53
5.2.3 Social security	55
6. Conclusions.....	58
References.....	61
Glossary	70
Annex 1. Interviews.....	71

List of Abbreviations

AI	Artificial Intelligence
AMT	Advanced Manufacturing Technologies
API	Application Programming Interface
B2B	Business-to-Business
B2C	Business-to-Consumer
BYOD	Bring Your Own Device
CEDEFOP	Centre for the Development of Vocational Training
COE	Conseil d'Orientation pour l'Emploi
CRM	Customer Relationship Management
DAE	Digital Agenda for Europe
DESI	Digital Economy and Society Index
DSM	Digital Single Market
eID	Electronic Identification
eTS	Electronic Trust Services
EU	European Union
ERP	Electronic Resource Planning
GDP	Gross Domestic Product
ICT	Information and Communications Technology
IFT	International Federation of Robotics
IoT	Internet of Things
IRS	Internal Revenue Service
IT	Information Technology
NIS	Network and Information Security
NL	The Netherlands
OSH	Occupational Safety and Health
PAC	Privacy and Cyber-security
PET	Privacy Enhancing Technologies
POS	Point-of-Sales
RFID	Radio-frequency identification
R&D	Research and Development
SE	Sweden
SMEs	Small and Medium-sized Enterprises
UK	United Kingdom
US	United States
VAT	Value Added Tax
VHC	Very High Connectivity

Executive Summary

Broader application of ICT and new digital technologies such as data analytics, artificial intelligence (AI), 3D printing, cloud computing, Internet of things (IoT) and robotics are changing the labour markets. Previous industrial revolutions led to clear welfare gains and more jobs. It is currently unclear whether this will also be the case for the digital revolution.

This study focuses on the effects of digitalisation in the EU on traditional businesses and industries and the on-demand economy, as well as the interaction and converging trends between them. The study emphasises the opportunities that digitalisation creates and the barriers that prevent employers from taking them, then highlights the challenges of overcoming these barriers, identifying when possible how this can be done.

The study focuses especially on the perspective of employers, sectors and businesses of all sizes, which has been relatively underrepresented owing to the literature's frequent assumption of the perspective of the platform worker¹ or employee.

Impact of digitalisation on employment

Digitalisation transforms existing jobs, demanding new skills to carry out new tasks, which may imply that the current work force has to be retrained or replaced by workers who already have these skills. Digitalisation gives rise to new jobs, while other jobs become redundant. These dynamics are not new. There are many examples of how new technologies, like steam engines and electricity, have shaken up the world of work before. In the past, technological progress initially led to a contraction of labour demand before it started generating new jobs.

The main question now is whether this revolution will have similar effects. There are several studies that estimate job creation and destruction resulting from digitalisation in *traditional businesses and industries*. Results vary widely and depend on the methodology applied and the countries examined. Estimates generally take into consideration the potential number of routine and non-routine jobs that can be automated, which does not mean that automation will also happen. Only a few studies also account for job creation through the development of new technologies and other effects such as productivity gains.

These estimates suggest that digitalisation is likely to contribute to labour market polarisation. Especially low- and middle-skill jobs are assumed susceptible to automation. Digital skills will be in high demand in the labour markets of the future, as will entrepreneurial skills and creativity.

¹ Within the context of the study the term 'platform worker' is used to refer to those who offer their labour on an online platform. With this term a neutral position is taken, because there still is much discussion about the status of those who work through an online platform and platforms may differ substantially from each other in this regard. See the Glossary for the main terms and definitions applied.

As it is already difficult to assess the impact of digitalisation in terms of job creation or destruction on traditional industries and businesses, it is even more difficult to assess the impact on the *on-demand economy*. The on-demand economy is currently largely absent from official statistics. Most studies have, therefore, relied on surveys and case studies in order to analyse the size of the sector, how work is organised, who is working on what platforms and how much they earn. In Europe, the on-demand economy is still fairly small, despite its impressive growth.

Impact of digitalisation on enterprises

Digitalisation has a strong impact on enterprises, both in manufacturing and services industries, where converging trends are detectable in the way micro, small and medium-sized enterprises interact with customers and employees. The main factors for successful adaptation are the ability to collect and exploit data, the interconnection of value chains, the creation of digital customer interfaces and mitigation of cyber threats.

Digitalisation can substantially lower market entry barriers, opening up potential markets that firms can serve, and create new ones. The widespread use of algorithms enables online platforms to exchange goods and services including labour. Algorithms are also transforming traditional companies, enabling them to better manage their assets and processes, while redefining their strategies according to innovative solutions. Trends in ‘platformisation’ and asset dematerialisation are significantly reducing costs of using ICT tools, e.g. data storage, sharing and processing, and improving collaboration within working teams. Overall, digitalisation reduces transaction costs, maximises trading volumes, and improves demand and supply matching.

In *traditional businesses and industries* digitalisation affects existing organisational and management structures, which is most visible due to the higher flexibility and fragmentation of work, changing work monitoring methods, recruitment strategies, and skill and training needs. More generally, the real challenge for industrial operators is whether they, as established firms, can engage their own digital transformation before disruptive competition forces them out of business. Digitalisation also raises questions on the role of and interaction between robots or platforms and employees or users, touching on issues related to legal responsibility, data protection and work safety rules.

In the *on-demand economy*, virtual work is more flexible by design, i.e. online labour market. This flexibility fades significantly when services have to be delivered physically and locally, e.g. local labour market. The relationship between online platforms and individuals who offer their skills and time online has been the subject of widespread debate, though no clear-cut answer has been put forward in most cases.

Impact of digitalisation on labour relations

As digitalisation and the emergence of the on-demand economy have enabled new forms of employment, e.g. online or distance work, they severely affect how work is organised and how employers and employees interact with each other. With digitalisation and the on-demand economy, work has become less bound to space and time, e.g. more autonomy and better monitoring of work outcomes. There are also, however, challenges to overcome, such as maintaining a healthy work-life

balance. There is an important role for negotiations between employers and employees. Informing and consulting workers prior to the introduction of new technologies, in accordance with relevant national practices, may smooth the transition. Early results suggest that finding ways in which technology can support workers in their tasks, rather than replace them, generates the most benefit for all involved.

Digitalisation affects labour relations between employers and employees in *traditional businesses and industries*, because it drastically changes the organisation of work and the relationship between employer and employee. As a result of digitalisation, the organisation of work is characterised by increased flexibility, which affects when, where and how tasks are performed. This may bring advantages to employers and employees, in the form of improved work-life balance and more autonomy. It is, therefore, not very surprising that both employers and employees have expressed an interest in more flexible work. However, flexibility can also have an impact on worker income certainty, e.g. when it results in income variability, their social security and work-life balance. More flexibility requires monitoring or recording of work, mutual trust and new forms of management. Existing legislation and rules may prevent firms from fully reaping the benefits of flexibility. For instance, regulations on working time in many countries are tied to the location where work is being performed and current collective agreements are not always digitalisation-proof.

In the *on-demand economy*, the status of those who offer labour through an online platform has been much discussed. As no consensus has been reached on whether platform workers are self-employed or employees, the role of industrial relations remains unclear. The actors in the on-demand economy are typically not represented and collective bargaining is largely absent. Interestingly, platform workers have recently been the subject of several initiatives to unite or gain representation – whether on the initiative of the platform workers themselves or through unions or new types of organisations. Less seems to be happening regarding platforms. Discussions in this domain have largely focused on work conditions and remuneration.

Government responses

While digitalisation and the on-demand economy are high on the agenda of European policy-makers, there is substantial variation in the priorities of individual member states. Some countries, such as Estonia, have been front runners when it comes to encouraging digitalisation. In other countries, the debate centres on more traditional labour-related questions. Nevertheless, many governments have acknowledged the potential that digitalisation and the on-demand economy creates for their economy and businesses, citing benefits such as potential productivity gains and new forms of work and activities. Governments have, however, mostly focused on attempting to address the side effects of the on-demand economy, such as job losses, declining competition and concerns about the status of workers.

In *traditional businesses and industries*, it appears that most efforts have focused on labour conditions and taxation. There is only limited evidence of initiatives or responses that relate to social security. In turn, many governments have come up with proposals on how to deal with certain issues, e.g. social security-related issues, of the *on-demand economy* but have not yet put them into practice. In other cases or domains, local governments have taken measures, e.g. taxation of Airbnb flats.

1. Introduction

Digitalisation is radically reshaping business landscapes and the nature of work, as well as redefining the boundaries of production, distribution and consumption. Technology-driven innovations are transforming both manufacturing and services sectors through the increasing incorporation of artificial intelligence and automated systems (online platforms, robotics, machine learning, big data, etc.). These trends represent both threats and opportunities for employers² and employees³, who need to adjust work organisation, job allocation and skills.

Digitalisation has thus major implications for the labour market. In particular, digitalisation will change both the quantity and quality of labour demanded. Indeed, an ever increasing part of work can be performed automatically, with limited or no human intervention. This phenomenon is not new: during industrialisation, primarily simple, repetitive tasks were automated. What differs now is that less frequently performed and more complex tasks are also increasingly subject to automation, e.g. administration. This reduces the demand for low-skilled but in particular medium-skilled and even the lower levels of high-skilled white collar workers that currently perform these tasks. In turn, the remaining workers require different, often higher, more creative and technical skills to design, maintain and work with the new applications. Digitalisation also allows workers to do their work more efficiently. In particular, in recent decades, digitalisation has primarily changed the way people work, with, for example, more support from online communications and information-sharing as well as mechanical support for information processing, which in principle means less people are needed to perform the same task, but also that the skills demanded of workers may change, i.e. digitalisation primarily takes over simple tasks, thus workers must have higher qualifications. In addition, digitalisation also creates new forms of employment. For instance, new techniques such as big data analytics, additive printing, automation, virtual reality and the Internet of things allow for the development of new, more complex and sophisticated products and services. The new jobs to develop and maintain these products/services often require higher skills, while the application of the technologies can also create more service-oriented low-skilled jobs. The transition towards the more digital labour market can in turn be facilitated by digital solutions such as e-learning.

For the most part, the way in which work is allocated and organisations are organised has remained largely the same as before digitalisation. Hence, human interaction still plays an important role in allocating work and most people still work inside organisations. The ongoing digital revolution is now slowly changing this realm of work, with platforms intermediating work between individuals online without the intervention of people or organisations other than the platform. The on-demand economy seems for the moment not to have a great impact on the offline labour market or the create/destroy

² The term “employer” refers in this study to businesses and organisations that hire staff to carry out specific tasks which are packaged into a job, in return for a remuneration. The relationship between the employer and his or her employees is based on a formal employment contract and hierarchical in nature. No distinctions are made between employers, whether size of their business or their business model. See the Glossary for the main terms and definitions applied.

³ The term “employee” refers only to those who work as subordinates in hierarchical relations, i.e. employees who have a formal employment contract and carry out work for an employer in return for remuneration. See the Glossary for the main terms and definitions applied.

impetus.⁴ The only exception may be the taxi sector in some of the larger cities in the European Union, where the on-demand economy platforms (in particular, Uber) have gained traction. Nevertheless, the low level of development of the on-demand economy provides a potential opportunity to create new jobs. Hence, the services that were before not intermediated can potentially, through further reductions in transaction costs, become marketable and create in particular low-skilled service jobs.

The on-demand economy has many synonyms or associated concepts, including the access, sharing or collaborative economy.⁵ The chosen definition for the on-demand economy covers a broad range of popular initiatives including Airbnb, BlaBlaCar and Uber, but also numerous smaller, local yet unexplored initiatives that could potentially be expanded to all sectors of the economy. The online on-demand economy is not a homogenous market. There are great differences between the characteristics of the work that is intermediated and the jobs that are being created. In general, there are three main distinguishing factors. The first factor is the type of activity; on-demand platforms are intermediating goods, services and combinations of both. The greater the goods component of the activity, the smaller the labour component. The second factor is the location of the activity. Some intermediated products/services are virtual, which creates in general a larger, more competitive market. The third distinguishing factor is that one can find both high- and low-skilled services on offer. The current paradigm might, however, shift when the on-demand economy expands and other sectors are affected. Besides the direct impact on people working for platforms, a larger on-demand economy might also have an implications for labour relations. Traditional businesses and industries might be more constrained in their offerings to employees and could start using platforms to outsource some activities as well as use techniques similar to those of platforms to allocate and schedule work.

This study looks at the impact of the digitalisation and on-demand economy on the labour market, and in particular how it changes the roles of employers, employees and organisation of work. This includes enterprises active in traditional businesses and industries as well as platforms and special agents active in the on-demand economy. The study focuses on the European Union in general as well as Estonia, Finland, France, Germany, Italy, the Netherlands, Poland and the United Kingdom. In addition, experiences from outside the EU such as Canada are used to illustrate potential consequences. Analysis is based on desk research and interviews with 22 key stakeholders including employers' and employees' representatives, platforms, sector organisations, policy-makers and other experts. The work was conducted between July 2016 and February 2017.

⁴ Based on estimates of work performed through platforms focusing on the intermediation of services in De Groen & Maselli (2016), approximately 100,000 workers were active in the online on-demand economy in the EU at the end of 2015. They represent around 0.05% of the total employees in the EU, which is significantly less than the 0.4% to 1% of employees that is assumed to be participating in the US. The large difference between the EU and the US may be explained by the fact that the platforms began later in the EU and take more time to develop due to fragmented markets and regulation, as well as the fact that labour is more protected and sector concerns may be more regulated, e.g. it is forbidden to offer taxi services without a license in most European countries.

⁵ While the emergence of the on-demand economy has prompted much attention in recent years, the policy debate is still hampered by a lack of a clear definition and a lack of unbiased and complete evidence. In this research a broad definition of the 'on-demand economy' is applied. The on-demand economy is defined as the new phenomenon of digital peer-to-peer intermediation that provides consumers temporary access to one another's goods and/or services without owning them. See the Glossary for the main terms and definitions applied.

Chapter two will discuss the impact of the on-demand economy and digitalisation on employment. The impact of digitalisation on both traditional businesses and on-demand platforms is assessed in chapter three. The impact on labour relations is discussed in chapter four. Chapter five is an overview of government responses to changes in employment, e.g. in terms of policy and legislation. Conclusions are drawn in the sixth and final chapter.

2. Impact of digitalisation on employment

This chapter focuses on the work that is created through digitalisation in traditional businesses and industries as well as through new on-demand platforms for which digitalisation is an enabler. It provides various estimates of overall employment creation and destruction through the transition as well as of distribution across specific sectors and businesses. The chapter also assesses the impact of the transition on remuneration and labour conditions⁶.

2.1 Traditional businesses and industries

The digitalisation of the economy, or **fourth industrial revolution**, as some experts have labelled it, will have severe consequences for job creation/destruction. There are, however, largely diverging views on the extent to which broader application of ICT and new digital technologies such as data analytics, artificial intelligence, 3D printing, cloud computing, the Internet of things (IoT) and robots will cause change, eliminate existing jobs, and create new activities and jobs. Besides automation, globalisation, economic developments and the changing preferences of consumers and procedures will also change labour demand and supply.

The previous industrial revolutions led to **welfare gains and an increase in jobs**, though in most cases it took some time before they were realised. In fact, technological development, e.g. steam, electricity, the assembly line, first led to a contraction of the economy before it started growing again (Mokyr et al., 2015; OECD, 2015). It remains to be seen whether the digital revolution will also lead to an improvement of socio-economic conditions. Based on currently available information it is impossible to be conclusive about the specific processes and groups that will be affected by digitalisation.

New technology has an ambiguous effect on **existing products and services**. On the one hand, it is likely to contribute to higher productivity, which would mean that fewer workers would be required. On the other hand, increased productivity will most probably lead to lower prices and thus more demand. It is difficult to determine how strong both effects would be and they would likely differ between sectors, regions and across time. Uncertainty about the impact of automation on job creation is also demonstrated in surveys by technology experts, such as a Pew Research Center survey that shows a large divide in opinions on whether automation will create or destroy jobs (Smith & Anderson, 2014).

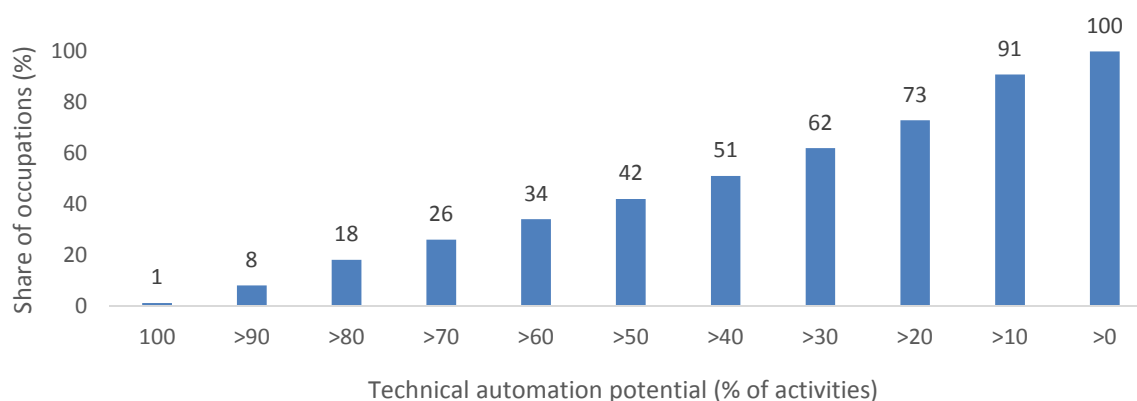
Estimates of the **impact of digitalisation** also show a large variation. Frey & Osborne (2013), for instance, estimated that about 47% of US employment is at risk in the next 10 to 20 years. In the UK, about 35% (Frey & Osborne, 2016) of jobs are at risk and in Finland 36% (Pajarinen & Rouvinen, 2014). In many developing countries the share of employment at high-risk of automatisisation is

⁶ Within the context of this study, the concept of “labour conditions” (or “organisation of work”) is used in a very broad sense. Labour conditions are understood as the circumstances or conditions in which the work is being performed. Examples are the place where work is carried out, e.g. at home or in the office, or the times during which work is done, e.g. during the weekend or at night. See the Glossary for the main terms and definitions applied.

substantially higher. For example, in India 69% of employment could be automatised, in China 77% and in Ethiopia 85% (Frey & Osborne, 2016). When the same methodology is applied to OECD members, the average share of employment at risk due to digitalisation is about 57%. The differences between countries are explained by the progress that has already been made as well as to what extent jobs depend on face-to-face interaction (Arntz et al., 2016).

Based on **demonstrated technologies** many activities can be automated, but in most cases this does not make the jobs disappear entirely (Autor & Handel, 2013). For example, in OECD countries, Arntz et al. (2016) estimated that in only 9% of jobs could more than 70% of the activities be automated. McKinsey Global Institute estimates show that the activities of only about 1% of jobs could be automated entirely based on demonstrated technologies, while a large share of activities of many more jobs could be automatised. At least 30% of the activities of 60% of the jobs is automatable (see Figure 2.1). In the five largest EU economies⁷ automatable activities represent the equivalent of about 62 million full-time jobs or €1.75 trillion in annual wages.

Figure 2.1. Automation potential based on demonstrated technologies (share of occupations)



Notes: The figure above shows the estimated potential for automation based on technologies that have proved their effectiveness. Automation potential is expressed both for the share of occupations and the minimum share of activities that combine to form the occupation. For example, more than 40% of the activities of 51% of the occupations has the potential to be automated.

Source: MGI (2017).

Many jobs might not be automated completely but consist of a large share of activities that are automatable. The automation of these tasks will **significantly change the way these jobs are conducted** (OECD, 2016). The French Conseil d'Orientation pour l'Emploi (COE) claims that less than 10% of jobs in France are at risk due to the automation, while half of existing jobs are likely to evolve in terms of content and organisation. It has been widely demonstrated that manufacturers are increasingly selling services on top of manufactured products, in order to compete in increasingly

⁷ France, Germany, Italy, Spain and the United Kingdom.

tough global markets. By adding a service to their product, they can receive recurring income instead of one-off revenues from selling goods.

The potential of activities to be automated in general depends on whether the activity is **routine or not and manual or cognitive**. In the past manual and cognitive routine tasks have been most subject to automation (Autor et al., 2003; Goos et al., 2009; Autor & Dorn, 2013). Digitalisation is also likely to change these routine activities (Marcolin et al., 2016). But new technologies and ICT are now also gradually leading to automation of other activities that have traditionally been considered non-routine (Frey & Osborne, 2013). For example, car navigation, hand-writing recognition, and translation have become routine tasks and automated through the use of data analytics (Veres et al., 2011; Plötz & Fink, 2009). Automation will expose jobs such as office and administrative support as well as transportation and logistics (Frey & Osborne, 2016). In turn, there are also cognitive non-routine activities that can be automated. For example, diagnosis of chronic disease and cancer treatments have been partially automated using data analytics on vast numbers of medical records for benchmarking and recognition of patterns (Cohn, 2013). There remain, nevertheless, plenty of activities that are very difficult to automate. In these activities originality and social skills play an important role (management, business, arts, media, education, healthcare, etc.).

Owing to **education levels**, existing disadvantages of some workers are likely to be reinforced through automation. More specifically, workers with a lower level of education have the highest chance of seeing their activities being automated. OECD (2016) indicates that about 40% of lower educated workers face a high risk that their job will be automated, while only 5% of workers with a tertiary degree face the same risk (Berger & Frey, 2016; Arntz, Gregory & Zierahn, 2016).

The potential to be automated does not necessarily mean that the **new techniques will be adopted** and automation actually occur. During previous industrial revolutions, it took decades before the new technologies were fully adopted and the impact on the labour market was clear (WEF, 2016). Whether and when the activities will actually be automated depends on the following general criteria (MGI, 2017).

