A concept paper on digitisation, employability and inclusiveness

the role of Europe

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EXECUTIVE SUMMARY

Over the last year or so, there have been numerous expressions of concerns that digitisation, in particular robots and artificial intelligence, will replace jobs and increase inequality. These concerns come from the research community, technologists and trade unions and are widely reported in the media. As a result, according to the latest Eurobarometer survey[1], while 75% of Europeans think that digitisation has a positive effect on the economy, 74% also think that digitisation replaces more jobs than it creates. As digitisation is a major vector of change in European societies, it is important that the European Union takes the fears expressed seriously, even if they may be partly unfounded and rely more on perceptions than on evidence.

This does not mean that the European Union should embrace the pessimistic views expressed by some of the analysts. On the contrary, for two decades the European Union has consistently believed[2] that digitisation is and will be an important source of economic growth[3] and jobs creation as the two always come together. Our main objective is to manage the changes well and turn ongoing digital developments into real opportunities. We need to acknowledge that there is a need to accompany people through this transition - and as some tasks will be replaced, workers will have to work with machines, traditional occupations will be modified and new activities will emerge. Policies need to be put in place to address the adjustment costs that the digital transformation of the economy brings about on the labour market.

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Digitisation enables higher productivity across the economy, which leads to lower prices, higher real incomes to higher standards of living. It also facilitates the creation of new and better products and services with fewer resources, reduces physically demanding efforts and exposure to dangerous activities in the workplace. Much of this is yet to come. For those embracing this revolution with technological know-how, the digital economy offers plenty of opportunities: for IT-savvy workers, for creative people, for SMEs, for traditional industries, for disadvantaged regions etc.

At the same time, digitisation, like previous technological advances, will also have repercussions on labour markets. Some jobs will be replaced, some jobs will be created, and many jobs will be transformed. For the moment, it is impossible to estimate the job replacement and job creation effects with any degree of certainty. Moreover, new jobs may not go to the same people as the old ones, and may not go to the same geographic areas.

In any case, there will be a significant adaptation process. Key policies will mainly fall in three groups: active labour market policies and policies ensuring that workers enjoy an adequate level of social protection comparable to the one they now enjoy; fiscal policies, to ensure that redistribution reduces potential inequality gaps that may result from labour market polarisation; education and training policies to ensure that the workforce has adequate skills to thrive in the digital economy. These skills include the ability to work within the digital environment, and also the capacity to go beyond the logical reasoning at which computers excel. It needs to be underlined that these policies are mostly within the competence of Member States. However the European Union can assist Member States wherever it is appropriate.

1 Eurobarometer survey 2017, 'Attitudes towards the impact of digitisation and automation on daily life'
2 See eEurope (1999), eEurope 2002 (2000), I2010 (2005), Digital Agenda (2010), Digital Single Market (2015)
3 For example, the benefits of the Digital Single Market have been estimated at up to € 415 billion

1. Introduction

The debate on the impact of digitisation on economy and society has gained considerably in prominence over the last year or so. One of the reasons for this rise in importance are concerns about the unknown effects of digital transformation on job content, profiles and occupations, and potential inequalities. As a result, the main headline in this policy debate has changed from "technology X will create Y €billion in revenues" to "technology X will replace Y millions of jobs". The social acceptance of digital technologies is a key factor for the success of the digital transformation.

Addressing these concerns implies basically two elements. Firstly, a detailed analysis of how digitisation actually affects the labour market, and the need to separate, where possible, fact from fiction. Such an analysis should cover both positive and negative aspects, and it should acknowledge where available data is too limited to come to definitive conclusions. However, it is difficult to make forecasts in a fast-developing environment. For example, self-driving cars were not so long ago thought to remain science-fiction but are a test-bed reality now. On the other hand, the adaptation of ebooks seems to have stalled much earlier than anticipated.

In a second step, it should be evaluated how possible negative effects could be (or are already) minimised or compensated, by EU policies or by Member States policies. Potential measures must deal with gross effects, not net effects – i.e. if 1000 jobs are lost to digitisation somewhere, the impact on those workers must be considered even if 1000 jobs are created elsewhere. The relevant policies are not limited to the digital domain but will cover a wide array of policy fields, from labour market and education policies to Structural Funds, Capital Markets Union and Single Market strategies. Waiting for the problem to occur and then to react is not optimal. Ideally, they should take advantage of the fact that even in a fast-moving digital environment there is still a time lapse which allows to prepare for a sustainable transition.

2. The impact of the digital transformation on the labour market

2.1 Digitisation transforms the economy

Like previous waves of technological progress, digitisation, including artificial intelligence, big data, 3D printing, the Internet of Things, blockchain and advanced robotics brings enormous benefits to economy and society[4]. However, the scale, scope and speed of the digital transformation sets it apart from other technological developments. Digital technologies can be scaled up to any size and number. As a general purpose technology, digital affects all sectors of the economy, from agriculture to teaching. And anything which can be incorporated into software can be replicated millions of times at zero cost over night.

As a result of all this, digitisation enables higher productivity across the economy, which leads to lower prices, higher real incomes, higher standards of living, as well as facilitating the creation of new and better products and services with fewer resources. For example, firms that adopt data-driven decision-making have been found to have a higher output and productivity[5]. The most recent estimates put the potential for additional data workers at 1.3 million new jobs in 2020 compared to 2015[6]. Contrary to previous technological breakthroughs, digitisation also allows much higher degrees of personalisation, thus enabling products to correspond more closely to the needs of the consumers.

With all this, one has to keep in mind that despite the numerous effects digitisation has already had, the digital transformation is still only at its inception. Artificial intelligence has not yet been deployed widely. The number of 3D printers sold doubled in 2016[7] and will continue growing at more than 20% a year. The arrival of the Internet of Things will allow digitisation to move away from the screen and into the real world on a large scale; and autonomous vehicles are expected to become common place on the roads in the next ten years or so.

4 https://ec.europa.eu/epsc/publications/strategic-notes/enter-data-economy_en
5 For the US, the gain is 5-6% - Brynjolfsson, E., Hitt, L. M. and Kim, H. H., 'Strength in numbers: How does data-driven decision making affect firm performance?', SSRN 1819486, 22 April 2011.
6 IDC: European data market, http://www.datalandscape.eu/study-reports
7 Wohlers Report 2016, from https://wohlersassociates.com/

Given these trends, digitisation is no longer a choice businesses can afford to ignore. It is now a necessity: any business missing out on the opportunities of digital will not be able to sustain the competitive pressure from more digitised rivals. Similarly digital disruption has a global reach. Therefore, a scenario where a country's transition to digital slows down and workers are protected does not exist. Digitisation cannot be stopped but needs to be accompanied. Failing to embrace the digital paradigm will not protect workers; it would only expose them to the threat of global competition by making the companies where they are currently employed vulnerable.

For those embracing this technological revolution, the digital economy offers plenty of opportunities:

- for technology start-ups which can dream up new products and services;
- for towns and regions across Europe which can attract re-shored automated production;
- for inactive people who can enter the labour market more easily thanks to collaborative economy platforms that remove some of the traditional entry barriers;
- for new sustainable business opportunities resulting from the better use of resources through collaborative economy platforms, including via new or alternative business models which foster inclusive jobs and growth (eg in social enterprises and the social economy);
- for small producers to take advantage of larger markets;
- for creative workers who can take advantage of the new possibilities to blend technology and art, etc.

In short: It is still early days and yet digitisation brings a huge potential to increase higher standards of living. Digital transformation cannot be stopped, rather it needs to be managed.

Policy makers need to prepare for the fact that digitisation, again like previous technological advances, will impact labour markets, since job profiles are changing and skills mismatches are occurring.

2.2 The challenges of digitisation for employment

1) Job replacement

In the digital transformation of the economy, certain types of jobs **may be replaced**. A recent OECD paper[8] put the headline figure at **9% of jobs** which can be automated. Three years ago, a debate on the future of jobs began after the publication of a study which estimated that 47% of jobs in the US were in danger[9]. However, this approach has since been criticised because it treats jobs as either automatable or non automatable. In reality, most jobs are somewhere in between: jobs consist of tasks that can be automated and others tasks that cannot. The new OECD report arrives at the figure of 9% by taking this into account and following a task-based approach.[10]

Very recent research now shows that robots have a negative impact on local employment[11], but macro economic data does not reflect this. Recent research has found that **after a recession, employment continues to recover at the same pace as it always does**. Indeed, employment in the EU has now exceeded its pre-2008 peak. Moreover, some industries who have experienced more automation such as financial intermediation or retail trade have not undergone slower employment recoveries in comparison to other sectors. Finally, on average middle-skill employment did not recover more slowly after recent recessions. Therefore, for the time being, technology has not caused jobless recoveries in developed countries[12]. There was indeed lower employment growth between 2011 and 2015 in the mid-paying jobs, but this was due to the heavy losses of mid-level employment in the construction industry in several countries. However, the crisis in this industry was not linked to digitisation.