First, the level of **difficulty to automate** the activity, i.e. the effort that is required to invent, integrate and adapt the technologies so that they function in a satisfactory manner. The time required to automate the activity might become substantially shorter when machine learning advances.

Second, the **costs** that are involved in developing and using the technologies required for automation. These costs for both hardware and software are likely to decrease over time, making the adoption of the technology more likely. Moreover, advances via automation through self-learning machines may also reduce the human resources required and thus decrease the required time and investment.

Third, the **costs and availability of labour** are important factors in determining whether automation is attractive. Labour costs vary between countries, occupations and positions. The higher the labour costs, the more likely the activity will be automated. Moreover, automation may change the distribution of workers across income groups. Middle-income workers in manufacturing or

administration may lose their jobs due to automation and look for lower-wage jobs, crowding out existing low-income workers, or try to get high-income jobs, which makes longer-term unemployment more likely.

Fourth, **economic benefits other** than lower labour costs, including productivity, reliability, quality and safety gains.

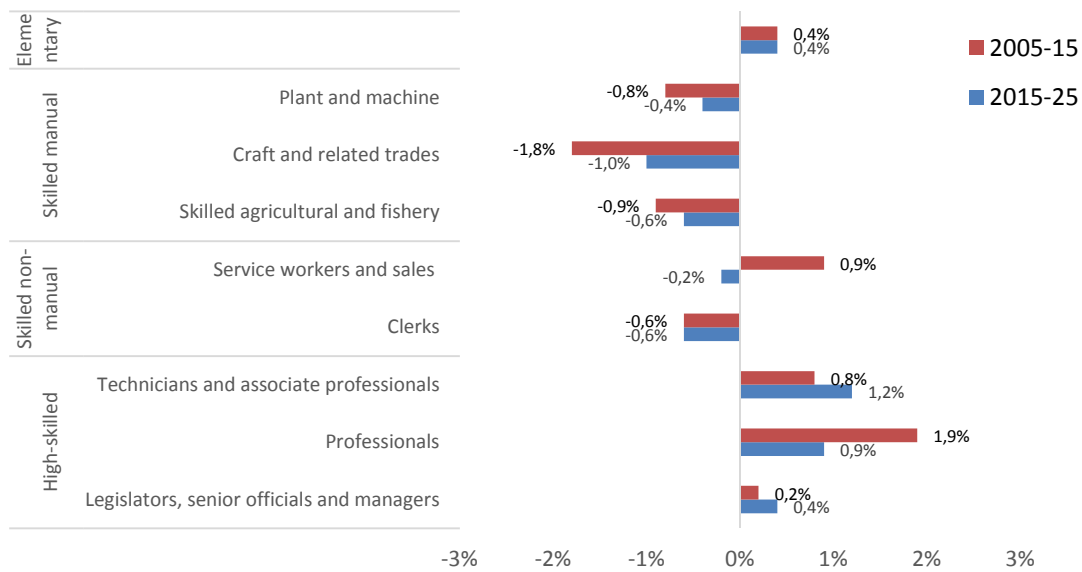
Fifth, whether the automated activity is **allowed under legislation and socially accepted**. It takes time for investment to be shifted to the development of the required technology, to change organisational processes and practices and make clients feel comfortable with automated activities.

Studies on the impact of digitalisation on labour markets estimate the potential job destruction primarily through automatisisation based on currently known technologies. They do not yet take into account **new technologies** that still need to be developed. Perhaps more important, they do not consider potential gains due to enhanced productivity, repatriation of activities previously outsourced to low-income countries, and the development of new products and industries.

There is very limited information available on the number of **new jobs created** with the new technologies. The International Federation of Robotics (IFR) estimates that robotisation will create about one million high-quality jobs within five years (Frey & Osborne, 2016). Moreover, every job that is created in the high-tech industry is estimated to create an additional five jobs in the wider economy (Moretti, 2010; Goos et al., 2015). Overall, however, the extent to which new jobs associated with the technology sector are created seems to have slowed. For example, in the 1980s 8.2% of the US workforce shifted to new jobs related to new technologies, whereas in the 1990s this was just 4.4% (Lin, 2011). In the 2000s, only 0.5% of the US workforce shifted to sectors related to new technologies (Berger & Frey, 2016).

Jobs created by new technologies predominantly require high skills. Frey & Osborne (2016) estimate that almost half of all the new jobs require high skills. These include jobs such as data scientists, cloud architects and security analysts. European Centre for the Development of Vocational Training (Cedefop) figures for the past decade and its estimates for the next decade suggest that occupations that require either low/elementary or high skills are growing in importance, while the mid-skilled professions are almost non-exclusively decreasing in importance (see Figure 2.2). Hence, automation is likely to contribute to the so-called **polarisation** of the labour market. In order to avoid a skills mismatch between labour supply and demand, education and learning programmes need to target more technical, creative and entrepreneurial skills demanded by automation. Moreover, adaptability must be taken into consideration.

Figure 2.2. (Expected) developments in shares of occupations (2005-25)



Source: Authors' elaboration based on Cedefop (2016).

Some new technologies such as 3D printing make it more attractive to establish the **production closer to home**. Moreover, automation is likely to make labour a less important production factor, which incentivises manufacturers to position their production facilities closer to customers in countries with higher labour costs. This is likely to be to the advantage of developed countries, from which many production facilities have been outsourced to developing countries in recent decades (Sirkin et al., 2015). In a survey of institutional clients of large US banks, for example, about 70% of participants indicated that they expect a large or minor reshoring of activities due to 3D printing (Frey & Osborne, 2016), particularly of highly automated plants.

Finally, if digitalisation destroys jobs on a net basis, this would **not necessarily lead to structural unemployment**. Hence, the working-age population is growing much less rapidly than in the past and is even about to decline in some developed countries such as Germany and Italy. Productivity needs to be improved in order to prevent gross domestic product per capita from declining. MGI (2015) estimated that automation could contribute between 0.5 and 1.1% to annual GDP per capita growth in the period up to 2065, primarily depending on the speed of adoption of new technologies and ICT. Moreover, when there is less demand for labour, the number of hours worked per employee may drop, which has been the case in many European countries in the past (Spiezia & Vivarelli, 2000). Labour markets may also counter the enhanced importance of capital through price adjustments, as the past has also shown (MGI, 2017).

2.2 On-demand economy

Data available at the time of writing is insufficient to be conclusive on net job creation through the on-demand economy. The on-demand economy is (not yet) included as a separate category in official labour statistics, in which it is likely to be understated. Hence, the on-demand economy is not a main source of income for most people and there is no relevant category for it. In addition, many participants do not consider their online platform⁸ activities work, which makes them unlikely to report them on labour surveys (Coyle, 2016). In order to bridge the gap in official statistics, we will use surveys and estimates to get an indication of job creation through online platforms.

Focusing on the current employment situation, several surveys found that a substantial part of the population is active on online platforms. The 2015 online survey by Burson-Marsteller, the Aspen Institute and TIME of 3,000 Americans found that 44% of the population is active on on-demand platforms (this includes both users and service providers). In the survey, the on-demand economy refers to the following sectors: ride-sharing, accommodation-sharing, task services, short-term car rental and food/goods delivery. The figures corrected for demographics and Internet penetration show that almost the entire population active on the online platforms has used on-demand economy services (42% of the adult population has used at least one on-demand economy service), while only about one-half of the population that has been active in the on-demand economy has provided services (22%). Providers were on average active on two types of platforms, offering transportation (10% ride-sharing and 6% car rental/sharing), professional services (11% do-it-yourself services and 7% food delivery). Letting accommodation was also popular (9%).

Regarding the demographic profile of participants, providers of on-demand services are relatively more often men, belonging to racial/ethnic minorities, living in urban areas and part of the millennial generation (aged 18 to 34). In particular, the share of platform workers belonging to minorities (55% among platform workers, 34% among non-platform workers) is substantially higher in the on-demand economy. This high representation of minorities, men and young people becomes even higher among platform workers who rely heavily on the on-demand economy for their income.⁹ Moreover, they more often have children, are married and provide services on multiple platforms.

In **Europe**, similar kinds of online surveys have been undertaken, of which the results are fairly similar across countries. Huws & Joyce (2016) commissioned four online surveys that were conducted in early 2016 of more than 8,500 adults in Austria, the Netherlands, Sweden and the United Kingdom.¹⁰ The surveys focused only on crowd work or otherwise stated services with an important labour component intermediated through online platforms. Participation in all countries was around

⁸ An online platform is defined as a digital – most of the time in the form of a website or software application that runs on smartphones or tablets – provider of the peer-to-peer intermediation that is central to the “on-demand economy”. See the Glossary for the main terms and definitions applied.

⁹ Heavy reliance on the on-demand economy is defined as earning one’s main income or over 40% of one’s income from online platforms or unable to find work in the offline labour market.

¹⁰ Online surveys in Austria were completed in April 2016 by 2,003 people aged 18 to 65; in the Netherlands in April 2016 by 2,125 people aged 16 to 70; in Sweden in February-March 2016 by 2,146 people aged 16 to 65; and in the UK in January 2016 by 2,238 people aged 16 to 75. The same caveat applies for these online surveys as mentioned for the US case.

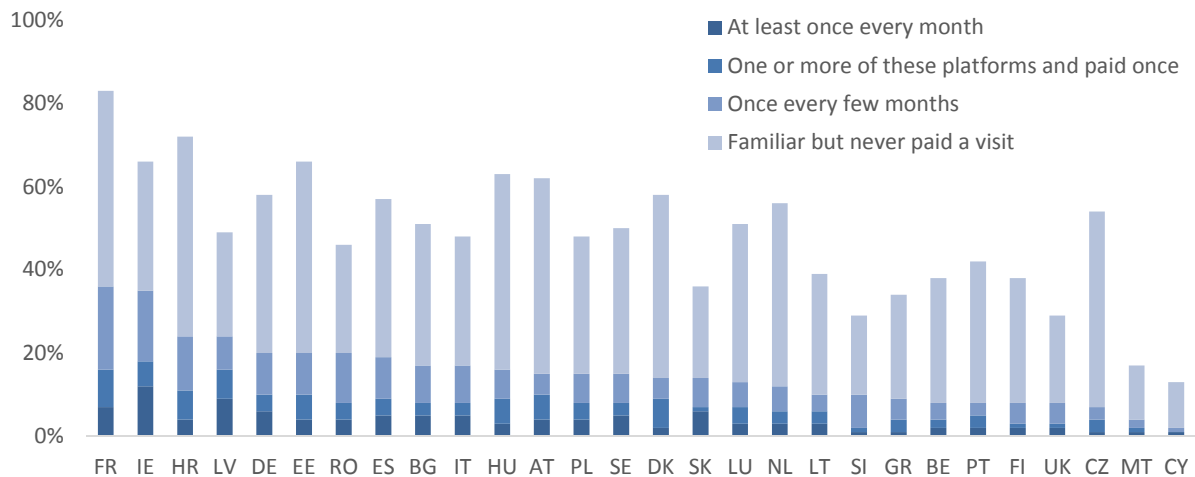
11 to 12%, except for Austria where about 23% found work through platforms such as Upwork, Uber or Handy. In all countries examined, there were substantially more people who would like to work in the on-demand economy. Hence, in Austria and the Netherlands participation could have been about 50% higher and in Sweden and the United Kingdom even twice as high if everyone who would have liked to be active in the on-demand economy had performed tasks.

The **demographic profile** of participants is similar to that of participants in the US. Millennials form the largest group of platform workers, varying between 44% (NL) and 57% (SE). Compared to the shares of the population and active population, millennials, and in particular student-aged platform workers (18 to 24), are overrepresented. In turn, in all countries older platform workers (45 and older) are clearly underrepresented in the on-demand workforce. The gender balance is also fairly similar across countries. Like in the US, men are relatively more active in the on-demand economy in the surveyed countries, except for in the UK. Male dominance in the on-demand labour force is not surprising, since they are also dominant in the offline labour force and the on-demand economy is more developed in sectors where traditionally more men than women are active, i.e. transport. The granularity of the survey results is, however, insufficient to explain why in the UK more female platform workers are active in the on-demand economy.

Platform workers in the on-demand economy are in most cases not earning all their income through a single online platform. They generally perform their activities in addition to another job and/or are active on **multiple platforms**. For most platform workers who were active in the sharing economy over the past year, the work has been occasional. In all four surveyed countries, only about a third of on-demand platform workers performed work through an online platform at least once a month. Despite the limited activity, on-demand platform workers in Europe indicated that they performed, on average, four different types of work indicated in the survey (professional work, personal service, household services, driving, etc.). This suggests that European on-demand platform workers, which are often also active in the offline labour market, are in many cases active on multiple platforms.

The above **online survey results** must, however, be treated with some caution. Results are not always comparable, because they use different names and definitions for the on-demand economy. In addition, most surveys are conducted online, which might mean participation is overstated. Both the participants in the on-demand economy and the respondents in these surveys are likely to be relatively more active online, which is, for example, indicated by the high share of survey respondents that indicated other sources of online income in the Huws & Joyce (2016) surveys. For example, between one-half and two-thirds of respondents indicated they sell possessions or belongings on websites such as eBay and Amazon.

Figure 2.3. Activity in the collaborative economy

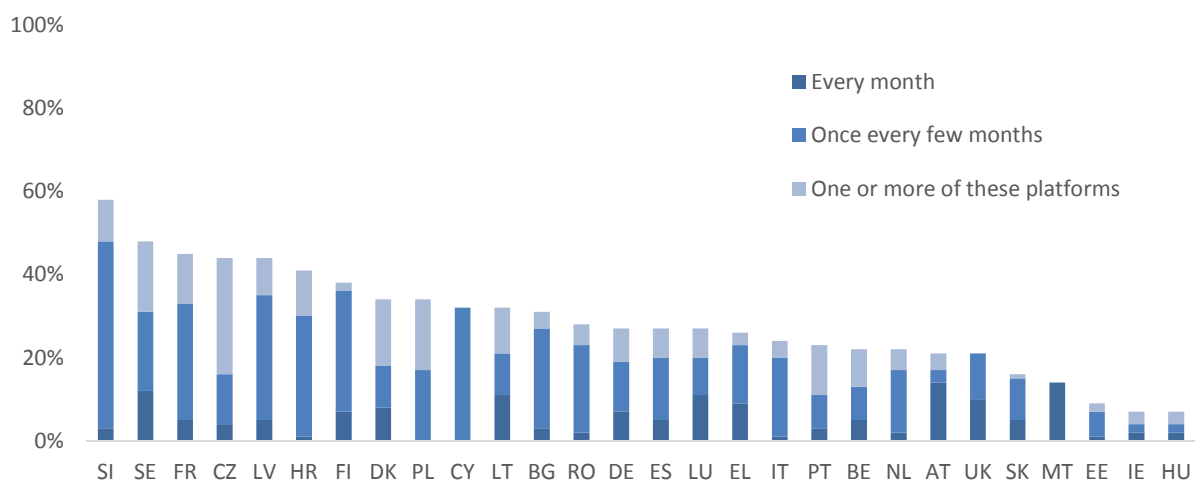


Notes: The figure shows the activity of EU citizens on collaborative platforms.

Source: Eurobarometer (2016).

The Eurobarometer on the collaborative economy confirms that the online surveys are likely to overstate the use of online platforms. The Eurobarometer on the collaborative economy was conducted around the same time as the Huws & Joyce survey, but the participants were interviewed by phone instead of online. Moreover, it considered all the platforms and not only the work-intensive ones. Use and provisioning of services is, nevertheless, lower. The Eurobarometer found that 17% of EU citizens used platforms in early 2016 (both users and providers), although there is a large difference between countries. Respondents in France (36%) and Ireland (35%) were most active on platforms, while in Cyprus (2%), Malta (4%) and Czech Republic (7%) were the least active. The results further confirm that men, millennials and the more highly educated are more active in the collaborative economy. Moreover, employees and self-employed are more active than manual platform workers.

Figure 2.4. Providing activities in the collaborative economy (% of people that visited platform)



Source: Eurobarometer (2016).

Only a small share of the participants in the surveys **provided services** through platforms. About a third of the persons that visited platforms also provided at least once a service on the platform. The share of providers is highest in Slovenia (58%) and Sweden (48%) and lowest in Estonia (9%), Ireland (7%) and Hungary (7%). The profile of the providers is similar to that of the users.

Indeed, the online surveys suggest that **substantially more participants** are active in the on-demand economy than estimated based on the figures provided by some of the platforms. Harris & Krueger (2015), for example, estimate, based on extrapolation from the number of active Uber drivers, i.e. those who perform at least four trips in the reference month, which had in the US around 600,000 active participants at the end of 2015, which is equivalent to about 0.4% of all US employees. If the participation rate were the same in the EU, the online collaborative economy would have 900,000 active participants. The on-demand economy is, however, still less developed than in the US. Following a methodology similar to that of Harris & Krueger (2015), De Groen & Maselli (2016) estimated that there were roughly 100,000 active platform workers in the on-demand economy at the end of 2015, which is only 0.05% of the total employees in the EU.

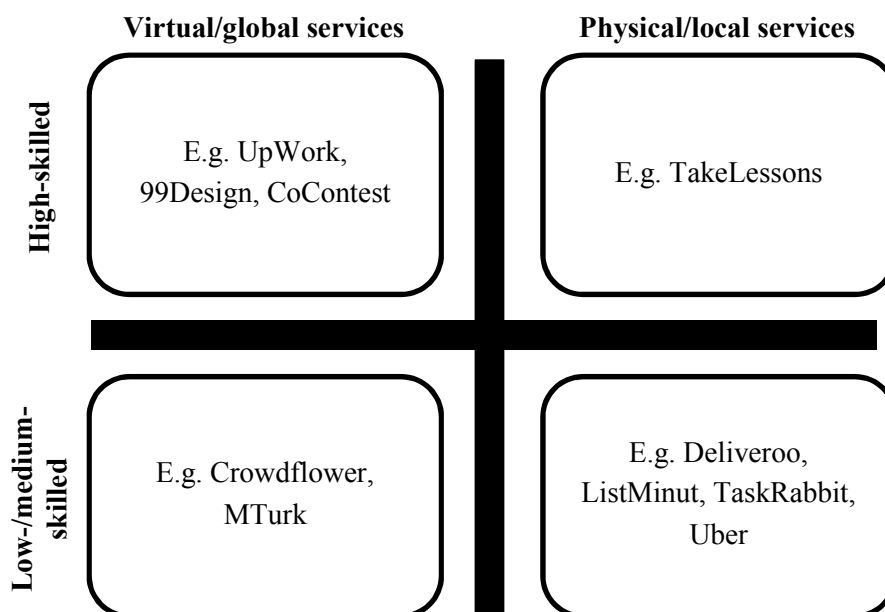
The on-demand economy thus is still only a minor part of the economy. But if it continues to grow at the current pace, it will ultimately fundamentally change the overall economy, not only sub-segments as it does today (Baker, 2015). However, the **growth of the on-demand economy** depends on many factors, such as legal and social acceptance, and remains therefore hard to predict. PWC (2016) estimated, for example, that the on-demand economy generated gross revenues of €32 billion in 2015 (around 0.2% of EU GDP), focusing on the five largest sectors: accommodation, transportation, household services, professional services and financial. The figure was substantially greater than they had expected in 2014. The growth of the on-demand economy accelerated since 2013, with total revenue growing 58% in 2014 and 79% in 2015. Two-thirds of these revenues are, however, generated in the accommodation and finance sectors of which labour forms only a minor part of the delivered service. The labour intense on-demand activities, including transportation and household services, generated approximately €2.4 billion and €6.75 billion in gross revenue respectively. Although only generating about €850 million in revenue, professional services, e.g. freelancer platforms, intermediating food delivery and do-it-yourself tasks are growing most rapidly. The three sectors combined generated in 2015 about €10 billion or around 0.1% of EU GDP.

The on-demand economy is **not a homogenous market**. Several scholars have attempted to conceptualise the on-demand labour market and came up with similar kinds of categorisations. In all of these conceptualisations, the location and skills required are considered the main elements to distinguish between online platforms. Remuneration and conditions differ considerably between platform types. These conditions are:

First, the **location** where the service can be provided. Codagnone et al. (2016a) make the distinction between tasks that are cognitive and therefore electronically transmittable and tasks that require manual/interactive work that requires a local presence. This has clear implications for the relevant labour market: whereas the on-demand economy can create global labour markets for electronically transmittable services, the markets for manual/interactive work is local in nature. De Groen et al.

(2016) use a similar framework (see Figure 2.5) to conceptualise the on-demand labour market. They break the market down into cognitive (high-skilled) and manual/interactive (low/medium-skilled) tasks and virtual/global and physical/local services.

Figure 2.5 Conceptualisation of the on-demand labour market



Source: De Groen et al. (2016).

Second, the **skills** that are required to deliver the service. Codagnone et al. (2016a) distinguish among the low-, mid- and highly educated three levels of skills, but this second dimension is intended to be a continuum. In turn, De Groen et al. (2016) make a clear distinction between the more general low- or medium-skilled and more specialised high-skilled services. For the US, several authors have argued that the kinds of skills required can be important in determining whether a platform worker is a truly self-employed or a misclassified self-employed worker that should be an employee (Cherry, 2016; Harris & Krueger, 2015). In Europe, skills are not a determinant of whether someone is an employee or self-employed. More commonly, the determining factor is the way in which work is carried out. One of the determining factors of an employment relationship is whether employers can direct and supervise work. Moreover, it is also important to determine the market power of the participants, i.e. the more specialised or bounded the skills required to perform the tasks, the stronger the position of the platform worker.

Interestingly, the on-demand economy makes certain services tradeable that were previously considered **non-tradable** (Maselli & Fabo, 2015). The on-demand platforms increasingly target high-skilled or high-paying work. There are, for example, platforms for architectural work, lawyer-on-demand apps, medical advice and administrative assistance (Codagnone et al., 2016a).

Third, the **assets required to deliver the service** could be a distinguishing factor. Huws & Joyce (2016), for example, consider in their surveys three types of work. Besides tasks that can be performed from home (cognitive/virtual) or outside home (manual/physical), they use a special category for driving. Most on-demand platform workers need a car in order to deliver the service. De Groen et al. (2016) also argue, however, that it seems in practice that the need to have access to specific material can be relatively easily overcome, for example, by leasing or renting a car to deliver driving services.

Turning to **remuneration**, it is not straightforward to compare earnings in the online and traditional economies. Most on-demand platform workers are agents, e.g. freelancers, or self-employed individuals who are paid by task. Platform worker earnings thus depend in most cases on the number of tasks performed and the price per task. Since there are great differences of activity between platform workers in the on-demand economy, the focus in this assessment is on earnings per hour. Available data on remuneration in the on-demand economy are rather limited and fragmented, and in most cases does not concern the EU but rather the US, where the on-demand economy and relevant research are more developed.

Table 2.1 Hourly earnings compared to offline earnings

	Virtual/global services				Physical/local services	
	High-skilled		Low-skilled		Low/medium-skilled	
	CoContest		Mechanical Turk		ListMinut	Uber
Platform workers (Country)	Italy	Serbia	United States	India	Belgium	United States
Average (€)	9.3	10.3	5.1	2.9	15.4	17.2
As % of the country average	70%	318%	23%	549%	84%	88%

Notes: The figures show the pre-tax hourly earnings on various platforms and countries (trimmed at 99% and without zero-earners), compared to the average earnings. The expenses for delivering the services have not been taken into account. The exclusion of zero-earners has an especially large impact on platforms that distribute the earnings with contests like CoContest.

Source: De Groen & Maselli (2016), Berg (2016), Eurostat (2016), De Groen et al. (2016), Hall & Krueger (2015), ILO (2016), Statista (2016), US Bureau of Labor Statistics (2016).

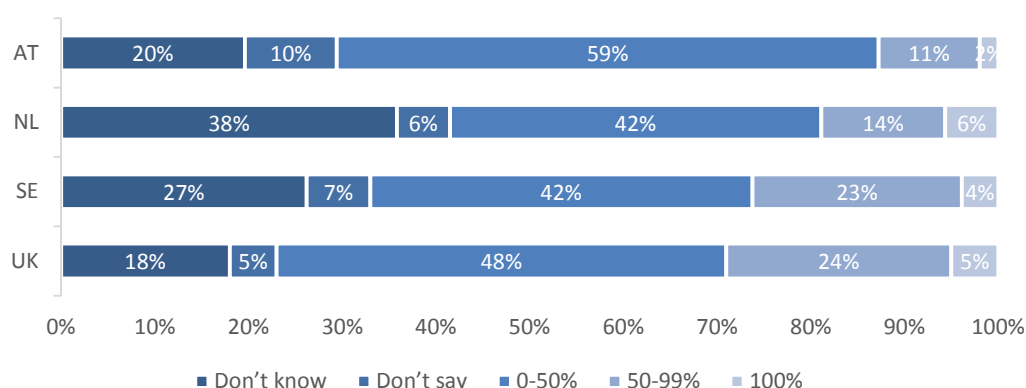
Remuneration seems to strongly depend on the **competitive position of the platform worker**. Table 2.1 gives an overview of the hourly earnings found in various case studies. It compares average earnings for online platforms in various categories: CoContest (architecture) belongs to ‘high-skilled virtual’ (data are available for Italy and Serbia), while Amazon Mechanical Turk (‘click work’) belongs to ‘low-skilled virtual’ (data available for the United States and India), and ListMinut (do-it-yourself and household services) (Belgium) as well as Uber (driving) (United States) are considered ‘low-/medium-skilled local’. Platform workers who perform physical/local services seem to have higher hourly earnings than those who conduct virtual services (regardless of the latter group’s required skill level). Although the evidence is not very strong yet, online platforms intermediating virtual services seem to create global markets (De Groen & Maselli, 2016). Platform workers in India

and the US are, for instance, competing for the same micro-tasks on MTurk and architects from Serbia and Italy for the same design work on CoContest.

The earnings compared in this section are **less the fees charged** by the platforms, which can be substantial. Most platforms charge a fixed or variable fee that varies between platforms and sectors. PWC (2016) estimated that in 2015 average fees ranged between 12% of the gross revenues on professional services, 19% on household services and 24% on transportation. To platform workers, the exact fees are not always clear, because the platform displays only the net amount or uses an alternative reward scheme. Designers who take part in contests organised by the CoContest platform, for example, only receive money when the client identifies theirs as one of the three best designs. Since on average ten designers participate, seven of them do not receive any reward for their work (De Groen & Maselli, 2016).

Although platform workers are not employees that receive a regular salary, it is interesting to compare their remuneration, especially to gain a better understanding of whether the on-demand economy is potentially putting pressure on the earnings of workers in developed countries. The granularity and deepness of the data on earnings is insufficient to be conclusive on the relative level of the revenues. Looking at the gross earnings compared to the local average wage in Table 2.1, there seem to be **large differences between low and high income countries** for virtual services. While earnings for virtual services in high-income countries like the US are below the average wage (23%), earnings in lower income countries like India are well above the average earnings per hour, i.e. 549% of the average wage. In contrast, earnings on physical services are below the average wage. Better pay for virtual work is also an important motivation for people in India to participate in the on-demand economy. Moreover, that people in higher income countries are, nevertheless, still providing services on online platforms might be because they are providing virtual services while performing other work, want to work from home, or consider it a form of enjoyment/leisure (Berg, 2016).

Figure 2.6. Share of income from on-demand economy



Notes: The figure shows the share of income generated through online platforms by platform workers in Austria (AT), the Netherlands (NL), Sweden, (SE) and the United Kingdom (UK).

Source: Huws & Joyce (2016).

Currently, on-demand platforms do **not provide sufficient work** to generate income similar to that earned in traditional jobs. Notwithstanding that platform workers can be active on multiple platforms, most platforms do not – at the time of writing – have the size to provide sufficient services. This is reflected in the large share of platform workers who would like to be active in the on-demand economy as well as the occasional character of participation in it. Moreover, it is reflected in the earnings from online platforms. Figure 2.6 shows that the great majority of platform workers active in the on-demand economy – who form a minority of the population varying between approximately 11% in the UK and 23% in Austria according to the surveys conducted by Huws & Joyce (2016) – either do not know the contribution of the on-demand economy to its income or indicate that it is less than half. Other platform workers predominantly indicate that they obtain more than half of their income from the on-demand economy (between 11% and 24%), while less than 6% of platform workers in each of the countries indicates they obtain all of their income from delivering on-demand services.

Another important aspect in the assessment of the quality of on-demand work are the **labour conditions**.¹¹ These seem to be set by the users and platforms, which are likely to remain dominant as long as they can rely on a large group of platform workers. Knowing this, users can post requests at the last minute, which contributes to more uncertainty for platform workers (Huws, 2015). It will also add to the inefficient use of platform workers' time. Berg (2016), for example, found that platform workers spend on average 18 minutes searching or performing unpaid work to obtain new tasks for every hour of paid work. A recent study by Eurofound (2015) stated that payment risk, lack of social protection, isolation, stress and work-life imbalance are among the most problematic issues related to on-demand work. One could argue that these issues may not be so relevant now, as only a very small segment of all platform workers offer services through an online platform as their main form of work. In the future, however, this may be rather different. At the same time, on-demand work may also entail rather favourable labour conditions from which platform workers can benefit, such as increased flexibility (as is discussed in more detail below).

Work in the on-demand economy is in most cases either **allocated** with algorithms through the platform or the customer. In both cases, the allocation varies according to the platform's rating of the platform worker. The platform often does not disclose the detailed calibration of the rating, except if it wants to incentivise certain behaviour. It is widely assumed that most ratings are based on characteristics of the platform worker as well as feedback from users. TaskRabbit,¹² which primarily intermediates do-it-yourself services, for example, requires platform workers to respond, when available, in at least 85% of cases within 30 minutes, and to accept at least 75% of jobs for which they indicated they were available and qualified, and to complete at least 85% of the accepted tasks. Platform workers who do not comply with these conditions are removed from search results and

¹¹ Within the context of this study, the concept “labour conditions” (or “organisation of work”) is used in a very broad sense. Labour conditions are understood as the circumstances or conditions in which the work is being performed. Examples are the place where work is carried out, e.g. at home, in the office, or the times during which work is done, e.g. during the weekend, at night.

¹² See <https://support.taskrabbit.com/hc/en-us/articles/204409610-TaskRabbit-Performance-Metrics>.

therefore unlikely to receive any work (De Groen & Maselli, 2016). Uber has similar kinds of arrangements: when drivers reject rides because the fares are too low or only pick the most profitable ones, they risk being suspended. Thus Uber drivers are only informed of the user's destination after accepting the ride (Rosemblat & Stark, 2015).

Use of **ratings** can contribute to the long-tail or superstar effect, i.e. when a small share of platform workers performs the largest share of the tasks. It is still unclear for which platforms these distributive effects play a role (Codagnone et al., 2016b). Based on various case studies, it is at least important for services for which direct availability and proximity are less important and quality is more important. On the ListMinut platform that intermediates household and do-it-yourself services, where timing seems less important and quality more important, about one-third of the earnings are generated by just 6% of the platform workers (De Groen et al., 2016). Uber drivers, in turn, need to receive a minimum score from their customers to continue driving for the platform. When they meet the required minimum, their location is the most important determinant on whether they receive a ride (Rosemblat & Stark, 2015).

Box 1. On-demand economy in Canada

In Canada, the on-demand economy is currently relatively small and mostly dominated by online platforms from the United States (especially Uber and Airbnb are present in large cities, but not so much in smaller cities, because they are much less densely populated). Only a few platforms were conceived in Canada (Canadian Business, 2016), and they appear to have drawn on lessons from the experiences of their older and larger American counterparts. InstaBuggy, for example, is an online grocery delivery platform that from the start has collaborated closely with grocers to make sure that they agree with their activities. Moreover, InstaBuggy's workers are part- or full-time employees (Canadian Business, 2016). The contrast with other online grocery delivery platforms, such as the US-based Instacart, is notable.

When it comes to the size and structure of the on-demand economy in Canada, Statistics Canada (2017) has recently published results based on a Labour Force Survey. Between November 2015 and October 2016, 2.7 million people (9.5% of the population aged 18 and older) were engaged in the on-demand economy by using peer-to-peer ride services or accommodation services; 7% used ride services, while 4% used accommodation services. In total, spending in these two sharing economy industries amounted to 1.3 billion Canadian dollars (or €0.9 billion), including both spending in Canada and abroad. Especially young Canadians are engaged in the on-demand economy, more so than older Canadians, which is similar to Europe. The survey also suggested that about 0.3% of the population 18 years or older had in fact provided peer-to-peer ride services and 0.2% had offered accommodation services.

Box 2. Platform workers with employment contract by third-party

Not all platform workers are self-employed. There are also platforms that deliberately allow their workers to become employees, i.e. freelance under salaried contract, as explained in more detail in the paragraph below. For example, the food delivery service Deliveroo offers its bikers in Belgium the possibility to be either self-employed or an employee.

The large majority of the predominantly student workers chose to become employees (90% or 2,600 in February 2017). They have a contract with SMart, which is a non-profit cooperative that supports freelancers in the development of their activities by providing them with a wide range of services both digital and non-digital (training, advice, insurance, co-working spaces, etc.). Hence, the platform workers obtain employee status (social security, etc.), but need to arrange the work themselves. In the case of students this is a preferential regime with lower tax rates and social contributions in Belgium.

Bikers wanted to enlist SMart, but, initially, Deliveroo's conditions did not allow this. Because SMart needs to comply with all the conditions of an employer, such as wage, work-time and safety requirements, it negotiated with Deliveroo for bikers to receive prior safety-training, reimbursement for use of professional gear including the bicycle, minimum shifts of three hours and a wage that is at least slightly above the legal minimum hourly wage (instead of payment per delivery). Deliveroo originally paid their bikers per delivery instead. Moreover, SMart takes care of accident insurance, which is especially important for both bikers, who have relatively more accidents than other independents, and for platforms running business models that still have to prove themselves, and ensures that the salary is paid. Members pay a share of their income (6.5%) to cover SMart's services. The fee is in the case of Deliveroo directly charged to the platform.

SMart has offered a similar service in the past to bikers of Take eat Easy, which failed in 2016. SMart disbursed the €340,000 salary that Take eat Easy still had to pay to its SMart-contracted bikers. SMart remains open to offering the service to platform workers on other on-demand platforms, as long as the request comes from users and the service does not disrupt existing sectors and complies with labour laws. There have been preliminary negotiations with UberEATS, but it has not agreed to the minimum conditions formulated by SMart.

3. Impact of digitalisation on enterprises

This chapter assesses the impact of the development of the on-demand economy and digitalisation on the enterprises generating work. Digitalisation is changing companies from the inside by influencing organisational structures and managerial strategies, as well as from the outside in their relations with customers, partners and competitors within changing business ecosystems. The chapter discusses the opportunities and threats of the on-demand economy and digitalisation, as well as best practices for small and medium-sized and large companies along two avenues: interaction with customers and interaction with employees. A third part will analyse the levels and pace of digitalisation in countries covered by the study.

The development of new technologies and increasing reliance on algorithms are continuously driving down transaction costs¹³ and reducing information asymmetries in trading. This incentivises enterprises to redefine their production and distribution processes and to streamline their organisational structures (Henten & Windekilde 2016). The reduction of transaction costs in most cases leads to the reduction of barriers to entering markets, forcing incumbents to adapt to new competitors and market dynamics. New entrants often have other business models than those of the incumbents. For instance, new intermediation platforms operate in a different setting than so-called ‘pipeline’ businesses, and they often do not employ workers who perform services intermediated on their platforms. Technological changes can generate additional economic activity, whether by creating new products and services, or by improving existing ones and targeting untapped market ends. It also tends to improve the efficiency and effectiveness of employees.

3.1 Interaction with customers

Technological advances in software and hardware industries render the manufacturing of products and provision of services **more cost- and time-effective**, e.g. accelerating production cycles and time-to-market, **more interactive**, e.g. through multi-channel solutions, constant interconnectedness and peer-to-peer systems, and **more personalised**, e.g. exploitation of digital data for improved customisation. These characteristics empower producers and service providers in their ability to better track consumer behaviour and predict preferences. The Internet also enables consumers to compare offers and interact more easily through peer reviews and rating systems, price comparison features and social networks that improve **access to information** and enhance **consumer choice**.

¹³ Transaction costs refer to a series of costs generated by all the adjustments made necessary in the internal and external functioning of an organisation. These costs are driven by several factors, such as the economic agents’ bounded rationality or more generally by uncertainty, opportunism, asset specificity and transaction frequency. Examples of transaction costs range from searching for customers and partners, finding suitable subcontractors, time to access information and contacts, contracting or monitoring output. For a more comprehensive analysis of transaction costs, particularly in the context of Internet-based platforms and the role of data, see Henten & Windekilde, 2016.

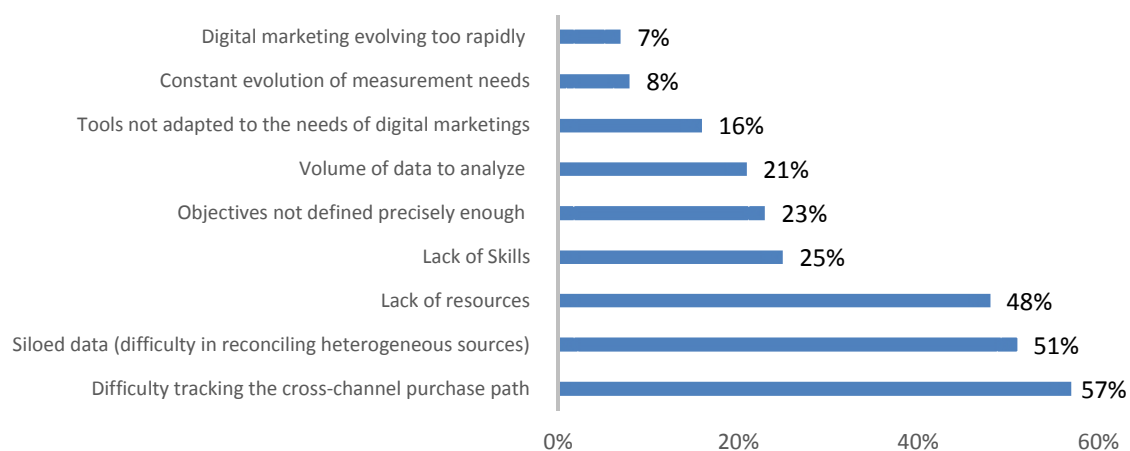
Better access to information and enhanced consumer choice lead to **increasingly demanding and proactive customers**.¹⁴ In turn, as consumers tend to more systematically assess and compare offers through peer review systems, they no longer rely exclusively on the information provided by sellers and brands. Therefore, they tend to become less passive and receptive to traditional commercial communications. Various surveys seem to support this assumption, showing that consumers are more confident towards peer reviews than corporations: 78% of consumers trust peer recommendations while only 14% trust brand advertising (EY, 2011). Likewise, Deloitte (2014) found that 81% of consumers actually read customer reviews and ratings when shopping online.

These characteristics are reshaping commercial practices, e.g. marketing and advertising, and redefining strategic relations in both B2C and B2B settings. Digital practising confers a first-mover advantage in attracting consumers' attention and building a trusting relationship with them. Good practising in **digital marketing** and **cybersecurity** are two fundamental drivers enabling competitors to thrive.

However, measuring the direct impact of digital marketing and advertising practices on **firms' performance** remains a difficult exercise for most businesses that were not digital-born, as opposed to emerging platforms. This is one of the salient conclusions from a survey conducted among marketing and sales professionals in France (see Figure 3.1) (EBG & Qlik, 2015). One of the most cited barriers (57% of polled respondents) was the difficulty of tracking clients' purchase paths across multiple channels. Likewise, more than half (51%) mentioned the difficulties encountered in combining and reconciling data from different sources within the same company, while nearly half (48%) pointed to the lack of resources and 25% to the skills shortage. Interestingly, a large majority of respondents (72%) thought that mobile usage was not duly taken into consideration when assessing firms' digital performances. Another key finding of the survey indicated that 89% of polled professionals declared that digital practicing had a positive impact on sales and overall performance, while only 21% thought that managers were able to measure this impact in an accurate way. Finally, almost half of respondents declared that they invested less than 20% of their global marketing budget in digital.

¹⁴ The concept "prosumer" is often referred to when describing the evolution of consumer behaviour along with the evolution of information technology (McLuhan & Nevitt, 1972), including the progressive blurring between producers' and consumers' respective characteristics, or how consumers are increasingly involved in the production process, e.g. companies increasingly relying on end-user perspectives and direct input to design new product and services.

Figure 3.1. Barriers to measuring digital marketing performance



Source: EBG & Qlik (2015).

Recent studies have identified the **key drivers of digitalisation** that European established industries should leverage in order to optimise their core activities. PWC (2015) conducted a survey among German industrialists declaring that, owing to better integration and management of horizontal and vertical value chains, managers were able to focus more on customer satisfaction by developing tailor-made solutions. Similarly, Roland Berger reported that most successful digital transformations rest on firms' ability to leverage four sets of tools to boost productivity from 20% to 30% per industry: i) the collection and exploitation of digital data, ii) the automation of production processes, iii) the interconnection of value chains and iv) the creation of digital customer interfaces.

Similarly, Boston Consulting Group (2016) has estimated that overall **efficiency gains** triggered by digitalisation in the provision of services could cut off 60% of companies' operating cost. Interestingly, it describes how ICTs have been transforming the service industry through the progressive integration of new technologies, shifting from manual reporting and tasking most commonly used in the 1950s, to the development of postal services and telecommunications which delivered significant improvement in Customer Relations Management (CRM) and internal labour organisation, e.g. advent of call centres. Further on, a second wave of innovations saw the widespread use of computers and nascent Internet deliver additional efficiency gains. The adoption of open standards improved interoperability between information systems, which enabled a more functional and systemic integration of production sequences. Meanwhile, the development of the first generation of channel-specific solutions and self-service options reinforced customers' autonomy and satisfaction. From now on, service providers do not only provide reactive solutions to standardised offers but are able to proactively improve their services and anticipate customers' preferences. By leveraging their digital assets, service providers can integrate and crosscut customer databases by combining external data, e.g. social media and third parties providers, with internal data troves, e.g. customers' purchase history, locations, etc., to create holistic customer profiles. They can also provide support to their customers through multiple channels, including seamless customer support services on personal devices.

Consumer welfare is therefore maximised by the combined effects of enhanced transparency over pricing and quality, and the widening of service offers. However, this dynamic might progressively fade away in a fully digitalised economy if conflicting standards and closed platforms generate lock-in effects, drifting markets into exclusive winner-takes-all dynamics that might stiffen competition and reduce consumer choice in the long run. In addition, the more established business models feel threatened by new players, the more competitive pressure will intensify across service industries, amplified by the blurring of industry boundaries. While traditional service providers might seek to expand their own technology solutions, technology companies would seek to expand their service offers. For instance, digital service providers are developing their own network infrastructures to provide Internet access and/or energy management solutions.¹⁵

In order to meet growing demand for more differentiated services, companies are constantly **shortening their development cycles**. Traditional manufacturing and services industries will see their established business models increasingly threatened by the rise of ubiquitous, lean and responsive business models in various sectors, e.g. banking, insurance, energy, transport and accommodation, as well as in manufacturing sectors. More generally, the shift occurring in manufacturing sectors towards so-called ‘servicisation’ is likely to be exacerbated by widespread ICT innovations. The rise of multi-sided on-demand platforms and increasing automation of core production activities cause a blurring distinction between products and services and enable firms to emancipate themselves from location constraints.