8 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. http://dx.doi.org/10.1787/5jlz9h56dvq7-enArntz et al. reference

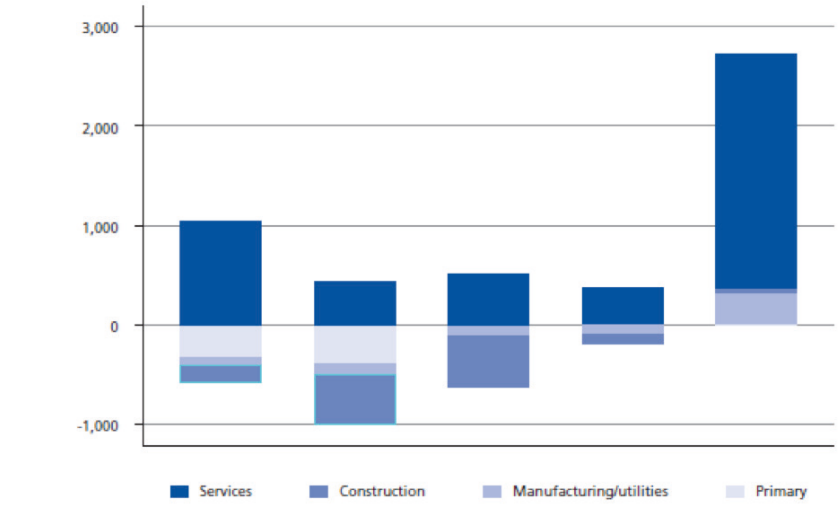
9 Frey, Carl Benedikt, and Michael A. Osborne. . "The Future of Employment: How Susceptible are Jobs to Computerization?" September 2013

10 There is no single consensual figure, but the OECD is considered the most authoritative among the sources offering estimates. For example, McKinsey (2016) provides estimates in the 40-50% range for many EU Member States http://public.tableau.com/profile/mckinsey.analytics#!/vizhome/InternationalAutomation/WhereMachinesCanReplaceHumans

11 D; Acemoglu, P. Restrepo: Robots and Jobs, Evidence from US Labor Markets, NBER Working Paper 23285

12 CEP Discussion Paper No 1461, January 2017, "Is Modern Technology Responsible for Jobless Recoveries?", Georg Graetz, Guy Michaels (using data on recoveries from 71 recessions in 28 industries and 17 countries from 1970-2011)

Figure 6: Employment shifts (in thousands) by job–wage quintile and broad sector, EU, 2011 Q2–2015 Q2



Source: EU-LFS, SES (authors' calculations).

Source: Eurofund Jobs Monitor 2016
From left to right the columns represent increasingly well-paid groups of workers

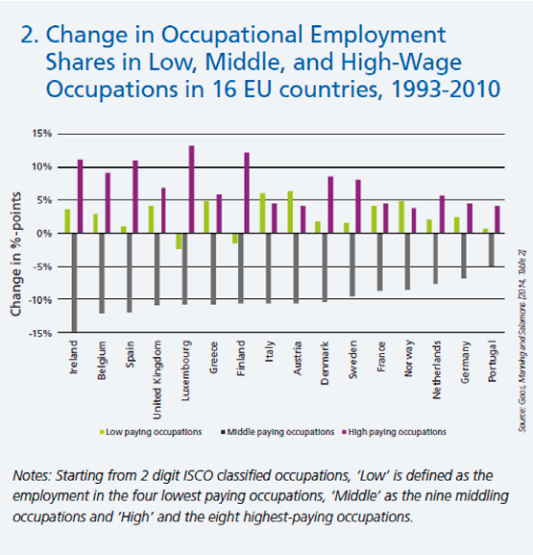
Despite a high degree of uncertainty as to the size of job replacement, the impact of digitisation on job creation/job replacement will affect far fewer people than the **transformation of current jobs** (where some of the tasks will be automated and other tasks will be added). This is because digitisation affects virtually all jobs, from the farmer who digitally monitors soil humidity to the teacher accessing online educational resources.