The Internet is progressively becoming the critical infrastructure of the economy. With the development of machine-to-machine communications, remote data storage centres, smart grid management systems and the increasing number of functions migrating to the network, the capacity to ensure network and information security (NIS) becomes a major concern. Similarly, the ability of firms to protect users’ privacy also constitutes a key asset, allowing businesses to build on their competitive advantage. For instance, best practices in privacy and cybersecurity (PAC) management are already determinant factors in the e-commerce sector. It is believed that in the context of the European data protection rules overhaul, Europe could play an important role in developing privacy enhancing technologies (PETs) (De Souza & Veugeler, 2014).

Research in **cybersecurity** has demonstrated how sensible merchants’ practices were regarding e-commerce website vulnerability and risk of data breach. Considering over 574 data compromises investigated across 15 countries, one study highlighted that weak passwords or weak remote access security contributed to 94% of point-of-sales (POS) breaches. Similarly, weak or non-existent input validation or unpatched vulnerabilities, i.e. software being non-systematically updated, contributed to 75% of e-commerce breaches in 2015 (Trustwave, 2015). Over 2014-15 the European Commission has adopted a set of complementary initiatives to push European businesses and public authorities to

¹⁵ For instance, technology companies like Alphabet providing Internet access through Google Fiber, or Amazon delivering on-demand video services through Amazon Prime Video, and also manufacturing electronic devices, e.g. eBook readers.

work hand in hand to define common standards for secured identification systems (eID) and trust services (eTS).

The development of an industrial Internet, i.e. of cyber-physical systems and complex machinery with embedded networked sensors and software, and ongoing ‘**platformisation**’ of the economy drives the rise of new powerful intermediaries that have direct access to customer data and offer improved services but also shape entirely new business ecosystems.¹⁶ In order to remain competitive and avoid sudden disruption, existing businesses should internalise and maximise these new processes while engaging in strategic and complementary collaborations.

3.2 Interaction with employees

Digitalisation and ubiquitous on-demand platforms are dramatically changing the organisation of work, triggering major changes in apprehending workplaces and workforce specialisation. Digital transformation generally tends to maximise capital assets and use while reversing labour intensity in core production. However, this substitution effect is coupled by a compensation effect yielding to a reallocation of tasks among humans and machines (or software) within the same companies but also across sectors. Digitalisation acts therefore as a driver of organisational change. In addition, through the adoption of new **managerial strategies**, ICTs allow for a more systematic monitoring and control over employees’ activities. As a result, digitalisation provides new opportunities for internal and external collaboration. In this regard, access to ICT devices and **information infrastructures** are key. For instance, virtualisation technologies, e.g. cloud computing, enables firms to centralise information storage while decentralising information access, thus enabling workers to access and share resources promptly and remotely.

These technologies make it possible for smaller companies to reduce their capital expenditure, e.g. buying or leasing hardware, as they can download software, applications and other tailored solutions, e.g. software as a service or infrastructure as a service. With new technologies driving transaction costs down, companies are economically incentivised to specialise in a core industry or product, while outsourcing other activities (Todoli-Signes, 2015). Particularly in services, but also in manufacturing, the organisation of work is becoming more flexible in terms of time and space, and organisational and hierarchical structures tend to flatten and, to a certain extent, are more transparent. For instance, automation and data analytics improve managers’ control over the production process, both qualitatively and quantitatively, e.g. monitoring output and customer satisfaction and ensuring electronic transactions.

¹⁶ The phenomenon often referred to as “platformisation” of the ICT ecosystem will trigger serious implications for the entire economy, as explained by Renda (2016), who emphasised that understanding the economics of platforms and its far-reaching consequences – and particularly defining innovation and competition policies applied to quickly changing ecosystems – was essential to understanding in turn the direction and pace that innovation might take in various parts (layers) of the ICT ecosystem. As ICT innovations are gradually pervading every sector of the economy, ecosystems and value chains are redefined by various platforms stacked and interconnected, where companies often build and combine their assets based on other companies’ assets and services all along the value chain. For a more comprehensive analysis on dynamics of platforms, see Renda et al. (2017).

Here also, mitigating cyber threats has become a critical aspect of firms' functioning and performance. This is not only important for maximising trust in the customer relationship but also in ensuring a high level of internal network and information security and data protection *vis-à-vis* the employees. So-called 'bring your own devices' (BYOD) practices expose both employers and employees to potential incidents of data leakage or unauthorised access to confidential data and operating systems. It can also involve employees downloading unsafe apps and content, which is a concern for employers who want to prevent introducing vulnerabilities into existing secure environments. Likewise, it has been reported that the increasing **dematerialisation** of key components, e.g. remote access and data storage, bears a number of new security risks with growing vulnerabilities pertaining to operating systems, communication protocols and applications (ENISA, 2016). Firms need to implement risks management measures and train employees to ensure a high level of privacy and security.

Most enterprises do not yet reap the **full potential benefits** of digital innovations. It was allegedly reported that in 2015 only 1.7% of EU enterprises made full use of advanced digital technologies (including big data, cloud computing, mobile and social networks solutions), and 41% were not using them at all (European Commission, 2015). However, studies have shown that the widespread use of ICT innovations and large-scale extension of robotics to SMEs is expected to have a serious impact in the near future, with the widening of new market segments to smaller businesses. In Europe, over 95% of companies are SMEs, with key European market segments, such as food, agriculture, light engineering and many others (JRC, 2010) dominated by small businesses. Both in services and manufacturing sectors, higher levels of system integration and systematic reliance on collaboration tools will allow managers to shift their focus to strategies to improve customer and worker experiences. These characteristics, as discussed above, tend to maximise customer efficiency but can also **improve individual performance and working conditions**.

Brynjolfsson et al. (2011) have emphasised the benefits arising from data-driven decision-making for firms' performance. They collected data on business practices and digital investment from 179 firms and found that firms building their strategic decisions based on data analytics would boost **output and productivity** by 5 to 6%. Studies have also shed light on the causal relationship between investment intensity in ICTs and sales per employee in large firms. It was also demonstrated that investment in ICTs tend to have a positive effect on productivity especially when coupled with investment in complementary assets, such as organisational and human capital (Brynjolfsson, 2003; Bloom et al., 2012).

Digitalisation allows for **more flexibility** in the case of remote working activities, e.g. teleworking, and virtual services performed through online labour markets. Nevertheless, this flexibility in terms of location and time management is less relevant in the case of local services requiring the physical presence of the workers (Huws, 2015; De Groen et al., 2016).

Regarding the rise of **collaborative economy models**, more research is needed to draw evidence from the different types of interaction occurring between platform workers and on-demand platforms.¹⁷ For instance, to what extent does a platform intervene as a mere intermediary? How does the algorithm operate the matching between the parties and what are the criteria? Does the platform set the price or let the parties agree on a price? When and how does it influence the market representation as reflected by the application programming interface (API), e.g. surge pricing, information asymmetries?

Debates have been sparked all across Europe on the growing tension between emerging on-demand business models and national regulations. Many questions remain unanswered on the role of governments in tackling uncertainties for platforms, users and established industries. Additional issues have arisen, ranging from liability and security in the working environment to the status of individuals performing services on platforms. There is still no consensus regarding the relationship between those proposing their labour and the platforms: is the relationship based on subordination and what kind of dependence is occurring between the two parties? Interestingly, a recent decision from a labour employment tribunal in the UK ruled that Uber's drivers should not be regarded as self-employed workers but rather as regular employees subject to social benefits, including minimum wages and sickness and holiday pay. More details on these issues are provided in the following chapters.

Additionally, the massive adoption of advanced manufacturing technologies (AMTs) by European industries demands the need to **rethink human resources strategies** according to new competences and higher qualifications, e.g. data scientists, IT engineers, etc., and to reshape work allocation and specialisation. The European Commission has long been emphasising the needs and challenges in limiting market frictions between supply and demand for high-skilled employees. A recent study suggests that by 2020 in Europe, around 756,000 vacancies might be unfilled in the ICT sector.¹⁸

The increasing **interactions between workers and smart machines** pose numerous challenges for the organisation of work. This implies an enhanced complementarity in the relations between humans and machines. Automation might increasingly support, and in some cases entirely replace, the bundle of tasks constituting a job, but it might also relieve employees from heavy and dangerous tasks and increase production outputs. The expropriation from specific skills poses new challenges in terms of specialisation and retraining within firms. It also requires quick adaptation of national education systems as well as national and regional specialisation strategies. Likewise, these new interactions

¹⁷ Note that we use the term “worker” to refer to someone who offers labour through an online platform without an employment contract. The term “employee” is used to refer to those who work for someone else, with an employment contract.

¹⁸ From Hüsing et al., (2015), referred to in JRC (2016), Employment and Social Development in Europe, Annual Review 2016.

will generate new health and working safety risks, entailing an adjustment in liability regimes due to the increasing presence of robotics and artificial intelligence in the working environment.¹⁹

Interestingly, a report from the Friedrich Ebert Stiftung drew three scenarios regarding **widespread automation throughout industry** (see Buhr, 2015). The first would see automated systems direct humans, with monitoring and control tasks taken over by technology and employees merely responding to the needs of cyber-physical systems and taking on primarily executive tasks. This would lead to the devaluation of low- to mid-skilled workers. The second is a hybrid scenario where monitoring and control tasks are performed via cooperating robots and interactive technologies, bringing more collaboration between smart devices and individuals. This would favour more highly skilled and flexible workers. Finally, the specialisation scenario is when workers steer systems. Here, cyber-physical systems are tools that support human decision-making, which ensure a dominant role for highly qualified workers over machines, e.g. robotic surgery.

The real challenge for European industry lies in the ability of established industrial leaders to **engage their own digital transformation** before disrupting competition forces them out of business. The impact of emerging on-demand platforms on employment is still controversial. Recent studies tend to show that, so far, they have not significantly displaced or cannibalised traditional employment (Hathaway & Muro, 2016). Instead, on-demand platforms have developed in parallel to more traditional forms of business, therefore complementing existing offers. However, the situation is expected to change in the near future as new technologies continue to deeply integrate production and operational processes. As a result, workers from incumbents, and even from some players already seen today as disrupting business models, might be overturned by the massive uptake of automation and artificial intelligence that will expand to all sectors of the economy. For instance, the transport sector has seen the development of online ride-sharing and car-sharing platforms that, for the most part, have complemented existing taxi and public transport offerings. Meanwhile, new business models are developing, such as decentralised and fully automated systems, e.g. blockchains and driverless cars, which might render such platforms obsolete.

3.3 Level of digitalisation in the EU

The development of **digital infrastructure** is a key precondition to a deeper integration of digital technologies in business and public services. Digital infrastructure refers to the development of virtual networks entailing the upgrade of existing network infrastructures into a fully-fledged collaborative data infrastructure. Primarily relying on the combination of ICT innovations, such an infrastructure requires supercomputing capabilities, high data storage capacity, high-speed connectivity and cutting-edge software-based services for science, industry and the public sector. In this context, the role of

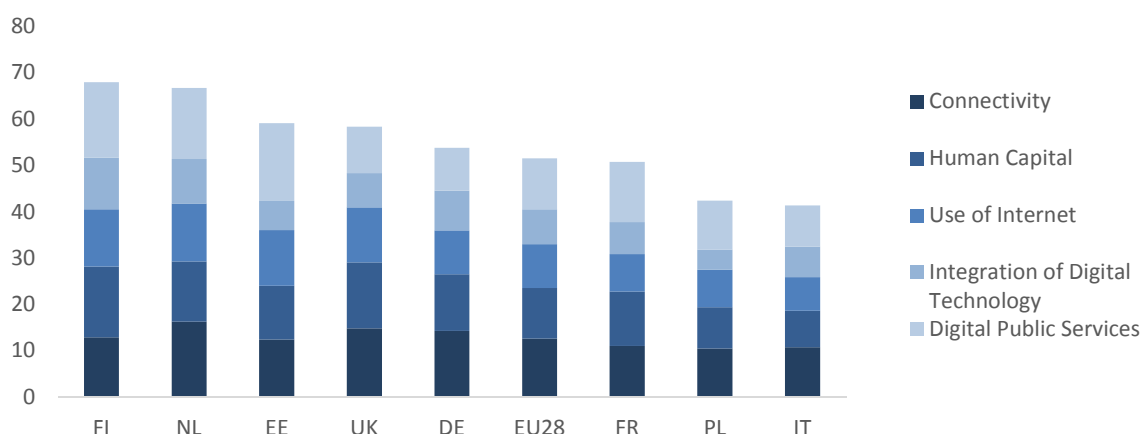
¹⁹ The European Parliament has initiated a debate and plan to adopt recommendations on how to best address the challenging ethical, economic, legal and social issues related to the developments in the area of robotics and AI for civil use, as identified in the report with recommendations to the Commission on Civil Law Rules on Robotics (Delvaux, 2017), adopted in Plenary in February 2017. The report calls for a series of actions to develop a European legal framework on robotics and AI so as to, among other things, enforce ethical standards, establish liability for accidents involving automated systems, and to set up a European agency responsible for overseeing this quickly growing field and ensuring an integrated approach throughout the EU.

data takes a central dimension. Upgrading network capacity to support the deployment of high-performing, sustainable and efficient interconnected trans-European networks would find applications in the fields of transport, energy distribution and digital services.

As part of its **Digital Single Market (DSM)** strategy, the European Commission has proposed a new ‘connectivity package’ setting strategic (non-binding) objectives for the deployment of so-called ‘Very High Connectivity’ (VHC) capacity networks.²⁰ In particular, it envisages a universal coverage of 100 Mbps-connections by 2025 and all urban areas and all major terrestrial transport paths having uninterrupted 5G coverage (European Commission (2016c)). The focus on Internet access has been progressively complemented by a series of fine-grained statistical indicators on Internet usage, the development of new digital services, and the digitalisation of the industry, as gathered in the Digital Agenda Scoreboard²¹ and the Digital Economy and Society Index (DESI). The latter summarises some 30 indicators on the EU’s digital developments in five key fields over time: i) connectivity, ii) human capital, iii) Internet use, iv) integration of digital technology, and v) digital public services.

In terms of performance, Finland, the Netherlands, Estonia and the UK rank among the digital frontrunners in the EU, while Germany and France are close to the EU average, and Poland and Italy lag behind based on their DESI score (see Figure 3.2).

Figure 3.2. Digital Economy and Society Index (2016)



Source: European Commission and Eurostat

Fixed broadband penetration in the EU was 30.9% in 2014, more or less equivalent to Japan and the US, but below that of Canada (32.8%) (Rubio et al., 2016). Based on the Digital Progress Report

²⁰ VHC networks refer to electronic communication networks capable of maintaining network performance at peak hours in down- and uplink bandwidth, resilience, error-related parameters, latency and its variation. It usually also refers to a range of technologies connecting homes and businesses to ultra-fast broadband, including G.Fast close to the end user, fibre-to-the-building or premise (FTTP), DOCSIS and 5G networks.

²¹ The Digital Agenda Scoreboard includes more than 100 indicators, divided into thematic groups, which illustrate some key dimensions of the European information society (telecom sector, broadband, mobile, Internet usage, Internet services, e-government, e-commerce, e-business, ICT skills, research and development).

(2016), the share of EU households enjoying a fixed broadband subscription rose up to 72% in 2015. Although basic **connectivity** has been progressing quickly in recent years, the broadband penetration rate for high-speed connectivity remains limited with only 22 % of EU households actually benefiting from fast connections of at least 30 Mbps (Digital Progress Report, 2016). The picture remains, however, highly heterogeneous across Europe, revealing major disparities among member states as well as between rural and urban areas. In 2015, the Netherlands was leading on connectivity indicators, followed by the United Kingdom, Germany and Finland. France ranked below the EU average while Poland and Italy fell further behind.

Regarding **mobile broadband** scoring, the 4G coverage soared up to 86% of EU households in 2015, with Sweden, Finland and the Netherlands leading the way in covering widely both urban and rural areas, as indicated in the DESI index (2016). According to the OECD (2017), Canada has been lagging behind France and Germany in terms of mobile broadband subscriptions in 2015 (OECD, 2017). However, it has been reported that Internet traffic per user via mobile broadband (downloads and uploads) was still much higher in the United States than in Western Europe on both mobile (1.8 GB vs. 0.8 GB per month on smartphones) and fixed networks (75 GB vs. 39 GB per month) (European Commission, 2016c).

In terms of **Internet usage**, most of the Digital Agenda targets have been reached, with 75% of the EU population using the Internet at least once a week and 65% on a daily basis. However, there is still 18% of the EU population who have never used the Internet. There is a clear divide between the northern member states where, on average, a larger share of the population uses the Internet than in the southern member states. France, Poland and Italy have the lowest scores in these indicators. Interestingly, the main reasons reported by respondents for not subscribing to fixed broadband were a lack of interest (45%), lack of skills (41%), and cost factors for equipment (27%) and access (24%). Digital literacy is an important factor. The digital divide is largely driven by age and education levels, with 52% non-users being low educated and 50% aged between 55 and 74.

Turning to the **traditional businesses and industries**, most businesses do not fully leverage the opportunities that the increasing connectivity of the EU population offers, e.g. e-commerce platforms, cloud and online solutions. It is particularly interesting to see that only 16.8% of European businesses sell online, whereas an increasing proportion of Internet users shop online (63%) or rely on online banking (57%). Large companies are more often selling online (38%) than SMEs (17%). This gap in online activity has widened in recent years (DESI 2016).

Another key trend in digitisation of traditional businesses is the progressive **dematerialisation** of key business assets and processes. A growing share of EU companies use software for internal Electronic Resource Planning (ERP), CRM, electronic information sharing, or for sending electronic invoices. They also increasingly rely on radio-frequency identification (RFID) technologies, social media to engage with customers and partners (DESI, 2016), and cloud computing services (European Commission, 2016d).

Regarding e-government, only 26% of the population used **online public services** in 2014 to submit forms to public authorities online (Digital Agenda Scoreboard, 2015). While the initial Digital Agenda target of 25% has been reached, a series of barriers such as the lack of trust, transparency or user-friendly interfaces still must be overcome in order to increase the use of online public services. Among core countries, Estonia is reporting the highest use of online services, with a deep transformation of public administration and the development of trusted digital services (e-residency). In particular, Germany and Italy remain behind, with lower scores for e-government indicators.

4. Impact of digitalisation on labour relations

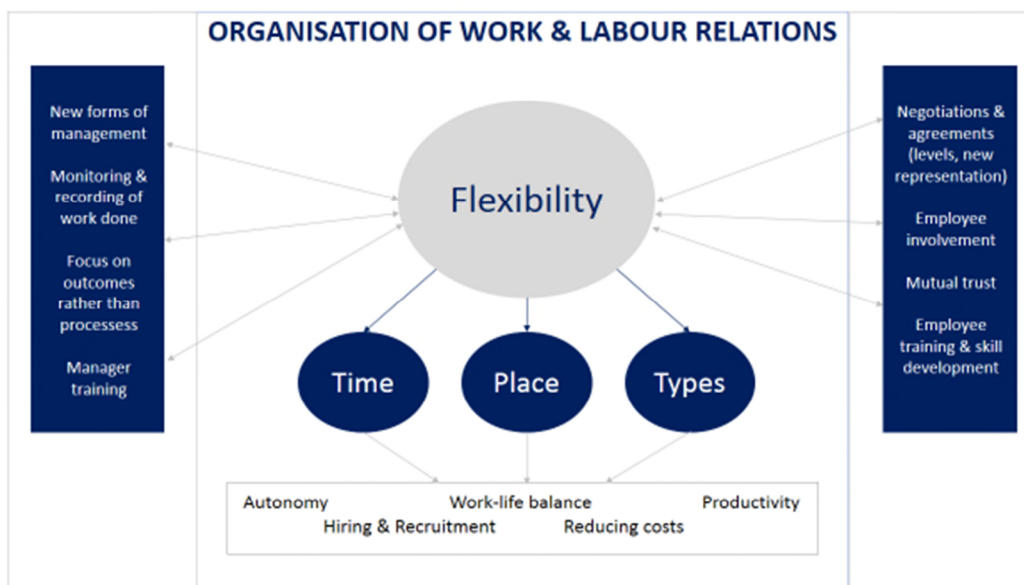
This chapter focuses on the impact of digitalisation and the on-demand economy on the labour market and on how they influence the **organisation of work** and **industrial relations**. Changes resulting from digitalisation and the development of on-demand economy could be deep and affect various areas of organisation of work. They impact, in particular, the time and places where tasks are performed, but also the forms of employment or the skills that are needed in the labour market to facilitate the transition towards digitalisation. Moreover, digitalisation also strongly impacts, and sometimes even transforms, the relationships between employers and employees, by creating new forms of collective bargaining, social dialogue or management styles.

The chapter deals with these issues from the **employer's point of view** for both the traditional businesses and industries and the on-demand economy. It examines, for instance, whether and how existing regulations and laws may constrain employers from fully reaping the benefits that digitalisation can bring or from addressing its potential negative effects.

4.1 Traditional businesses and industries

Figure 4.1 emphasises the flexibility that digitalisation induces, in terms of where, how and what type of work is being performed. This may bring advantages to both employers and employees, in the form of increased autonomy and productivity, improved work-life balance and reduced costs. Flexibility further calls for – and may give rise to – new types of management and skills. Training of both managers and employees was emphasised as key by several of the interviewees. In addition, continuous involvement of employees in any digitalisation-related decisions that may affect them was also mentioned on multiple occasions, as this can ensure smooth transitions and cooperation.

Figure 4.1 Framework on impact of digitalisation on labour



Source: Authors own elaboration.

One of the main impacts of digitalisation on the organisation of work in the traditional businesses and industries is growing **flexibility**, which influences how workers and employers interact and communicate with each other. Digitalisation and technological innovation lead employers to deal with the development of more flexible ways of performing tasks. In a series of reports published in 2015, BusinessEurope underlined the need to adapt to increased flexibility and the skills required in light of digitalisation. Yet, in countries where existing laws and labour codes already allow for much flexibility, e.g. in terms of working times, employers may be less focused on digitalisation and the potential benefits that it brings. This point was mentioned by one of the Polish interviewees. In these countries, governments have not taken any specific (legislative) actions.

One of the most visible results of increasing flexibility in the organisation of work relates to where work is being performed. In other words, the **places** where tasks are performed are increasingly varied. ICTs tend to make human labour less bound to location, and as a consequence the office is no longer the only place of work, especially in the services industries (Gareis et al., 2006; Popma, 2013). Telework, whereby workers spread their office work between the business premises and their home, has developed in recent decades to one of the most important workplace innovations in Europe (Beblavý et al., 2012). Eurofound (2015) uses ‘mobile work’ or ‘ICT-based mobile work’ to describe work arrangements that are carried out (at least partly but regularly) outside the main employer’s office thanks to communication technologies. The working places outside the main employer’s office include many possibilities: another company’s premises, a customer or client’s office, a hotel, a customised home office and working while travelling, for instance in a train (Gareis et al., 2006). Interestingly, this may also imply that there is less need to commute to urban areas, as work can be done remotely and, as a result, jobs may move away from urban areas, as reported by an Estonian interviewee. According to the most recent figures, in the EU an average of about 17% of employees are engaged in telework or ICT-based mobile work (Eurofound-ILO, 2017). This aggregate figure hides a great variation depending on the country, occupation, sector and the frequency with which employees engage in this type of work. For instance, in most countries, larger proportions of workers carry out telework occasionally rather than on a regular basis. Moreover, telework is more common among professionals and managers, but is also significant among clerical support and sales workers. It is also interesting to note that in general, men are more likely to work while mobile than women, but women carry out more regular home-based telework than men. An autonomous framework agreement to support teleworking was negotiated between the European social partners in the early 2000s, and its implementation was reviewed in 2008.²² The 2008 report on the implementation of the Framework Agreement on Telework considered it a success (this is confirmed by Itschert & Alfaiate, 2015).

The **times** when tasks are performed are also becoming more flexible. This stems from the flexibility in terms of work spaces. Working times are, for instance, more flexible if workers can work on journeys, or from home. In many sectors of the economy, new possibilities for working anywhere also result in an increasing international division of labour, with more worldwide interconnection.

²² See the implementation reports prepared by the European Commission and the social partners.

Therefore, there is an increasing need for communication across time zones, either between different firms or within multinational corporations (BDA, 2015; Gareis et al., 2006).

From the point of view of economic theory, enhanced flexibility can be regarded as a **change in the coordination costs** within firms. According to Coase (1937) and Williamson (1975) firms and markets are two forms of coordination of economic activities. Firms coordinate economic activities thanks to hierarchy, control and authority. This form of coordination entails the costs of supervising employees, controlling the quality of their work and, generally speaking, managerial activities. However, these costs are lower than the **transaction costs** on markets (search and information costs, bargaining costs, etc.), which is the reason that firms exist. Information and communication technologies greatly reduce coordination costs. Implementation of ICT eliminates physical distances as a major limiting factor, because it cuts costs linked to organisation and communication over longer distances. This is true, in particular, for small and medium-sized enterprises. Technology can even reduce hiring and recruiting costs significantly²³ (Beblavý et al., 2012).

Digitalisation and flexibility may blur the boundaries between **work and private life**, at the cost of private time (Popma, 2013). In some countries, measures have, therefore, been taken to redefine these boundaries. In France, for example, since 1 January 2017 firms with more than 50 employees and a trade union representative are constrained by law to include **the right of being ‘non-reachable’** (or the **right to disconnect** from the use of digital tools) in the mandatory annual negotiations with trade unions, specifically in the part on gender equality and quality of life (Article L.2242-8 French Labour Code) (Allen & Overy, 2017). If no agreement is reached, the employer has to prepare a unilateral charter. By requiring agreement on regulations on the use of ICT tools, the law aims to ensure that some time slots are earmarked for rest and holiday. The impact on the boundaries between work and private life was also stressed in several interviews. In Germany, for example, agreements have been made between unions and employers, e.g. Volkswagen and Daimler, on the reachability of employees and their right of being non-reachable. In Italy, a draft law aims at introducing a “right to disconnect”. One of the interviewees pointed to the controversies that surround this topic in France. More specifically, there were controversies about a recent proposal to implement a right to disconnect that implied, for example, preventing e-mail access after 6:00 pm. Such rules, however, may hamper flexibility, which is something that many employees have called for.

Besides the right to disconnect, flexibility regarding the times when tasks are performed can also lead to **less predictable and stable schedules** for part-time employees. This is the case with scheduling software, which helps employers to design part-time employee schedules that better meet variations in demand (Greenhouse, 2012). Unpredictable schedules may undermine the boundaries and the balance between work and private life. One Canadian interviewee stressed that working times and scheduling have become much discussed issues in the country. Especially in the retail and service sectors, digitalisation has allowed for the frequent changing of schedules, sometimes at short notice. According to the interviewee, tension is starting to emerge between low-wage workers who may not

²³ For example, the Open University makes use of technology to recruit specialised instructors regardless of geographical boundaries.

be getting enough work hours and high-wage workers who may be working too many hours without compensation.

At the same time, employers should also take into account the fact that the demand to organise work in a less traditional and fixed way may come from employees too. Digitalisation is likely to bring a lot of opportunities for workers, as flexibility can go hand in hand with **more autonomy, more learning, a better work-life balance or even new employment possibilities** (Gareis et al., 2006; Popma, 2013; Eurofound, 2015). For example, workers may achieve a better work-life balance if they can work from home or when it suits them best. In Italy, some trade unions underline the potential benefits of digitalisation for workers in terms of flexibility, autonomy in work, the end of routine tasks and training opportunities.

As a consequence of digitalisation, employers and employees increasingly demand flexible **forms of employment**. It is important to note that digitalisation does not necessarily entail new forms of employment contracts. For example, according to case studies conducted by Eurofound (2015), mobile forms of work are generally based on standard work contracts. However, in many cases digitalisation does go hand in hand with more flexible forms of employment which may necessitate more flexible contract forms (temporary or permanent contracts). For Germany BDA (2015) underlines that to fully benefit from digitalisation it is necessary that temporary and fixed-term employment continue to be available in the future. German employers even call for new laws to facilitate the use of fixed-term employment (BDA, 2015). The current legislation of some European countries sometimes creates employment rigidities, which prevents firms from reaping the potential gains of digital economic opportunities. This might be the case, for instance, of high level of employment protection in France (Van der Marel, 2016). McKay et al. (2012) have pointed out that flexible contract forms may raise questions about income certainty, pension rights and social protection. For example, some workers may prefer contracts with an indefinite duration over fixed-term contracts because this ensures a more stable flow of income and avoids uncertainties that would result from gaps in employment. The employees with a fixed-term contract build up social security rights during the time of employment, which are retained even when the contract ends. At the same time, more flexible work may require more flexibility within the contract types.

Although new technologies allow for working from anywhere and anytime, as explained in the previous sections, **legislation may form an obstacle** in some cases. According to BDA (2015), the German rules should no longer set a *daily* maximum working time, but rather a *weekly* maximum. Workers should also be able to work at home longer than planned when it is necessary, as long as this is compensated by a rest period at another time. The ban on working on Sundays and statutory holidays should be removed, as it prevents employers from developing connected work worldwide. One possible solution could be the use of working time accounts that provide more leeway in the organisation of working time; they already exist in Germany, but it currently has a bureaucratic and cumbersome legislative framework (BDA, 2015).

A recent report on working time regulation in Finland sheds more light on this (Ahtela, 2015; Ahtela, 2016). In Finland, the main issue with the existing working time regulation is that it is strongly based

on the **location** where work is carried out. In a digitalised world, where telework is common, this is problematic. Many companies made in-house agreements on telework (with the IT sector as a prominent example) because the legislative framework is rigid and does not allow for sufficient flexibility. The report, therefore, recommends broadening the scope of local solutions as regards working time, e.g. annualisation, simplification of flexi-time and working over the weekend, recognising distance work in the legislation, e.g. specification of criteria, meaning of contactability, and emphasising the significance of rest periods and recovery. Autonomy and mutual trust are key in this context.

Moreover, the **negotiations and agreements between employers and employees** need to be adapted to digitalisation. The emergence of ‘ICT-based mobile work’ requires negotiations between employers and employees about non-wage issues such as working time and location. In Greek firms, this is sometimes hindered by the absence of a negotiation culture on such issues (Eurofound, 2015). In addition, traditional collective agreements may be inappropriate in the context of developing ICT-based mobile work, as they lead to the potential exclusion of mobile employees because the controllability of the correct execution of these agreements may be more limited in their case (European Commission, 2010). For instance, a collective agreement on working time that works well within the organisation is difficult to monitor for mobile workers, since they work outside the organisation – though many companies may already have worked out solutions for this problem. Conversely, digital applications may provide tools that enable employers to check remotely, at least to a certain extent, the working times of mobile workers.

Still, in many countries, none or only limited modifications are being made to **collective agreements**, e.g. Germany.²⁴ In Finland, digitalisation appears to have diluted the hierarchy, pushing negotiations from the collective to the firm level. In Italy, it has been reported that digitalisation impacts collective bargaining in the sense that new topics are being drawn to the centre of debate: conciliation between private and working life, excessive stress and intensification of work due to technological devices, training opportunities, participation in the decision-making process. In November 2016, the renewal of the collective agreement of metal workers in Italy introduced a right to training.

Negotiations and agreements between employers and employees may also be important to make sure that both employers and employees benefit from the increase in **flexibility**. Greenhouse (2012) points out that labour unions are raising issues that stem from scheduling software, such as the fact that employees in some cases have short shifts (two or three hours) or rapidly changing schedules (and are informed on changes at the last minute), for further negotiation with employers. This was confirmed by an interviewee from a Canadian labour union. This interviewee further emphasised that under the Wagner Act, collective bargaining typically took place between one union and one employer in the work place, but that digitalisation has substantially affected all of them: it is increasingly difficult to identify who the employees are and to organise them (changing unions), the concept of work place

²⁴ Poland is another case: there are no examples of collective bargaining concerning digitalisation. Existing legislation that prevents unions from bargaining for non-subordinates is under review, but this is related to issues facing the self-employed and those with special contracts, e.g. drivers. Similarly, little attention is devoted to the on-demand economy.

(changing work place) has drastically changed and employment relationships are changing shape (changing employers). The interviewee therefore argued that a change in the collective bargaining system would be appropriate. Some of the interviewees also mentioned that digitalisation can be used as a way of improving labour relations, for instance through digital tools that can help labour unions to be more democratic and to better communicate with their members.

Another interesting example of how digitalisation may affect **labour relations**²⁵ can be found in Estonia. According to the interviewees, one must keep in mind that there are two issues occurring at the same time. On the one hand, workers, especially those without digital skills, may be losing out in sectors where digitalisation reduces the demand for labour, which undermines their position and shifts the power balance in favour of employers. On the other hand, the power balance has shifted in favour of workers with digital skills, especially when they are employed in sectors where digital skills are in high demand. Regardless of the balance of power, digitalisation may bring new challenges that employers and employees need to address. One example is stress: digital technologies are blurring the borders between working and private life and may lead to employees feeling pressured to be available in the evenings or over weekends. This may result in increased stress levels (Eurofound, 2015; Vogel, 2015; Degryse, 2016). But it is important to acknowledge that digitalisation and increased flexibility may also diminish stress, by giving employees more autonomy and control. Therefore, the research on the relationship between digitalisation and stress is inconclusive.

A joint declaration by the social partners on the impact of digitalisation in the insurance industry stressed that the **existing framework** of laws, codes, regulations and collective agreements serves as a key backbone (see AMICE et al., 2016). The argument is that this existing framework already provides ample protection of workers' rights and that new initiatives should comply with it. In addition, the existing framework is found to be flexible enough to adapt to the challenges and opportunities that digitalisation brings – though collective bargaining and social dialogue are considered essential to this process.

Digitalisation requires employers to create **new forms of management**. One possible hurdle to the development of ICT-based mobile work in some countries, such as Greece or Slovenia, is the traditional culture of control by employers over employees, which is incompatible with employees working outside employer main offices (Eurofound, 2015). A key question is whether such a culture would change as digitalisation progresses. In Denmark, the spread of ICT-mobile work has been accompanied by more self-organisation and self-management by employees (Eurofound, 2015). Another example of the necessary evolutions of management is that traditional **occupational safety and health** (OSH) management can hardly be applied to ICT-based mobile work, because some factors – excessive noise levels or static and poor posture, for example – become variable and cannot be managed (European Commission, 2010). OSH management then has to evolve, for instance, by providing guidelines to employees rather than trying to control all the risks. Management training will

²⁵. These terms labour relations or industrial relations designate the collective relations between the management of an organisation and its employees or employees' representatives, also at the industry or national level. See the Glossary for the main terms and definitions applied.

also be important in the future as stipulated in the joint declaration in the insurance sector and as was also mentioned by one of the interviewees. New technologies can, in fact, facilitate both the monitoring of employees and the recording of work activities, making it easier for employees to prove that certain tasks have been carried out, in both cases monitoring the outcome rather than the process. This would also require more freedom and responsibility for workers to organise their own work. This may increase their level of motivation. The Finnish IT sector is a frontrunner in this regard. Another key lesson from Finland is to involve employees when important decisions are made, in terms of both informing and consulting with them. It should also be mentioned here that among the labour unions we have interviewed in different countries, many believe – for instance, in Italy and the UK – that the facilitation of monitoring through digitalisation can be a risk if it results in excessive control over employees.

Digitalisation and changes in the organisation of work may further result in greater **productivity**, as was indicated by a Finnish and a German interviewee who also pointed to the fact that digitalisation promotes new modes of production. In Estonia, there are several examples to highlight these dynamics. In the telecom and energy sectors, for example, sales departments have been downsized and, in turn, the use of digital means has gone up, e.g. increased use of databases. For workers who are employed in these industries, having digital skills is therefore of crucial importance. In the spring of 2017 a new initiative will start in Estonia, supported by trade unions, employers' representatives and the government, which sets out to provide training for those who are most vulnerable to these dynamics, e.g. older workers. According to the interviewee, there is an important role for the government in this domain.

To fully reap the benefits of digitalisation, firms may require that their current employees to acquire **new skills**. In Sweden, which embraced ICT-mobile work in the late 1990s, this has led to the acquisition of new skills related to information and communication technologies (Vinnova, 2007). El-Darwiche et al. (2013) insist on the role of the state as a regulator or a demand stimulator of specific training programmes such as those that have been launched by telecommunication authorities in Japan and South Korea. BDA (2015) points out that Germany should secure the necessary skilled workers. This applies to all workers in traditional and new types of employment, although it would be particularly relevant to those who are faced with global competition (virtual work). It means that, in particular, science, technology, engineering and mathematics (STEM) education should be included at all levels in the education system. Digital skills, such as a grounding in information technology, must also be a requirement in curricula. Similarly, in several publications that appeared in 2015, BusinessEurope emphasised the need to ensure that all workers have the appropriate skills, in which digital literacy, STEM skills and employability are crucial. This requires an adaptation of education and training systems, with an emphasis on interdisciplinary programmes, teacher training and new teaching methods. Online learning could be a valuable cost- and time-effective way for companies to offer training to their employees, and should be supported, according to BusinessEurope. This focus on skills can also be found in the joint declaration of the social partners in the insurance sector, in which further training of employees and improvement of their employability is emphasised.

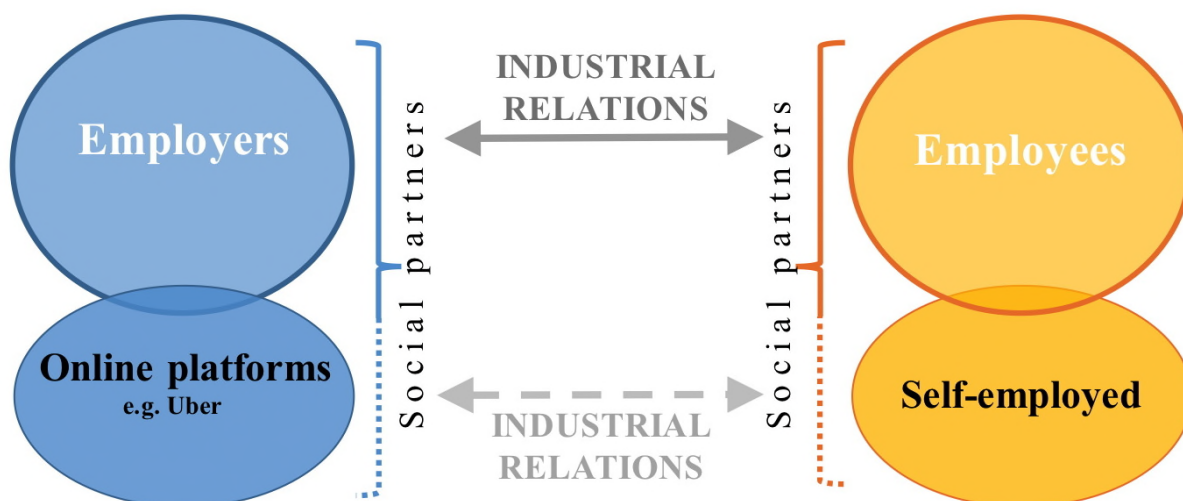
Digital and STEM skills are high on the agenda of policy-makers across Europe. In the ‘**New Skills Agenda for Europe**’, the European Commission has underlined the steps to be taken to foster digital skills in Europe. Another important recent proposal is the Digital Skills and Jobs Coalition initiative,²⁶ which aims to support people in their career and learning choices, improve skills forecasting, analyse skills needs and bring digital skills to all education levels (in collaboration with a range of stakeholders including national governments, social partners and education institutes). The Digital Skills and Jobs Coalition targets the following groups:

- **Digital skills for all**; enabling all citizens to participate in the digital society.
- **Digital skills in education**; transforming teaching and learning of digital skills in a lifelong learning perspective and teacher training.
- **Digital skills for the labour force**; developing digital skills needed in the digital economy.
- **More and better trained ICT professionals**; developing high-level digital skills for ICT professionals in all sectors.

4.2 On-demand economy

Figure 4.2 attempts to summarise how industrial relations work in some parts of the **on-demand economy**. To a certain extent, the on-demand economy can be compared to more traditional sectors, where industrial relations take the form of discussions and collective bargaining between social partners representing employers and employees (as represented in the top part of the chart). Even if they are not technically employers, the role that some platforms – for instance, in the ride-sharing sector – play in industrial relations seems analogous to the employer role. In these cases, self-employed persons may find themselves in a position that is similar to employees’ positions.

Figure 4.2 Industrial relations in traditional businesses and industries and in the on-demand economy



Source: Authors own elaboration.

²⁶ More information can be found at <https://ec.europa.eu/digital-single-market/en/digital-skills-jobs-coalition>.

In traditional industries, the existing laws, codes and rules provide the framework in which measures can be taken to deal with the consequences of digitalisation and reap its benefits. In new industries or for new types of work, often **such a framework does not exist** or it is unclear how they would fit under the framework in place. In addition, social dialogue and collective bargaining typically are more complicated, for several reasons. For example, the status of both those who work through a platform and the platforms themselves is often unclear, i.e. is such a person an employee or self-employed? Is the platform an intermediary or an employer? Among the trade unions that have been interviewed, some have explained that neither platform workers nor platforms are necessarily represented by existing social partners. They may be difficult to unite and there is no framework in which negotiations take place. Nevertheless, such a negotiation framework could be valuable for all parties involved.

The on-demand economy is **flexible by definition**, because every person is free to decide when to offer supply time without any obligation (De Groen & Maselli, 2016). This stems from the underlying principle common to all platforms that they are only intermediary entities between a supplier and a demander. At least to a certain extent, it also meets the platform workers' preferences, as many studies suggest that personal control, flexibility, and the possibility to set one's schedule, select jobs or work from home are among their main motivations (De Groen & Maselli, 2016; Berg, 2016; Teodoro et al., 2014). It is important to recall that many platform workers perform tasks on multiple platforms.

As a consequence of these features of the on-demand economy, most people who obtain work through on-demand platforms are **self-employed or independent contractors** (Baker, 2015; Drahokoupil & Fabo, 2016). This is an important shift compared to the traditional employer-employee framework. In the US, up to 93% of platform workers are self-employed (Hathaway & Muro, 2016). On-demand economy platform workers typically do not have the same rights – in terms of working conditions or social security – as employees, owing to their **status**.²⁷ The status of those who offer labour on some platforms is clear. On others, however, it is unclear whether those who work through the platform are self-employed, employees or have another status. This may be problematic when those who work through the platform expect that they are employees but legally are not. Especially in developed economies, this is a much debated topic. Widespread litigation in the US, for example, focuses on whether platform workers have the status of employees or independent contractors (Cherry, 2016). The question of employee status is particularly important because many of the rights and benefits provided for in US employment law (minimum wage, protection from discrimination, unemployment insurance) are only applicable to employees. In contrast, in developing economies, attitudes towards online work may be radically different. Online work in those countries is regarded as offering great potential. Many who work online see themselves as entrepreneurs and are concerned that introducing laws and regulations would hamper them (World Bank, 2015).