2) Mid-level jobs may be most concerned

Increased efficiency due to **ICT has reduced the number of routine jobs in the middle of the income distribution**. In contrast, low-end jobs and in particular highly qualified jobs have increased in number. The emergence of this phenomenon has been shown both in the US[13] and for Europe[14]. This is sometimes referred to as task-biased technological change, and is considered to contribute to increasing inequalities. At the same time, wages have increased faster for higher-qualified jobs in some countries, but the reverse occurred in several Member States[15]. Contrary to the US, low-paying jobs have not increased in the share of employment in the EU.

Moreover, it is generally accepted that **inequality has stabilised at a high level** after significant increases *within* many Western countries, although it has decreased across the European Union as a whole[16].

13 See e.g. David Autor: Why Are There Still So Many Jobs? The History and Future of Workplace Automation, Journal of Economic Perspectives—Volume 29, Number 3—Summer 2015—Pages 3–30
14 OECD - V. Spiezia, Presentation to Digital Single Market High Level Group, 26 January 2017: M. Goos, A. Manning and A. Salomons: "Explaining Job Polarization: Routine-Biased Technological Change and Offshoring", American Economic Review 2014, 104(8): 2509–2526, http://dx.doi.org/10.1257/aer.104.8.2509
15 An anatomy of inclusive growth in Europe, cited above
16 Zsolt Darvas and Guntram B. Wolff: An anatomy of inclusive growth in Europe, Bruegel 2016



Source: M. Goos, J. Konings, E. Rademakers: future of work in the digital age: evidence from OECD countries, randstad 2016

3) A need to adapt

It is important to recognise that the digital disruption of employment can be unsettling for people. Even if more jobs are being created than replaced (and this is impossible to prove), and as economic well-being greatly increases, there may be friction and fear due to uncertainty. This fear may be well-founded on a personal or regional level: **the newly created jobs may not go to the same people as the old ones, and may not go to the same geographic areas**. In Europe, for example, many of the municipalities that were booming in the 1950s thanks to coal and steel, have been restructuring for 50 years and some are still in the doldrums today. In other cases, companies may find it cheaper to transfer jobs to Asia instead. However, in a number of cases, the fear of digitisation may well be unfounded, since many workers are likely to find equally good or better jobs relatively quickly in one of the newly created sectors of the economy (see next section).

Another issue which could arise is the organisation of social security systems. Some forms of self-employment and atypical forms of employment supported by digitisation which are currently not covered by existing arrangements, may become more common. Also, people will be expected to change jobs more often than they do now. The burden will be shifted onto the worker's ability to adapt his or her skills. Whilst these new forms of employment may be suitable to many workers for personal and/or professional reasons, current national social welfare structures are not equipped to **provide social protection and ensure collective bargaining** for these workers. The use of digital technologies at work may also impact other areas such as work/life balance, privacy, health and safety etc.

In short: Digitisation will result in the replacement of some jobs, especially in the middle of the income distribution, leading to job market polarisation. Even in the best scenario, there will be transition challenges to manage linked to the future organisation of work.

2.3 The benefits of digitisation for employment

All these negative concerns need to be weighed against the positive impact of digitisation on labour markets.

First, digital transformation creates jobs for ICT specialists. There were nearly 8 million persons employed in 2015 as ICT specialists, representing 3.5% of total employment[17]. 1.3 million of these jobs have been created since 2011 in new areas of expertise such as the hundreds of thousands of app developers for smart phones. Encouragingly, even more people could be hired if there were more candidates: 40% of companies recruiting ICT specialists reported problems finding candidates with the required skills[18]. Vacancies for ICT specialists can represent up to one quarter of all online vacancies by region (e.g. Lazio (Italy), February 2017[19]), and more than half of ICT specialists work outside the ICT sector. Overall, within the ICT specialist profession, there is also a trend towards higher levels of qualification: from 2011 to 2015, high-level jobs such as systems analysts grew by more than 8% per year, while lower-level jobs such as help desk workers only grew by less than 2% per year in the EU[20]. Advanced ICT specialists are the fastest-growing large jobs category in the EU and are also among the best-paid 20% of jobs[21].