²⁷ It is important to recall here that we use the term “platform workers” to describe those who offer their services through an online platform but do not have an employment contract (as an employee would). As a result, regulations that apply to employees are not applicable to them. The same goes for the self-employed.

In the European Commission's communication on the collaborative economy (European Commission, 2016b), an examination of the conditions under which an **employment relationship** exists according to EU labour law and jurisprudence is presented. As stated in the communication, the Court of Justice has stated that "the essential feature of an employment relationship is that for a certain period of time a person performs services for and under the direction of another person in return for which he receives remuneration". Building on this conceptualisation, the European Commission identified three main criteria to determine whether there is an employment relationship: a subordination link, remuneration and the nature of the work (also see the three bullet points below, European Commission, 2016b). As is stated in the Communication by the European Commission (2016b), these three criteria could also be applied to the collaborative economy:

- **Subordination:** There is evidence of subordination when the platform worker must act under the direction of the collaborative platform and the platform worker is not free to choose the services performed, remuneration and working conditions.
- **Remuneration:** If a platform worker receives remuneration for the services performed that surpasses a compensation of costs, he or she is not a volunteer.
- **Nature of work:** In this context it refers to an activity of economic value that is effective and genuine, excluding services on such a small scale as to be regarded as purely marginal and accessory.

Considering these criteria and their applicability to the collaborative economy, some argue that on-demand work is **not necessarily different from other kinds of "working relationships"** – which could mean that platform workers would be covered by the same labour laws and codes as workers in more traditional employment relationships (Drahokoupil & Fabo, 2016). As was indicated before, in the UK, a recent London employment tribunal ruling has stated that Uber drivers should be treated as employees instead of self-employed, receiving at least the minimum wage and holiday pay (Chapman, 2016). However, in many other countries in Europe, platform workers are considered self-employed, and it has been underlined that some regulations such as minimum wage, labour laws and existing collective agreements do not apply to self-employed workers (Drahokoupil & Fabo, 2016; De Groen & Maselli, 2016).

Uber is an interesting case. On the one hand, Uber could be regarded as an **intermediary**, linking customers looking for a ride to drivers who are self-employed and offer their skills whenever this suits them. On the other hand, given the way Uber organises work and controls drivers, many drivers may have the impression **of working for a company rather than being self-employed**. This raises certain questions, especially concerning taxation and social security contributions. Given this dual point of view, it is not very surprising that the case of Uber has sparked heated debates and that court rulings in different countries have reached different conclusions.

Many articles underline that industrial relations in the on-demand economy can be **unbalanced**. Todoli-Signes (2015) insists on the "unbalanced power positions" in the on-demand economy, which according to these authors lead in many cases to a situation whereby platforms establish working conditions to their own benefit and platform workers have to either accept them or not be able to work. Rosemblat & Stark (2015) shed light on power asymmetries between Uber and its drivers: many control mechanisms over the worker, such as semi-automated performance evaluations or rating

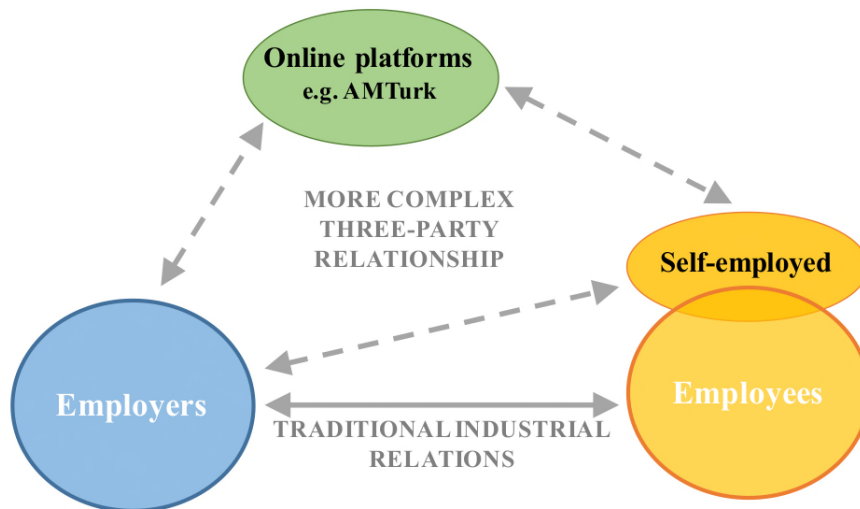
systems, which play a very important role for the allocation of tasks and selection of platform workers (De Groen & Maselli, 2016). Maselli et al. (2016) point out that the purely on-demand organisational principle (client-driven) combined with the availability of a large pool of workers place workers in a weak position and transfer stress and pressure to the workers. As underlined by some of the interviewees, trade unions have difficulty in shedding light on the working conditions of those who work in the on-demand economy, due to the absence of the traditional employment relationship.

However, **some examples of interest representation and collective bargaining do exist**. In the US, for instance, several Uber driver demonstrations occurred and were aimed at protesting Uber's reduced fares, tipping policy, five-star rating system and driver safety requirements (Kosoff, 2014). Uber drivers have even created associations such as the California App-Based Drivers Association or the Uber Drivers Network NYC.

Also in Europe initiatives have been taken to better represent platforms and platform workers. In Poland, on-demand economy businesses are creating an association for the sector, and in the UK, sharing economy platforms have established the Sharing Economy UK (SEUK), an association that aims at promoting and representing sharing economy businesses and facilitating trust between providers and customers (Vaughan & Daverio, 2016). In Germany, IG Metall has changed its statutes so that the self-employed can join the union. Similar examples also exist in Sweden.

While one can draw a parallel with relations that exist between employers and employees in traditional industries, it is important to acknowledge that relations between online platforms, such as Uber, and the self-employed are not employer-employee relations. **Industrial relations and collective bargaining differ radically from those in traditional industries**, and are in fact **non-existent** in most cases. This is due, for instance, to the fact that representation of platform workers and platforms by social partners is only in the early stages of development. As outlined above, there are some cases in which labour unions have extended their membership to the self-employed and there is also a growing number of examples of platform workers who have started their own union, are represented by new types of unions, e.g. freelancers' unions, or are joining initiatives such as SMart (see Box 2 in Section 2.2). Less seems to be happening in this area on the platform side.

Figure 4.3 Industrial relations in traditional industries and on-demand economy (different models)



Source: Authors own elaboration.

Next to Uber, several other platforms (more) clearly function as intermediaries. This is illustrated in Figure 4.3, using the example of Amazon Mechanical Turk. On this platform, people who post tasks are matched with people who offer their skills. Again, the latter are typically self-employed (although this is not always the case) and the relationships between the three parties involved do not reflect traditional industrial relations.

5. Government responses to digitalisation

This chapter focuses on how **governments** respond to digitalisation, specifically its impact on traditional businesses and industries, and the on-demand economy. It considers existing proposals, recommendations and measures, with a particular focus on the areas of labour conditions and organisation of work, taxation and social security.

In recent years, there has been a lot of debate on how local and national governments could or should respond to the challenges and opportunities engendered by digitalisation and the on-demand economy. However, despite broad interest in these topics and concerns of potential adverse effects as expressed, for example, by countless blog articles and opinion pieces, in terms of academic work and policy documents barely any information is available to inform the debate. Furthermore, most discussion in the general media appears to be focused on the on-demand economy rather than digitalisation and its implications for traditional businesses and industries. Moreover, when digitalisation is discussed, the focus is typically on productivity, business processes and growth. This chapter, nevertheless, discusses government responses to both dynamics. It thus draws heavily on current evidence as well as interviews with key stakeholders, in particular policy-makers representing different levels and departments of governments in the EU member states and Canada.

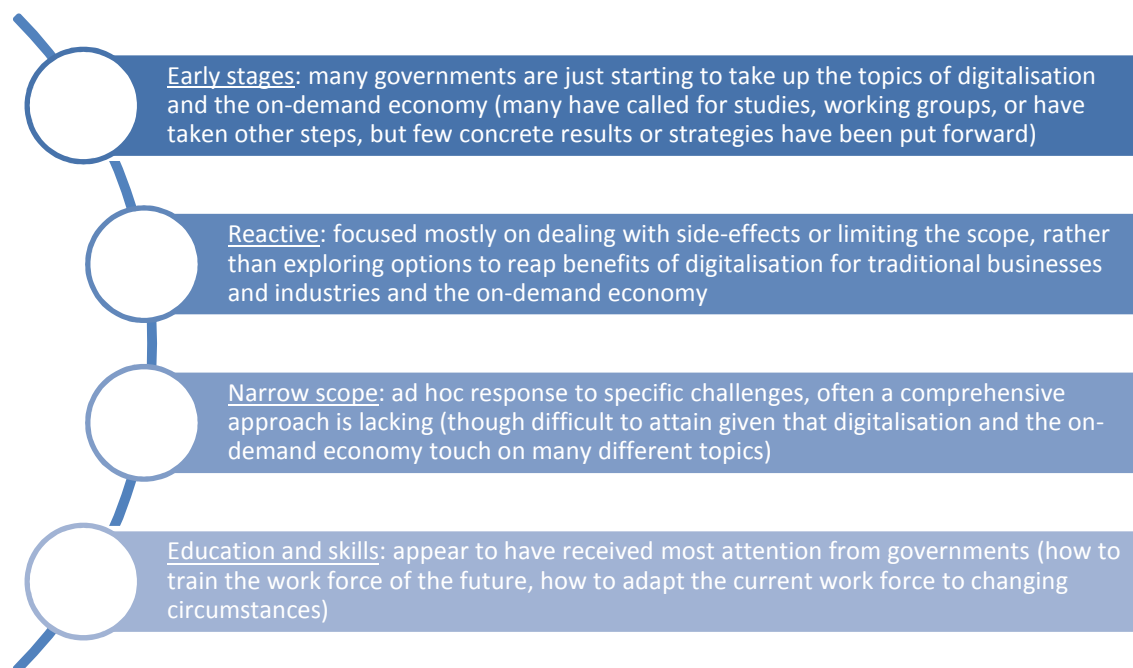
From the interviews one could draw the conclusion that many **governments are just starting** to investigate and respond to digitalisation and the on-demand economy. Several of the interviewees stated that their government had recently launched a call for study, established a work group or task force, or started to discuss these issues internally. Many interviewees stressed that as the government is now starting to take up these topics, only a few policy documents have been made public. When asked, some explicitly pointed to this issue to explain why they were unable to provide us with a published policy document to support their arguments. Other interviewees, though a minority, explained that digitalisation and the on-demand economy are not yet major issues on the policy agenda. To some extent, it is not very surprising that governments are only just starting to react to the on-demand economy and digitalisation. As Holmes & McGuinty (2015) underline in their report, technological advancements often happen at such high speed that governments face a rather difficult task in trying to set up regulations that keep up with them. This task becomes even more complicated when different levels of government are involved, such as the local and regional levels which play an important role when it comes to the on-demand economy.

Despite the aforementioned challenges, for some of the core countries assessed in this study, some documentation was available. For Germany, for example, a Ministry of Economy Green Book (which poses questions to launch a debate and deals with digital platforms in particular) and a Ministry of Work and Social Affairs White Book (which already contains concrete proposals on digital work) have been published. Interestingly, while both digitalisation and the on-demand economy are covered in these publications, the emphasis seems to be especially on the on-demand economy. Similarly, for Finland, where there is an ongoing discussion on how digitalisation can contribute to growth and on what the role of collective bargaining could be, there are already several interesting reports available.

Before detailing government responses regarding digitalisation and the on-demand economy, it is worth noting that in Europe several actors have expressed that the EU should take the initiative in these domains – although this depends on the types of actions envisaged. More specifically, concerning the on-demand economy, there are abundant publications calling for an EU approach. This point was also made by some interviewees (and refuted by others). In addition, this is not the case in other countries, including Canada, where provinces rather than the federal government aim to find solutions to account for the development of digitalisation and the on-demand economy, and do not expect or call for federal involvement.

Figure 5.1 briefly summarises these points: government responses to digitalisation and the on-demand economy appear to be still in the early stages and are generally more reactive than proactive in nature. The focus of responses also generally seems to target specific challenges, e.g. the rise of a specific online platform and the impact that it has on local competitors, rather than be comprehensive or strategic. Similarly, especially when it comes to the on-demand economy, many initiatives have been put forward by local rather than national governments. Most governments have devoted specific attention to education and skills.

Figure 5.1 Government responses to digitalisation and the on-demand economy



Source: Authors own elaboration.

5.1 Traditional businesses and industries

Although there is widespread debate over how governments could or should respond to the opportunities and threats that the on-demand economy creates, e.g. the case of Uber in major cities around the globe, the potential response to the effects of digitalisation in **traditional businesses and industries** appears to be much less discussed, especially considering issues such as social security.

While this is an interesting point to reflect on, one should keep in mind that digitalisation affects different domains and that digitalisation is happening alongside a number of related trends such as the growth of non-standard forms of employment, the growing service sector and globalisation, which may influence one another. This review of existing measures only provided limited evidence of how governments have reacted to digitalisation in traditional industries and businesses. This does not imply that it is not a topic of interest or concern.

Most examples are related to the topic of labour conditions and taxation; social security seemed to have received less attention. This observation was confirmed in the interviews. In fact, when asked about the consequences of digitalisation on traditional businesses and industries and the role of the government in addressing them, several respondents immediately highlighted the important potential role of the government in relation to the on-demand economy (and especially in the areas of social security and taxation), but far less attention was devoted to how **governments supported** traditional firms and sectors in their countries. Digitalisation may result in a global competition between workers, which may have implications for labour taxation, though this issue was barely raised in the interviews. Nevertheless, there are some interesting developments in the area of taxation. In France, for instance, there is an ongoing discussion on a proposal to tax robots.²⁸ This idea, to tax automation, had already been put forward before in a report prepared by Delvaux (2016) that was addressed to the European Parliament. This report, which is also known as the ‘Robotics Report’, covers a range of topics related to robotic innovations, from liability, data protection and security, to ethical codes of conduct and labour market policy. On 16 February 2017, the European Parliament voted on the report “Civil Law Rules on Robotics”.²⁹ It was adopted with 396 votes in favour, 123 votes against and 85 abstentions. The final report underscores the importance of having robotics laws and highlights the effects of robotics on the labour market, though the idea of a robot tax has been refuted.

Digitalisation further has a strong impact on the **labour conditions** of traditional businesses. In some cases, these impacts have triggered government responses, such as those to address **health and safety issues** outlined above. In Denmark, for example, the Working Conditions Act identified various locations where work is performed (Eurofound, 2015). It provides non-legally binding guidelines on which type of work should be done and where. Large writing tasks on laptops, for instance, should not be performed in trains or hotels, where working conditions are ergonomically not ideal. Instead, the guidelines recommend that while travelling, the employee should perform tasks such as reading or phone meetings. The example of Denmark shows that government responses should not necessarily take the form of traditional regulations but also softer forms of law, such as guidelines, self-regulation and education, etc. In Germany, the Ministry of Work and Social Affairs has proposed in its recently published White Book to allow for more flexible working times and create pilots for new enterprises. In other countries, such as Poland, existing labour codes governing individual and collective relations are currently under revision, though this exercise is motivated primarily by the need to update the

²⁸ Presidential candidate Benoit Hamon launched the idea for a robot tax, which would be used to fund a universal monthly basic income of €750 for every citizen.

²⁹ More information can be found at www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P8-TA-2017-0051+0+DOC+XML+V0//EN.

codes, which date back to the 1970s (as explained by one of the interviewees). Even though big changes are ahead, it remains unclear to what extent these revisions will cover the digital economy.

In addition to this focus on labour conditions, **skills and training** have also received much attention: some interviewees emphasised that the government can take measures to encourage workers, employers and unions to undertake or organise training, e.g. the cases of Estonia and Germany. One example for Germany relates to training when new technologies are introduced. Workers are entitled to receive additional training as agreed on in a collective agreement but do not always receive this in practice for various reasons.

Governments can play a role in this regard, either directly or indirectly, for instance by providing guidance and encouragement. The Canadian example is also interesting. Provincial governments have initiated panels and studies on a broad range of topics related to digitalisation, though their response is mostly focused on the development of skills. For example, they are currently considering a certification of skills as part of the CertWORK+ initiative that is difficult to earn through formal education but commonly earned on the labour market.³⁰ In a report prepared for the Business Council of Canada on ways to sustain and develop Canada's labour market information, Drummond & Halliwell (2016) underscore that changing labour markets go hand in hand with changing skill needs. They further underline the need for improved monitoring of skills offered by the labour force and skill needs of employers. Also in Europe, ensuring the future labour force develops the necessary skills and the current labour force can acquire these skills while adapting their existing knowledge and skills to the changing labour markets (through training and lifelong learning) are vital. Especially when it comes to the skills and knowledge of the current labour force, it may not be straightforward to bring them up to speed and ensure they can meet employers' needs. Governments have, therefore, devoted a lot of attention to knowledge and skills.

Some interviews mentioned the issue of **enforcement**. In Germany, for example, laws and collective agreements govern working times. The real challenge, therefore, lies in the verification of whether these laws and collective agreements are being respected in a world where digital technologies make it possible to work anywhere at any time, e.g. sending emails in the evening at home.

5.2 On-demand economy

To date, scant academic work has been done on the on-demand economy, which complicates the assessment of policy recommendations formulated by researchers, government officials or other stakeholders (Codagnone et al., 2016b; Maselli et al., 2016). However, there appears to be a clear consensus on the need for a policy response to the development of the on-demand economy, both inside and outside of the EU (BDA, 2015; Todoli-Signes, 2015; Codagnone et al., 2016b; Drahokoupil & Fabo, 2016). Holmes & McGuinty (2015), for example, have put forward

³⁰ See for example the CertWORK+ initiative, a joint initiative of the Canadian Labour Congress and Canadian Manufacturers & Exporters that aims to develop an integrated system of standards, competencies and performance indicators for six operations positions: manager, supervisor, lead hand, machine operator, assembler and material handler. More information at www.certwork.com.

recommendations to the Government of Ontario on how to tackle the challenges of the on-demand economy. Among the recommendations are creating measures to engage industry, establishing a cross-jurisdictional task force to further analyse opportunities and threats, and working with the federal government to ensure tax compliance.

This section focuses on government responses that relate to labour conditions, taxation and social security.

5.2.1 Organisation of on-demand work

One series of government responses is aimed at **limiting the scope** of the on-demand economy. There seem to be two main rationales here: one is to set some rules regarding the organisation of work,³¹ for example in order to guarantee customers a certain level of safety, and the other is to prevent unfair competition with traditional businesses. In Belgium, France or Italy, UberPop – whereby drivers are private individuals without any requirements – has been banned, though Uber is authorised in its UberX or UberBlack forms (depending on the country), provided that drivers meet a series of obligations, such as administrative registration, special insurance, special training or a clean criminal record (Vaughan & Daverio, 2016; Kirchgassner, 2015, Bayart, 2015; Jacquin, 2015). In Spain, Uber was banned nationally in December 2014 and is now trying to re-enter the Spanish market by working only with drivers who poses a special license (Vaughan & Daverio, 2016). Finally, the limitation of the use of crowdfunding platforms in Spain – with maximum equity and debt – is another example of regulation that restricts the scale of the on-demand economy.

Some other responses deal with the fact that on-demand economy workers **do not have the same rights as employees in terms of working conditions**, which is to be expected considering that often they are not employees from a legal perspective, i.e. they are not in a formal employee-employer relationship. In Germany, for example, concerns have been raised about the fact that regulations regarding minimum wages, sickness, holidays, etc., do not apply to platform workers, as was mentioned by one of the interviewees.

Another series of government responses aims at **fostering the development** of the on-demand economy. The Polish Ministry of Development, for instance, has recently launched informal consultation with Polish collaborative economy platforms to collect information on red-tape barriers hindering their development (Vaughan & Daverio, 2016). In the UK, the Deregulation Act relaxed permission requirements in London for Airbnb (Vaughan & Daverio, 2016).

5.2.2 Taxation

Taxation is in particular an issue for the on-demand economy. Most tax-systems in Europe have been designed based on current market structures. If on-demand economy platforms gain traction, these market structures and tax revenue/collection might fundamentally change. There are challenges at three levels: platform, worker and asset/services.

³¹ The platform-based economy is often perceived as being ‘unregulated’, as explained by one of the German interviewees.

The focus here is on the **taxation of the employment or worker**. Income generated through the on-demand economy is in most cases subject to one or more types of tax, e.g. personal income, wealth tax, VAT. There are great differences in both tax and social security systems across the EU member states, e.g. in terms of conditions, rates and amounts (De Groen & Maselli, 2016). In Canada, too, tax compliance and enforcement have been recognised as main challenges facing the on-demand economy (Holmes & McGuinty, 2015). Currently, there is often data insufficient to assess whether all incomes gained through the sharing economy have been reported.

On-demand economy income is often **not declared and tax authorities find it hard to retrieve** (Holmes & McGuinty, 2015; European Commission, 2016b). On the one hand, the platform worker has limited incentive to declare income; most workers have to pay tax but do not necessarily benefit from enhanced social security. Moreover, a large percentage is not even aware that the income needs to be declared. On the other hand, the platform is not required to report the earnings of the workers. They might even be inclined not to report their workers' earnings to avoid being considered employers or to discourage workers from being active on the platform. Uber, for example, exploited a loophole to avoid reporting information to tax authorities (Oei & Ring, 2015). Yet Uber recently agreed with several tax authorities to exchange information on drivers' earnings.

Some countries have issued **guidance** on the application of the national tax regime to the on-demand economy. For instance, in the US, the Internal Revenue Service (IRS) assists taxpayers who earn income from a sharing economy activity, which is generally taxable. The IRS offers tips and resources on a variety of topics ranging from filing requirements and making quarterly estimated tax payments to self-employment taxes and special rules for reporting vacation home rentals (Thomson Reuters Tax & Accounting, 2016). Another example is the Canadian Revenue Agency³², which has published specific information for any individual or business participating in the on-demand economy. The Canadian Revenue Agency stresses that any person or company must declare all income generated through sharing economy activities as well as meet the goods and services tax/harmonised sales tax reporting and remittance requirements. The agency makes explicit reference to the consequences of not complying with the rules, which include fines and jail time. Europe also presents examples. In 2015, the Finnish tax authorities provided specific guidance on how income from services such as Uber and Airbnb should be treated in tax reports (European Commission, 2016c). The need for guidance can come from on-demand economy firms themselves: in Poland, some crowdfunding platforms reckon that the lack of clear guidelines on how to apply tax law to crowdfunding is a key issue (Vaughan & Daverio, 2016).

The on-demand economy has also created **new opportunities for tax collection**. The introduction of digital platforms might enhance the traceability of revenues in certain sectors, particularly those that were formerly 'grey' such as personal household services, where workers are employed by private persons and cash payments are common. In some American and European cities – for instance, in

³² www.cra-arc.gc.ca/nwsrm/txtps/2017/tfsk27-eng.html.

France or the Netherlands – local authorities have agreements with Airbnb for the collection of taxes (Kaplan & Nadler, 2015; Kuchler, 2015; Vaughan & Daverio, 2016). In 2016 in France, Airbnb transferred €7 million of tourist taxes to local authorities (Airbnb, 2017)³³. Amsterdam has chosen to allow its residents to rent out their homes for up to 60 days per year (Frenken et al., 2015). Moreover, authorities have made arrangements to exchange information. In Estonia, for example, ride-share platforms send relevant data on drivers to tax authorities. The driver will then find his revenue through the platform pre-filled on his tax declaration form (European Commission, 2016b). The same has been arranged in Belgium, where recognised collaborative economy platforms such as ListMinut communicate the income obtained through the platform to the national tax authority.

Another government response in terms of taxation is to consider **changes to the existing legislation**. In Nevada, for instance, new regulations place an excise tax on Uber and Lyft (Eurofound, 2016). More specifically, the state adopted legislation to ensure that the 3% tax on passenger carriers would also be applicable to Uber and Lyft. In Rhode Island, Uber and Lyft are subject to a 7% sales tax on all rides that start and end within the state, based on a recently implemented law. In Italy, the recent Sharing Economy Tax Act introduces ‘fairer’ tax rates (Vaughan & Daverio, 2016): personal income under €3,000 from sharing economy platforms is not taxed, income under €10,000 is taxed at a 10% rate, and income over €10,000 is subject to the users’ marginal tax rate. In Belgium, recently a similar arrangement have been made in the Collaborative Economy Act, with the first €5,100 income obtained through recognised online platforms being taxed at a 10% rate. In the UK, tax-free allowances have been introduced for property and trading income for the self-employed, and for rental income from a room in a primary residence (Vaughan & Daverio, 2016). In France, the ‘auto entrepreneur’ status, created in 2008, has encouraged freelance work by making tax payment easier: all taxes and non-wage labour costs are replaced by a unique tax proportionate to the revenue. And in Estonia, Uber taxi drivers are paid directly via a bank account, which makes taxation straightforward.

5.2.3 Social security³⁴

Most European countries have well-equipped **social security schemes** that are imposed and controlled by (units of) the government for the purpose of providing social benefits to the community as a whole or specific parts of the community (OECD Glossary). Social security schemes are often financed through compulsory contributions by employers, employees or both. Social security benefits are paid out to promote health and well-being of the population at large and of those who are vulnerable. They typically include benefits regarding sickness, unemployment, survivors, maternity/paternity, family, old age, pensions, pre-retirement, disability, occupational diseases and work accidents. Some social security benefits are accessible by any citizen. Other benefits are only applicable to those working in an employment relationship, i.e. employees. Social security schemes are typically rather complicated and vary in several dimensions across countries.

³³ This was also discussed in many newspaper articles, such as www.lemonde.fr/economie-francaise/article/2017/02/06/airbnb-a-reverse-7-3-millions-d-euros-de-taxe-de-sejour-en-france_5075024_1656968.html.

³⁴ As was indicated earlier in this report, the Polish government has proposed changes in the social security system, though these changes have not been driven by digitalisation or the on-demand economy but rather reflect the government’s wish to make fake self-employment and civil contracts less attractive, e.g. by extending the minimum wage to such workers, for instance in the cleaning industry.

Applicable **rights and level of social protection** may remain uncertain for platform workers, mainly because of the uncertainty about the employment status. Considering that in most cases platform workers are, legally speaking, not employees, they have to rely on the system that applies to the self-employed. Given the high level of diversity in social security systems across Europe, social protection of the self-employed and agents (such as freelancers) also differs widely. Some examples include whether the social security scheme is voluntary or compulsory, applies to all self-employed or specific sub-groups, and requires contribution payments that are fixed or variable a combination of both. In terms of unemployment benefits, for instance, the self-employed are eligible for benefits under the general system in some EU countries, eligible for benefits under a separate system in other countries or not eligible at all. Another illustration is pensions. In many countries, as was stressed by several interviewees, the self-employed are not entitled to old-age benefits or only to a minimum level. In some countries there is a separate system for self-employed. In Finland certain self-employed individuals are for example under the Self-Employed Person's Pension Act obliged to take out pension insurance. This obligation is only applicable to self-employed³⁵ with an age between 18 and 67 years old that have ongoing business operations and estimated earnings from work of at least €7,557 per year (2016 threshold)³⁶. In Austria, there is a compulsory but separate system for the self-employed. In other countries, there is a minimum pension system that applies irrespective of the individual's employment status.

Challenges related to **social security in the context of the on-demand economy** also arise in Canada. Holmes & McGuinty (2015) describe this as follows: since many platform workers in the on-demand economy are independent contractors, self-employed or freelancers, they do not qualify for many of the benefits typically afforded to employees; this implies that platform workers are not required to pay into, nor will they have access to, key components of the social safety net, including Employment Insurance (EI) and the Canada Pension Plan (CPP). The CPP is an interesting example, as there is a recent initiative by the Ministers of Finance at the federal, provincial and territorial levels who have reached an agreement to further expand the CPP by reducing the eligibility age and increasing benefits (Block, 2016). The CPP is a universal system that is available to all Canadians and remains available from job to job. Considering the growing number of people engaged in non-standard employment, strengthening a universal system such as the CPP might be a good strategy to increase protection for all.

With the self-employed growing and changing in composition, there is a need for a **new funding model for the social safety net** (Rosenbush, 2016). There are already some national proposals for new systems on the table. One of them is the creation of a specific status that provides special protection for platform workers, similar to the statuses and protections of part-time, fixed-term and agency workers (Todoli-Signes, 2015; Drahokoupil & Fabo, 2016; Maselli et al., 2016). Such status

³⁵ Self-employment is in this context defined as work that is not taking place within the scope of an employment or service contract.

³⁶ This information is provided on the website of the Finnish Ministry for Pensions: <http://www.etk.fi/en/the-pension-system-2/the-pension-system/pension-coverage-and-insurance/self-employed/>

could be termed ‘dependent self-employed’, an intermediate status that falls between being a contractor and an employee. If this status would be introduced, online platforms would contribute at least some of the typical social protection provisions for these dependent self-employed. However, it is hard to implement such an intermediate status, because it is not straightforward to set the criteria that identify a dependent self-employed person (Codagnone et al., 2016a).

Another solution that has been put forward is **portability of benefits**. This proposal involves creating individual security accounts that are not linked to a specific employer and whose benefits are universal in nature, or even making employment status and the rights to benefits completely independent by implementing universal benefits (Dagnino, 2015; Codagnone et al., 2016a; Maselli et al., 2016). Under this proposal, the final employer of the platform worker would have to pay social security contributions as they would for regular employees (Harris & Krueger, 2015). In 2008, as mentioned above, the French government introduced ‘auto-entrepreneur’ status to lessen the administrative burden for independent workers.

In its White Book, the German Ministry of Work and Social Affairs has included a proposal that relates to the **social security status of the self-employed**. In Germany, by law, the self-employed cannot pay contributions into the pension funds. Participation is exclusively for employees (and the contribution is split equally over the employer and employee). As a result, many self-employed have no security at all and face a high risk of poverty in old age. The German government has proposed some modifications to this law that allow the self-employed to pay into this scheme, which could extend to on-demand economy workers. The main issue to be solved is where the second half of the required contributions come from. In Finland, similar concerns have been raised, and although they, too, arise from issues related to traditional types of self-employment, they could also impact those working in the on-demand economy; no concrete proposals have been formulated. In Estonia, an initiative is attempting to come up with legal packages in this regard.

Finally, a number of interviewees further emphasised that those who work in the on-demand economy are not always aware of the fact that they may not be covered by the same social protection provisions as employees, which may catch them by surprise at a later stage in life. Therefore, it is important to make **available information** regarding system differences in coverage, e.g. by better explaining who is covered and who is not.

6. Conclusions

In Europe, digitalisation has been regarded as a potentially important driver of innovation and economic growth, giving rise to new methods, techniques and data that increase efficiency and productivity and allow for the conception of new products and services. Digitalisation is expected to both create and destroy jobs, but it remains to be seen what the net impact will be.

Technological progress is not the only factor that has reshaped Europe's labour markets in recent decades. In fact, key drivers such as globalisation, demographic developments and climate change have also substantially impacted Europe's labour markets. As these dynamics are set against a background of very high levels of unemployment, they have attracted the attention of policy-makers and academics across Europe.

There is limited data available on the impact of digitalisation and the on-demand economy on labour markets and labour relations. Moreover, the data that do exist are divergent. For that reason, current literature on these topics is also fairly limited, though the research field is rapidly advancing.

As with previous industrial revolutions, digitalisation is likely to have two major consequences for enterprises and workers. On the one hand, new technologies and data analytics enable enterprises to enhance their efficiency, raise labour productivity and replace activities, which is likely to lead to a reduction in jobs. In many countries, such as Estonia, this has been confirmed, e.g. in the telecom sector and among taxi dispatchers. On the other hand, it will enable new enterprises and activities to develop, which generates jobs.

The on-demand economy is still fairly small in Europe, despite its rapid growth. It is currently only disruptive in a limited number of sectors. This may change if its growth rate continues to outpace the growth of the traditional economy. On-demand platforms are progressively emerging in every sector, suggesting a complete re-intermediation within the economy. This generates various market and regulatory frictions but also important opportunities for employers and workers, as previously undoable work is being done and persons previously excluded from the labour market are presented with new opportunities to become active.

ICT innovations and multi-sided platforms are also deeply transforming traditional industries as a positive loop resulting from disruptive innovations, pushing incumbents to redesign their business models, in which data plays a key role.

The impact of the on-demand economy differs across sectors. Based on the empirical work carried out so far, there seems to be a clear distinction between work that is virtual and can potentially be carried out globally and physical services that need to be performed locally. There also seems to be a difference between tasks that require low/medium skills and high skills. The on-demand economy has the potential to make tradable sectors previously considered non-tradable.

In terms of organisation of work, both digitalisation and the growth of the on-demand economy will lead to increasing flexibility. This is not surprising regarding the on-demand economy, which is by nature flexible, but most notable is that it also affects traditional businesses. This flexibility is reflected in many aspects of the organisation of work: the *times* and *places* when and where tasks are performed are becoming more flexible, as are the *types* of work. This may create advantages for both employers and employees, in the form of increased autonomy and productivity, improved work-life balance and reduced costs. It turns, it may also bear risks, for instance in terms of income certainty. Flexibility further call for and give rise to new types of management and skills. Several interviewees emphasised the importance of training both managers and employees.

Digitalisation and the development of the on-demand economy require changes in industrial relations. Regarding traditional businesses, industrial relations must adapt to the increasing flexibility that has been underlined as a major consequence of digitalisation. For example, legislation and/or collective agreements should take into account the need for flexibility in terms of working hours and places.

Regarding the on-demand economy, one of the main issues is the unclear status of both workers (employee or self-employed?) and online platforms (employer or intermediary?). As a result many actors are not represented by social partners, which hampers industrial relations and collective bargaining. There have already been some initiatives by trade unions to represent on-demand workers, but no similar initiative on the platform side has been identified.

Government policy measures at this stage seem primarily to target the side-effects of digitalisation, such as health and safety issues, while measures to promote the benefits that, for example, enhanced flexibility can generate are scarce. Some national governments are looking at the EU to take the lead in this area, calling for a supranational response. Other national governments prefer to put forward their own solutions. Most aspects touching on labour regulation and taxation might find solutions at national level based on the subsidiarity/proportionality principles, but a coordinated approach may benefit both established players and new platforms.

Conversely, regarding the on-demand economy, most of the legal framework remains to be built. Debate is widespread on how governments could or should respond to the challenges and opportunities that the on-demand economy entails, though few concrete measures have been implemented.

Interestingly, national and EU-level policy-makers have already devoted much attention to skills, as is evidenced by the upsurge in initiatives on improving the population's digital skills (some of which have also been launched by international organisations). The challenge of skills is dual: preparing the work force of the future as well as ensuring that the current work force can adjust to changes in the labour market. Lifelong learning will likely become even more important in the future.

Little is known about the impact of digitalisation on traditional businesses and industries, and the same conclusion also holds for the on-demand economy. There is a lack of available data to study digitalisation and the on-demand economy, which results in a relatively low number of evidence-

based studies, while the data, estimates and studies that are available point to varying conclusions based on different assumptions. Another issue is that digitalisation and the development of the on-demand economy are fast-paced and still very much in progress, which complicates analysis. Further monitoring will, therefore, be required to draw more definitive conclusions on the impact of digitalisation on labour markets.

References

- Ahtela, J. (2015), “Kello raksuttaa mennyttä aikaaTyöaikasääntelyn nykytila ja kehittämistarpeet”, SITRA, SITRA Reports 87, March.
- Ahtela, J. (2016), “Työaika, tietotyö ja tulevaisuus: esimerkkinä ohjelmistoala”, Ministry of Economic Affairs and Employment, TEM Report, 34/2016.
- Airbnb (2017), “Economic Impact: Airbnb remits €7.3m in tourist tax in France and will expand to more cities”, Article published on the Airbnb website (<https://france.airbnb.com/airbnb-remits-e7-3m-tourist-tax-france/>).
- Allen and Overy (2017), “The new ‘right to disconnect’ in France”, 21 February (www.allenoverly.com/publications/en-gb/Pages/The-new-right-to-disconnect-in-France.aspx.)
- AMICE, BIPAR, Insurance Europe, UNI Europa Finance (2016), “Joint declaration on the social effects of digitalization by the European social partners in the insurance sector”, 12 October (www.insuranceurope.eu/sites/default/files/attachments/Joint%20declaration%20on%20the%20social%20effects%20of%20digitalisation.pdf).
- Arntz, M., T. Gregory and U. Zierahn (2016), “The Risk of Automation for Jobs in OECD countries: A Comparative Analysis”, OECD Social, Employment and Migration Working Papers, No. 189, OECD Publishing, Paris.
- Autor, D.H. and D. Dorn (2013), “The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market”, *American Economic Review*, Vol. 103, no. 5, pp. 1553–1597.
- Autor, D. and M. Handel (2013), “Putting Tasks to the Test: Human Capital, Job Tasks, and Wages”, *Journal of Labor Economics*, Vol. 31, No. 2, pp. 59–96.
- Autor, D., F. Levy, and R.J. Murnane (2003), “The skill content of recent technological change: An empirical exploration”, *The Quarterly Journal of Economics*, Vol. 118, no. 4, pp. 1279–1333.
- Baker, D. (2015) “The Opportunities and Risks of the Sharing Economy”, Center for Economic and Policy Research (CEPR), Washington, D.C.
- Bayart, B. (2015), “Le cas UberPop soumis au Conseil constitutionnel”, *Le Figaro*, 25 June.
- BCG (2016), “Tapping into the Transformative Power of Service 4.0”, The Boston Consulting Group, Dusseldorf (www.bcg.de/documents/file217371.pdf).
- BDA (2015), “Seize the opportunities of digitisation BDA position on the digitisation of business and the working world”, May.
- Beblavý M., I. Maselli and E. Martellucci (2012), “Workplace Innovation and Technological Change”, CEPS Special Report, CEPS, Brussels.
- Berg, J. (2016), “Income Security in the Collaborative Economy: Findings and Policy Lessons from a Survey of Crowdworkers”, *Comparative Labor Law and Policy Journal*, Vol. 37, No. 3.

- Berger, T. and C. Frey (2016), “Structural Transformation in the OECD: Digitalization, Deindustrialization and the Future of Work”, OECD Social, Employment and Migration Working Papers, OECD Publishing, Paris.
- Block, S. (2016), “CPP expansion: a major advance for Canadians”, blogpost, *Behind the Numbers*, Canadian Centre for Policy Alternatives, Ottawa (<http://behindthenumbers.ca/2016/06/21/cpp-expansion-a-major-advance-for-canadians/>).
- Buhr, D. (2015), “Social Innovation Policy for Industry 4.0”, Good Society – Social Democracy 2017 Plus Project, Friedrich-Ebert-Stiftung (FES), Bonn (<http://library.fes.de/pdf-files/wiso/11479.pdf>).
- Brynjolfsson, E., L.M. Hitt and H.H. Kim (2011), “Strength in Numbers: How Does Data-Driven Decision making Affect Firm Performance?”, MIT Center for Digital Business (http://ebusiness.mit.edu/research/papers/2011.12_Brynjolfsson_Hitt_Kim_Strength%20in%20Numbers_302.pdf).
- Burston-Marsteller, Aspen Institute and TIME (2015), “The On-Demand Economy Survey”, 6 January (www.burston-marsteller.com/ondemand-survey/).
- Canadian Business (2016), “As Uber expands, Canada’s homegrown sharing economy struggles”, *Canadian Business*, 4 May (www.canadianbusiness.com/innovation/canada-sharing-economy-uber-airbnb/).
- Cedefop (2016), “Future skill needs in Europe: critical labour force trends”, Research Paper, Cedefop, Luxembourg.
- CEO (2017), “Automatisation, numérisation et emploi”, Synthèse, Conseil d’orientation pour l’emploi, Paris (www.coe.gouv.fr/Detail-Nouveaute.html%3Fid_article=1347.html).
- Chapman, B. (2016), “Uber ordered to pay drivers minimum wage in landmark case, *Independent*, 28 October (www.independent.co.uk/news/business/news/uber-verdict-loses-drivers-workers-rights-minimum-wage-a7384921.html).
- Cherry, M. (2016), “Beyond Misclassification: The Digital Transformation of Work”, *Comparative Labor Law & Policy Journal*, Vol. 37, No. 3 (<http://ssrn.com/abstract=2734288>).
- Coase, R. H. (1937), “The Nature of the Firm”, *Economica*, New Series, Vol. 4, No. 16, pp. 386-405.
- Codagnone, C., F. Abadie and F. Biagi (2016a), “The Future of Work in the ‘Sharing Economy’. Market Efficiency and Equitable Opportunities or Unfair Precarisation?”, Institute for Prospective Technological Studies, JRC Science for Policy Report EUR 27913 EN (<http://publications.jrc.ec.europa.eu/repository/bitstream/JRC101280/jrc101280.pdf>).
- Codagnone, C., F. Biagi and F. Abadie (2016b), “The Passions and the Interests: Unpacking the ‘Sharing Economy’”, Institute for Prospective Technological Studies, JRC Science for Policy Report EUR 27914 EN (<http://publications.jrc.ec.europa.eu/repository/bitstream/JRC101279/jrc101279.pdf>).

- Cohn, J. (2013), “The robot will see you now”, *The Atlantic*, 20 February.
- Coyle, D. (2016), “The Sharing Economy in the UK” (www.sharingeconomyuk.com/perch/resources/210116thesharingeconomyintheuktpdc.docx1111.docx-2.pdf).
- Dagnino, E. (2015), “A (New) Labour Law for the On-Demand Economy? Five Ws and One (Huge) H”, presentation given at the CEPS Winter School “From Uber to Amazon Mechanical Turk: Non-traditional labour markets driven by technological and organisational change”, INGRID FP7, CEPS, Brussels, 23-25 November (www.ceps.eu/content/2015-winter-school).
- Drahokoupil, J. and B. Fabo (2016), “The platform economy and the disruption of the employment Relationship”, ETUI Policy Brief, Brussels.
- De Groen, W.P. and I. Maselli (2016), “The Impact of the Collaborative Economy on the Labour Market”, CEPS Special Report No. 138, CEPS, Brussels, June.
- Degryse, C. (2016), “Digitalisation of the Economy and its Impact on Labour Markets”, ETUI Research Paper, Working Paper 2016.02.
- De Souza, C. and R. Veugeler (2014), “A broader view on EU data protection”, Blogpost, Bruegel, Brussels.
- Deloitte (2014), “The Deloitte Consumer Review: The growing power of consumers”, Deloitte LLP, London (www2.deloitte.com/content/dam/Deloitte/uk/Documents/consumer-business/consumer-review-8-the-growing-power-of-consumers.pdf).
- Delvaux, M. (2016), MOTION FOR A EUROPEAN PARLIAMENT RESOLUTION, Draft report with Recommendations to the Commission on Civil Law Rules on Robotics, prepared for the European Parliament, Committee on Legal Affairs, 2015/2103.
- Drummond, D. and C. Halliwell (2016), “Labour market information: an essential part of Canada’s skills agenda”, Business Council of Canada, Report, 13 June (<http://thebusinesscouncil.ca/wp-content/uploads/2016/08/Labour-Market-Information-June-13.pdf>).
- EBG and Qlik (2015), “Résultats du Baromètre 2015: L’impact du digital dans la performance marketing et commerciale”, Electronic Business Group, 7 December.
- El-Darwiche, B., R. Friedrich, A. Koster, K. Sabbagh and M. Singh (2013), “Digitization for Economic Growth and Job Creation: Regional and Industry Perspectives”, Chapter 1.2 of the Global Information Technology Report, Booz & Company, New York (www3.weforum.org/docs/GITR/2013/GITR_Chapter1.2_2013.pdf).
- ENISA (2016), “Security aspects of virtualization”, Report, European Union Agency for Network and Information Security, Athens, 10 February (www.enisa.europa.eu/publications/security-aspects-of-virtualization).
- ENISA (2017), “Towards a Digital Single Market for NIS products and services”, European Union Agency for Network and Information Security, Athens, forthcoming.
- European Commission (2008), New skills for new jobs: anticipating and matching labour market and skills needs, COM(2008) 868 final.