Fastest gaining large jobs

Occupation (ISCO two-digit)	Sector (NACE two-digit)	Employment		Quintiles		
		Current headcount (thousands)	% change 2011–2015	Wage	Education	Job quality
ICT professionals	Computer programming, consultancy and related activities	1514	38.6	5	5	5
Business and administration professionals	Activities of head offices; management consultancy activities	646	33.6	5	5	5
Legal, social, cultural and related assoc. professionals	Sports activities and amusement and recreation activities	522	23.0	3	4	3
Personal care workers	Households as employers of domestic personnel	532	20.5	1	2	2
Legal, social and cultural professionals	Creative, arts and entertainment activities	661	17.1	4	5	4
Stationary plant and machine operators	Manufacture of food products	739	16.7	2	1	1
Personal care workers	Residential care activities	1918	16.2	2	3	3
Business and administration professionals	Financial service activities	709	16.1	5	5	5
Legal, social and cultural professionals	Legal and accounting activities	1028	15.2	5	5	5
Food preparation assistants	Food and beverage service activities	1021	14.7	1	1	1

Source: Eurofound Jobs Monitor 2016

The new digital markets also create related jobs which are themselves not digital (and thus not counted in the above numbers). A recent example is the ecosystem emerging around the drone manufacturing which requires hardware suppliers, insurance companies, marketing and event organisers, and domain-specific services.

17 Eurostat press release 25 October 2016
18 Eurostat – survey of ICT use by enterprises, 2016
19 Commission online vacancy database, publication forthcoming
20 Empirica: e-skills in Europe, Working Paper November 2015, p. 14
21 Eurofound: European Jobs Monitor 2016, p. 14

Second, digitisation reduces costs for setting up a business and finding employment. It also creates opportunities for small companies to innovate and grow faster (by making it easier to distribute products, market services and reach a global audience).

- This is of great importance for job creation opportunities by successful start-ups: the 5% of small startups that do grow, create a disproportionate amount of jobs – ranging from 21% of the total job creation by new companies in the Netherlands to 52% in Sweden[22].
- It also impacts **traditional companies**, which can reduce their marginal cost of production. This has an growth effect on supply and helps to push up demand for labour. A 2015 report by the Fraunhofer Institute found that European companies which are intensive users of robotics are less likely to offshore production to low-wage regions, simply because robots improve their cost position so much that they can stay in high-wage regions[23].
- It also enables the creation of **markets which are entirely new**, even outside the ICT domain. This can occur where demand is too small to support the overheads of regular shops but big enough to entice suppliers, particularly if no overheads need to be paid for. These markets account for a fair share of online trading. By increasing traders' access to new markets, this also has a positive impact on jobs. For example, Etsy is an online marketplace where people around the world connect to make, sell and buy vintage and handmade goods. It now connects buyers and sellers in many countries around the world, making entrepreneurship accessible to a wider part of the population.
- Many of these businesses will require people to complement their rational and rules-based digital hardware and software skills with emotional intelligence and social interaction skills. In some cases, the core requirement of these new jobs will be creativity, and human empathy in order to ensure that the digital equipment and services are fit for human or consumer use.

eCommerce Europe estimates that **2 million jobs can be directly or indirectly attributed to the business-to-consumer e-commerce sector**, while a calculation by the European trade association EMOTA suggests that there were some 2.3 million jobs associated with e-commerce in 2013 and that this could grow by a further 1.5 million by 2018. Surveys in individual countries also report strong growth in e-commerce jobs. In France, for exam¬ple, nearly 10,000 new jobs were created in 2012 amongst 'pure play' (single product) and multichannel businesses, occurring primarily in web developer and product/commu¬nity management roles[24]. Also, it has been shown that related employment expands because of this growth, particularly in logistics and parcel delivery services[25] sector.

Digitisation also improves labour market demand and supply by **helping workers to find employment** across a much wider variety of job offers on different recruitment platforms such as.the Danish-based Graduateland or the Spanish-based talenandjob (with more than 10 million users), or even the US-based LinkedIn.

Third, digitisation enables new ways of working. This trend has been driven by collaborative economy platforms such as Adtriboo, TaskRabbit, Oltretata, Freelancer, Crowdsource, Crowdflower and Clickworker. These online labour markets specialise in micro-tasking by matching employers and on demand workers. This has offered opportunities for many people to join the labour market and even to complement other existing activities which could not be done under traditional labour arrangements. This has added to overall economic growth and employment[26].

It should be noted, however, that although decentralised, self-organised forms of work can increase workers' autonomy and boost business development, they may also blur the notion of work and limit awareness of or access to rights. This has led to new challenges in terms of health and safety at work and in the organisation of social dialogue. This can also lead to workers being denied statutory protection such as minimum wage, health and safety protections, or paid annual leave. A debate on the role of employers and their responsibilities regarding new forms of flexible employment should include the question of the nature, volume or duration of work[27].

22 http://www.kauffman.org/blogs/policy-dialogue/2015/august/deconstructing-job-creation-from-startups
23 https://www.researchgate.net/publication/286392353_Analysis_of_the_impact_of_robotic_systems_on_employment_in_the_European_Union
24 University of Oxford: Retail & Wholesale: Key Sectors For The European Economy Understanding The Role Of Retailing And Wholesaling Within The European Union.
25 https://www.ebayinc.com/stories/news/ebay-releases-new-report-showcasing-how-the-internet-empowers-european-smes/
26 See also C. Codagnone, F. Abadie, F. Biagi: The Future of Work in the 'Sharing Economy', JRC Science Report JRC101280 (2016)
27 Commission Staff Working Document, Key economic, employment and social trends behind a European Pillar of Social Rights, 8 March 2016, SWD(2016)51,, page 30

In this context it may also be useful have a closer look at specific groups of workers who are impacted by this new phenomena. It is particularly important to consider **the implications for women, whose employment rate remain considerably lower than men's employment rate (64.3% vs. 75.9%)**. Technology could make jobs more accessible as they lower some of the physical and social barriers to entry, and facilitate flexible work for both men and women. Nevertheless there remain significant challenges because women are significantly less represented in Science, Technology, Engineering or Mathematics related academic and educational fields. Targeted efforts are needed to attract girls into these sectors which offer good job perspectives. Female participation is crucial and necessary if we are to increase the total number of ICT specialists.

Fourth, there is also an income effect – since the digital transformation leads to higher levels of income, this additional income will be spent on many kinds of products and services, whether digital or not. This additional demand will support additional employment. How much of this employment will be high-paid and low-paid will depend on which products and services will be particularly sought after.

For example, in the context of the rapidly ageing population in the developed world, one of the sectors likely to benefit most from this development is the care sector. Healthcare workers currently account for 17.2 million jobs in the EU28, and one million new healthcare jobs are projected by 2020 and an additional 7 million job openings are expected due to replacement needs[28]. Given the problems associated with ageing – for example in Europe one in two women and two in five men over 50 years suffer from chronic diseases – people are likely to spend a significant share of their additional disposable income on additional healthcare services.

In short: Digitisation creates many well-paid new jobs for ICT specialists, and even more jobs in other fields of the economy. New forms of jobs create new situations to which our welfare states might not, yet, be equipped to deal with.

2.4 Conclusion: the impact of digitisation on the labour market in a nutshell

Digitisation creates economic growth. As this is a new evolving trend, there are no reliable forecasts yet on the **net employment effect**. However, the **total gross job creation will partly be offset** by jobs displacement. For example, online shopping partly replaces physical shopping, and therefore some jobs in physical retailing will disappear. Similarly, ICT specialists will manage machines which have replaced workers on specific and probably repetitive tasks (see above).

Finally, technology may also affect the quality of existing and new jobs. **Automation could** make certain jobs more attractive and improve **the well-being of workers**. Rather than expose humans to health and environmental risks, robots could undertake the least attractive, most physical, and unsafe jobs.

Digitisation is still at the beginning but will bring huge economic and societal benefits. It also has the potential to replace certain jobs, and also creates jobs and employment opportunities, often well-paid ones. More importantly, however, it will transform employment, both by changing the skills requirements for most jobs and probably by profoundly reengineering the current ways that work is organised in our societies.