- European Commission (2010), “The increasing use of portable computing and communication devices and its impact on the health of EU workers”, Report, Directorate-General for Employment, Social Affairs and Equal Opportunities, Unit F.4, December.
- European Commission (2015), A Digital Single Market Strategy for Europe, COM(2015) 192 final (<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015DC0192&from=EN>).
- European Commission (2016a), “Employment and Social Developments in Europe 2016”, Annual Review, Directorate-General for Employment, Social Affairs and Inclusion, December.
- European Commission (2016b), A European agenda for the collaborative economy, COM(2016) 356 final.
- European Commission (2016c), Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society, COM(2016) 587 and Staff Working Document - SWD(2016)300.
- European Commission (2016d), “Monitoring the Digital Economy & Society 2016 – 2021”, Report, Directorate General for Communications Networks, Content & Technology, February.
- European Commission (2017), Building a European Data Economy, COM(2017) 9 final.
- Eurofound (2015), “New forms of employment”, Report EF1461, Publications Office of the European Union, Luxembourg, 12 March.
- Eurofound (2016), “Digitalisation and working life: lessons from the Uber cases around Europe”, EurWORK topical update, 25 January (www.eurofound.europa.eu/observatories/eurwork/articles/working-conditions-law-and-regulation-business/digitalisation-and-working-life-lessons-from-the-uber-cases-around-europe).
- Eurofound-ILO (2017), “Working anytime, anywhere: The effects on the world of work”, Joint ILO–Eurofound Report EF1658EN, 15 February.
- EY (2011), “The Digitalisation of Everything: How organisations must adapt to changing consumer behaviour”, Ernst & Young LLP, London.
- Frenken, K., T. Meelen, M. Arets and P. van de Glind (2016), “Smarter regulation for the sharing economy”, *The Guardian*, 20 May.
- Frey, C.B. and M.A. Osborne (2013), “The Future of Employment: How Susceptible are Jobs to Computerisation?”, *Technological Forecasting and Social Change*, Vol. 114, pp. 254-280.
- Frey, C.B. and M.A. Osborne (2016), “Technology at Work v2.0: The future is not what it used to be”, Citi GPS: Global Perspectives & Solutions, January.
- Gareis, K., S. Lilischkis and A. Mentrup (2006), “Mapping the mobile e workforce in Europe”, in Andriessen, J.H. and M. Vartiainen (eds), *Mobile Virtual Work: A New Paradigm?*, Berlin: Springer.

- Greenhouse, S. (2012), “A Part-Time Life, as Hours Shrink and Shift”, *The New York Times*, 27 October.
- Goos, M., A. Manning and A. Salomons (2009), “Job polarization in Europe”, *The American Economic Review*, Vol. 99, No. 2, pp. 58–63.
- Goos, M., J. Konings and M. Vandeweyer (2015), “Employment Growth in Europe: The Roles of Innovation, Local Job Multipliers and Institutions”, *Utrecht School of Economics Discussion Paper Series*, Vol. 15, No. 10.
- Harris, S.D. and A.B. Krueger (2015), “A proposal for modernizing labor laws for twenty-first century work: The ‘independent worker’”, Discussion Paper 2015 – 10, The Hamilton Project, Brookings Institution, Washington, D.C.
- Hathaway I., and M. Muro (2016), “Tracking the gig economy: New numbers”, Brookings Institution, Washington, D.C. (www.brookings.edu/research/tracking-the-gig-economy-new-numbers/).
- Henten, A.H. and I.M. Windekilde (2016), “Transaction costs and the sharing economy”, *Info*, Vol. 18, No. 1, pp. 1–15.
- Holmes, A. and L. McGuinty (2015), “Harnessing the power of the sharing economy – Next steps for Ontario”, Ontario Chamber of Commerce (www.occ.ca/wp-content/uploads/2013/05/Harnessing-the-Power-of-the-Sharing-Economy.pdf).
- Huws, U. and S. Joyce (2016), “Size of the UK’s ‘Gig Economy’ revealed for the first time”, Crowd Working Survey, Foundation for European Progressive Studies (FEPS) and UNI Europa, February.
- Itschert, P. and A. Alfaiate (2015), “Promoting social dialogue and better implementation of EU social partners’ autonomous framework agreements in selected countries”, Experts’ report, prepared for ETUC, BusinessEurope, CEEP and UEAPME.
- Jacquin, J.B. (2015), “Le Conseil constitutionnel confirme l’illégalité du service Uberpop en France”, *Le Monde*, 22 September.
- Kaplan, A. and M.L. Nadler (2015), “Airbnb: A Case Study in Occupancy Regulation and Taxation”, *University of Chicago Law Review Dialogue*, Vol. 82, No. 103 (<https://lawreview.uchicago.edu/page/airbnb-case-study-occupancy-regulation-and-taxation>).
- Kirchgaessner, S. (2015), “Uber ordered to discontinue Pop service in Italy”, *The Guardian*, 26 May.
- Kosoff, M. (2014), “Uber Drivers Across The Country Are Protesting Today — Here's Why”, *Business Insider*, 22 October.

- Kuchler, H. (2015), “Airbnb to collect and remit taxes for hosts in Paris”, *Financial Times*, 25 August.
- Lin, J. (2011), “Technological adaptation, cities, and new work”, *Review of Economics and Statistics*, No. 93, pp. 554–574.
- Marcolin, L., S. Miroudot and M. Squicciarini (2016), “Routine Jobs, Employment and Technological Innovation in Global Value Chains”, OECD Science, Technology and Industry Working Papers, No. 2016/01, OECD Publishing.
- Maselli, I. and B. Fabo (2015), “Digital workers by design? An example from the collaborative economy”, CEPS Working Document 414, CEPS, Brussels.
- Maselli, I., K. Lenaerts and M. Beblavý (2016), “Five things we need to know about the on-demand economy”, CEPS Essay No. 21, Brussels, 8 January (www.ceps.eu/system/files/CEPS%20Essay%20No%2021%20On%20Demand%20Economy.pdf).
- McKay, S., S. Jefferys, A. Paraksevopoulou and J. Keles (2012), “Study on Precarious work and social rights carried out for the European Commission”, Working Lives Research Institute Faculty of Social Sciences and Humanities, London Metropolitan University.
- McKinsey Global Institute (2015), “Global Growth: Can productivity save the day in an aging world?”, January 2015.
- McKinsey Global Institute (2016), “The age of analytics: Competing in a data-driven world”, in collaboration with McKinsey Analytics, December.
- McKinsey Global Institute (2017), “A Future that Works: Automation, Employment, and Productivity”, January.
- McLuhan, M. and Nevitt, B. (1972), *Take Today: The Executive As Dropout*, New York: Harcourt, Brace Jovanovich, pp. 304.
- Mokyr, J., C. Vickers and N. Ziebarth (2015), “The History of Technological Anxiety and the Future of Economic Growth: Is this Time Different?”, *Journal of Economic Perspectives*, Vol. 29, No. 3, pp. 31-50.
- Moretti, E. (2010), “Local Multipliers”, *American Economic Review*, No. 100, pp. 1-7.
- OECD (2015), “OECD Digital Economy Outlook 2015”, OECD Publishing, Paris, 15 July.
- OECD (2016), “Automation and Independent Work in a Digital Economy”, Policy Brief on the Future of Work, OECD, Paris, May.

- OECD (2017), “Key Issues for Digital Transformation in the G20”, Report prepared for a joint G20 German Presidency/OECD conference, Berlin, 12 January.
- Oei, S.-Y. and D.M. Ring (2015), “Can Sharing Be Taxed?”, *Washington University Law Review*, Vol. 93, No. 4, 2016; Tulane Public Law Research Paper No. 15-3; Boston College Law School Legal Studies Research Paper No. 352.
- Pajarinen, M. and P. Rouvinen (2014), “Computerization Threatens One Third of Finnish Employment”, ETLA Brief No. 22, The Research Institute of the Finnish Economy, Helsinki.
- Plötz, T. and G.A. Fink (2009), “Markov models for offline handwriting recognition: a survey”, *International Journal on Document Analysis and Recognition*, Vol. 12, No. 4, pp. 269–298.
- Popma, J. (2013), “The Janus face of the ‘New Ways of Work’. Rise, risks and regulation of nomadic work”, ETUI, Working Paper 2013.07, Brussels.
- PwC (2015), “Industry 4.0: Opportunities and challenges of the industrial internet”, Strategy&, London (www.strategyand.pwc.com/media/file/Industry4.0.pdf).
- PwC (2016), “Assessing the size and presence of the collaborative economy in Europe”, Analytical paper prepared for European Commission, April.
- Renda, A. (2016), “Selecting and Designing European ICT Innovation Policies”, Joint Research Centre Science for Policy Report, EUR 28205 EN, doi:10.2791/077076.
- Renda, A., F. Simonelli, J.M. Leceta and T. Könnölä (2017), “Unleashing Innovation and Entrepreneurship in Europe: People, Places and Policies”, CEPS Task Force Report, Brussels, 25 April.
- Roland Berger (2015), “The Digital Transformation of Industry”, Study commissioned by the Federation of German Industries (BDI), Munich (www.rolandberger.com/publications/publication_pdf/roland_berger_digital_transformation_of_industry_20150315.pdf).
- Rosemblat, A. and L. Stark (2015), “Uber’s Drivers: Information Asymmetries and Control in Dynamic Work”, Data and Society Research Institute, 15 November (<http://ssrn.com/abstract=2686227>).
- Rosenbush, S. (2016). “Sharing Economy Expert Says Social Safety Net Must Be Revamped”, *The Wall Street Journal*, 5 July.
- Rubio, E., D. Rinaldi and T. Pellerin-Carlin (2016), “Investment in Europe: making the best of the Juncker Plan”, Notre Europe - Jacques Delors Institute, March.

- Sirkin, H., M. Zinser and J. Rose (2015), “The Robotics Revolution: The Next Great Leap in Manufacturing”, Boston Consulting Group (www.bcgperspectives.com/content/articles/lean-manufacturing-innovation-robotics-revolution-next-great-leap-manufacturing/).
- Smith, A. and J. Anderson (2014), “AI, robotics, and the future of jobs”, Pew Research Center, Washington, D.C.
- Spiezia, V. and D. Gierten (2016), “New Markets and New Jobs”, OECD Digital Economy Papers, OECD Publishing, Paris.
- Statistics Canada (2017), “The sharing economy in Canada”, *The Daily*, 28 February (www.statcan.gc.ca/daily-quotidien/170228/dq170228b-eng.pdf).
- Teodoro, R., P. Ozturk, M. Naaman, W. Mason and J. Lindqvist (2014), “The motivations and experiences of the on-demand mobile workforce”, Rutgers School of Communication & Information.
- Thomson Reuters Tax & Accounting (2016), “New guidance for taxpayers in the sharing economy on how to meet their tax responsibilities”, 25 August.
- Todoli-Signes, A. (2015), “The end of the subordinate worker: Sharing economy, on-demand economy, Crowdsourcing, Uber economy and other ways of outsourcing”, 21 December (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2719772).
- Trustwave (2015), “2015 Trustwave Global Security Report”, Trustwave Holding Inc., Chicago (www.trustwave.com/Resources/Library/Documents/2015-Trustwave-Global-Security-Report/).
- Van der Marel, E. (2016), “Digital Investments, Data and Growth in Europe: A Framework for Analysis”, European Centre for International Policy Economy, Brussels, May.
- Vaughan, R. and R. Daverio (2016), “Assessing the size and presence of the collaborative economy in Europe”, PricewaterhouseCoopers, document prepared for the European Commission (DG GROW).
- Veres, S.M., L. Molnar, N.K. Lincoln and C.P. Morice (2011), “Autonomous vehicle control systems – a review of decision making”, Proceedings of the Institution of Mechanical Engineers, *Journal of Systems and Control Engineering*, Vol. 225, No. 2, pp. 155–195.
- Vinnova (2007), Användningsdriven utveckling av IT i arbetslivet, No. 2, Stockholm (www.vinnova.se/upload/EPiStorePDF/va-07-02.pdf).
- Vogel, S. (2015), “Germany - Effects of digitalisation on the labour market and working conditions”, Eurofound, EurWork Article, 21 October.

Williamson, O.E. (1975), “Markets and Hierarchies”, *American Economic Review*, Vol. 63, No. 2, pp. 316-325.

World Bank (2015), “The Global Opportunity in Online Outsourcing” (<https://openknowledge.worldbank.org/bitstream/handle/10986/22284/The0global0opp0n0onlin0e0outsourcing.pdf?sequence=1&isAllowed=y>).

World Economic Forum (2016), “The Future of Jobs: Employment Skills and Workforce Strategy for the Fourth Industrial Revolution”, Global Challenge Insight Report, World Economic Forum, Cologny/Geneva, Switzerland.

Glossary

Employee. The term “employee” refers only to those who work as subordinates in hierarchical relations, i.e. employees who have a formal employment contract and carry out work for an employer in return for remuneration.

Employer. The term “employer” refers to businesses and organisations that hire staff to carry out specific tasks which are packaged into a job, in return for a remuneration. The relationship between the employer and his or her employees is based on a formal employment contract and hierarchical in nature. No distinctions are made between employers, whether size of their business or their business model.

Labour conditions or organisation of work. Within the context of this study, the concept of “labour conditions” (or “organisation of work”) is used in a very broad sense. Labour conditions are understood as the circumstances or conditions in which the work is being performed. Examples are the *place* where work is carried out, e.g. at home or in the office, or the *times* during which work is done, e.g. during the weekend or at night.

Labour relations or industrial relations. These terms designate the collective relations between the management of an organisation and its employees or employees’ representatives, also at the industry or national level.

On-demand economy. The new phenomenon of digital peer-to-peer intermediation (through “online platforms”, see below) that provides consumers temporary access to one another’s goods and/or services without owning them.

Online platform. A digital – most of the time in the form of a website or software application that runs on smartphones or tablets – provider of the peer-to-peer intermediation that is central to the “on-demand economy” (see above). Among the most famous examples are Uber, Airbnb or MTurk.

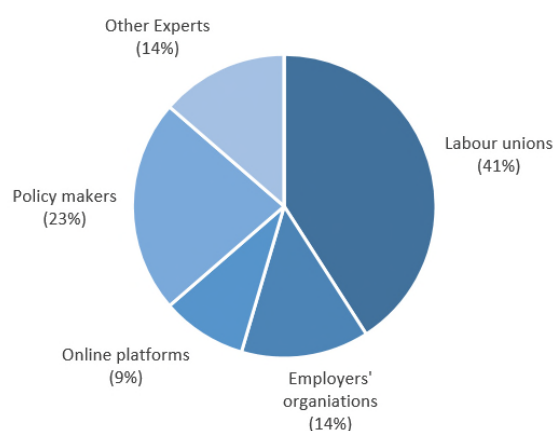
Platform worker. Someone who does not perform work for an employer in a traditional employer-employee relationship. For example, someone who offers labour on an online platform is denoted a ‘platform worker’ in the study. In this case, a neutral position is taken as there still is much discussion about the status of those who work through an online platform and because platforms may differ substantially from each other in this regard.

Annex 1. Interviews

While digitalisation and the on-demand economy are widely discussed, the academic literature on these topics, and especially on the on-demand economy, is still rather limited. The desk research was, therefore, completed with a series of semi-structured interviews. These interviews were carried out to get more information on the (latest) country-specific developments in relation to digitalisation and the on-demand economy, i.e. to better understand how individual countries are experiencing these phenomena and dealing with their consequences, and how the policy debate on digitalisation and the on-demand economy is advancing. Moreover, the interviews were used to reflect on the main findings of the study and the implications for employers, employees and their respective representation with a number of key stakeholders. The information obtained through the interviews was used to complete and finalise the study. All information was used in an anonymised way.

The list of interviewees was prepared in collaboration with the Secretariat of the Employers' Group of the EESC. It included platform owners and start-uppers, officials from the selected countries and local institutions, experts on digitalisation as well as employers' organisations and trade unions. The interviews were conducted between 12 December 2016 and 3 March 2017, were semi-structured (see list of indicative questions below) and lasted between 30 and 60 minutes each.

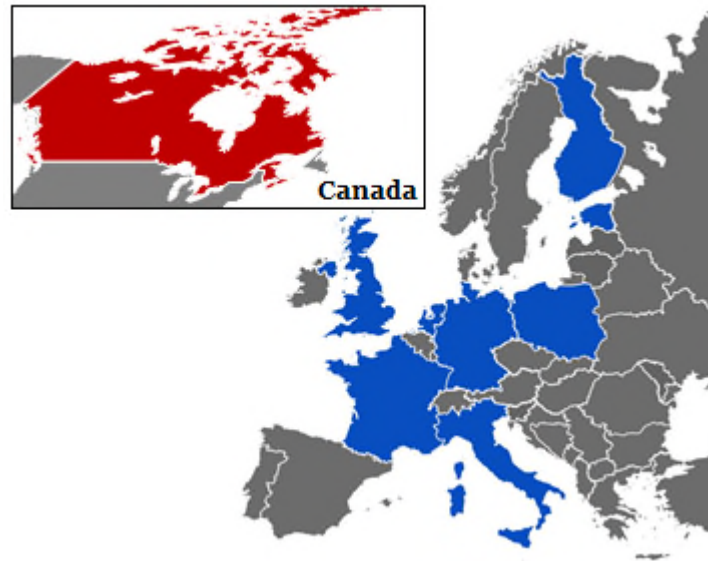
Annex figure 1.1. Types of interviewees



Source: Authors own elaboration.

Annex figure 1.1 presents some aggregated statistics about the background of the interviewees who accepted our invitation. In total, 22 interviews were conducted; in some, more than one person from the organisation participated, of which 55% worked as a representative of employers or employees, 23% as a policy-maker and 9% as a platform owner.

Annex figure 1.2. Map of countries covered in the interviews



Source: Authors own elaboration.

Annex figure presents a map of the countries that were covered in the interviews. More specifically, experts based in Estonia, Finland, France, Germany, Italy, the Netherlands, Poland, the UK and Canada were interviewed. In addition, several experts on the EU also shared their views. All experts were selected on the basis of their background, knowledge and expertise, not only about the topic of digitalisation and the on-demand economy in general but also about the specific context of their country.

Interview Template

Date and time of interview	
Location of interview	
Name of interviewee	
Position of interviewee	
Organisation	
Type:	Business association / Labour union / Regulator / Other
Contact details of interviewee	
Interviewer	
Country	

Digitalisation & employment/employers

- How is digitalisation effecting labour conditions?
- Please provide an example of an initiative that could be considered ‘best practice’ in dealing with the opportunities and challenges that digitalisation poses to enterprises? What is the initiative? Why can it be considered best practice?

Digitalisation, organisation of work and labour relations

Organisation of work

"Organisation of work" means the way work is coordinated, inside firms or between different firms, i.e. for instance the way jobs and tasks are distributed among workers but also across time and space.

- How does digitalisation affect the organisation of work in traditional businesses and industries (e.g. in terms of flexibility)?
- What do you consider main opportunities of digitalisation for the organisation of work?
- What are the main threats of digitalisation for the organisation of work?
- Do existing rules, laws or regulations on the organisation of work prevent the economy from fully reaping the benefits of digitalisation? If so, how?
- How could these barriers be overcome?

Labour relations

"Labour relations" means collective relations between the management of an organisation and its employees or employees' representatives, also at the industry or national level.

- How does digitalisation affect labour relations in traditional businesses and industries, e.g. in terms of representation, collective bargaining, management?
- What do you consider the main opportunities of digitalisation for labour relations?
- What are the main threats of digitalisation for labour relations?
- Do existing rules, laws or regulations on labour relations prevent the economy from fully reaping the benefits of digitalisation? If so, how?
- How could these barriers be overcome?

Digitalisation & government response

- What does the government do to address the negative consequences and realise the potential benefits from digitalisation for traditional businesses and industries, related to:
 - Labour conditions?
 - Taxation?
 - Social security?
 - Other labour aspects?

On-demand economy

- How does the emergence of the on-demand economy, e.g. sharing, collaborative economy,

impact the organisation of work?

- What impact does the on-demand economy have on labour relations?
- What initiatives have governments taken in response to development of the on-demand economy, related to:
 - Labour conditions?
 - Taxation?
 - Social security?
 - Other labour aspects?
- Are there any other issues or effects that are particularly important when it comes to the on-demand economy?

Other

- Is there anything you would like to add?
- Do you know of any relevant reports or literature that we should be aware of?

Thank you for the interview!



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BELGIQUE/BELGIË

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