28 http://ec.europa.eu/research/innovation-union/pdf/active-healthy-ageing/silvereco.pdf

3. The policies needed to accompany digitisation

3.1 The needs for boosting digital

The European Commission launched the Digital Single Market strategy to boost eCommerce (2015), the Digitising European Industry strategy to advance adoption of digital technologies by industry (2016), and the Data Economy Strategy (2017). In order to ensure the competitiveness of European industry, Europe needs to be at the forefront of the digital transformation and promote its uptake across the economy by fully taking advantage of the new employment possibilities offered by digital technologies. Otherwise digitisation will be designed by other countries and only be consumed to Europe with fewer benefits in terms of job creation.

3.2 The need for investing in digital skills

It is important to remember that the industrialisation of Europe, when millions of farmers left agriculture and joined the industrial workforce, was partly built on the parallel expansion of a compulsory education system which prepared the population for the requirements of the industrial age. Similarly, **the key variable of the digital economy are the skills needed to participate**.

Most importantly, individuals in the workplace will need to engage more comprehensively with machines as part of their everyday activities. They will need to acquire new skills that will be in demand in the new automation age and that will also be able to drive new innovations[29]. These skills include the ability to work within the digital environment, and the capacity to go beyond the logical reasoning at which computers excel. In other words: digital skills and complementary skills such as creativity, high-level cognitive and interpersonal skills will be needed.

However, nowadays, 37% of the European labour force does not have basic digital skills[30]. There is a need to modernise education systems to provide skills that are better adapted to the growing digital economy. While this has already been recognised by some Member States, more work needs to be done.

Europe cannot rely only on the new generations to address the digital skills gap. People in their 30s today will still be in the labour force in 2040 and will be using egovernment and ebanking and other services well into the 2060s. It is therefore critical to provide these newly required skills to people already in the labour force. This means significantly strengthening workforce training and lifelong learning.

According to forecasts, **even those still in education are likely to change careers several times during their life time and thus need continuing training**. In an increasingly dynamic living and working environment, people with initiative and the right set of skills stand to gain the most[31]. One popular estimate is that, 65% of children entering primary school today will ultimately end up working in completely new job types that don't yet exist[32].

However, **lifelong learning policies tend to benefit mostly those who need them the least**. In-work access to training remains highly dependent on the type of employment contract: almost one in two employees on permanent contracts receive training compared to 32% of employees with fixed contracts and 19% of self-employed[33]. Also, well-educated workers are much more likely to participate in job-related training than low-educated workers.

In short: Digitisation requires a strengthening of training and education policies, with a special focus on how to help those negatively affected by changes in the work place.

29 Harnessing automation for a future that works, McKinsey Global Institute http://www.mckinsey.com/global-themes/digital-disruption/harnessing-automation-for-a-future-that-works?cid=other-eml-nsl-mgi-mck-oth-1702
30 Eurostat
31 EPSC Strategic Note #13 'The Future of Work - Skills and Resilience for a World of Change' https://ec.europa.eu/epsc/file/strategic-note-13-future-work_en
32 "The future of jobs and skills" (World Economic Forum), http://www3.weforum.org/docs/WEF_FOJ_Executive_Summary_Jobs.pdf
33 http://ec.europa.eu/epsc/publications/strategic-notes/future-work_en

3.3 The need to adapt the welfare state

The digitisation of the economy offers new opportunities, increases possibilities for self-employment and new types of activities, and makes career patterns more diverse[34]. However, it also creates new "grey zones" in terms of labour rights and access to welfare which are challenging[35]. It is expected that peoples' working lives will be longer and less linear. They will likely have numerous transitions in jobs and professions, as well as by changing needs, with life-cycle and work-cycle pressures requiring career interruptions or breaks in order to take up caring responsibilities, or even to access re-skilling opportunities. The notion of work is becoming increasingly fluid and blurred, with ongoing, rapid technology-driven transformations presenting both challenges and opportunities. As a result, welfare states need to be modernised to respond to these challenges[36].

In short: Welfare states need to adapt to digitisation to support opportunities and manage challenges in terms of living standards and social cohesion.

34 Bundesministerium für Arbeit und Soziales (2015), Reimagining Work, Green Paper Work 4.0.
35 Commission Staff Working Document, Key economic, employment and social trends behind a European Pillar of Social Rights, 8 March 2016, SWD(2016)51, page 3
36 Commission Staff Working Document, Key economic, employment and social trends behind a European Pillar of Social Rights, 8 March 2016, SWD(2016)51,, page 4