



European Economic Area  
Consultative Committee  
Comité consultatif  
de l'Espace Économique Européen  
Beratender Ausschuß  
des Europäischen Wirtschaftsraums

**E U R O P E A N E C O N O M I C A R E A**  
**C O N S U L T A T I V E C O M M I T T E E**

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**RESOLUTION AND REPORT**

**on**

**Digitalisation and its impact on jobs and skills**

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**Rapporteurs:**

**Mr Petr ZAHRADNIK** (European Economic and Social Committee, Employers – the  
Czech Republic)

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## RESOLUTION

on

### Digitalisation and its impact on jobs and skills

The Consultative Committee of the European Economic Area (EEA CC):

- A. Noting the initiatives of the European Commission (Commission) to create a deeper and fairer Internal Market, including a Digital Single Market<sup>1</sup> which aims to open up digital opportunities for people and businesses and enhance Europe's position as a world leader in the digital economy,
- B. Noting the Commission's New Skills Agenda for Europe<sup>2</sup> which launched a number of actions to ensure that the right training, skills and support are available to people in the European Union (EU), including digital skills,
- C. Having regard to the opinions of the European Economic and Social Committee (EESC) on *Industry 4.0 and digital transformation: Where to go*<sup>3</sup>, on *The effects of digitalisation on the services sector and employment in relation to industrial change*<sup>4</sup> and on the *New Skills Agenda*<sup>5</sup>,
  1. Welcomes the different EU initiatives upgrading the Internal Market to support the creation of jobs and growth, which Europe urgently needs in a context of global competition, and urges the Commission and the EEA States to do more to promote policies aimed at boosting growth and productivity, and at creating high-quality jobs in every EEA State,
  2. Welcomes the EU Digital Single Market Strategy<sup>6</sup> which aims to create a European Digital Economy and society with growth potential: an inclusive digital society where citizens have the right skills to seize the opportunities created by the internet and boost their chances of getting a job, and to adapt successfully to the transformation of employment and work organisation,
  3. Calls for proactive policymaking at EU and national level to unlock the potential of digitalisation for the benefit of both businesses and workers, bearing in mind that these dynamic developments present both opportunities and risks for the economy and labour market and need to be managed in a sustainable way,

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<sup>1</sup> <https://ec.europa.eu/digital-single-market/en/digital-single-market>

<sup>2</sup> <http://ec.europa.eu/social/main.jsp?catId=1223>

<sup>3</sup> <https://webapi.eesc.europa.eu/documentsanonymous/eesc-2016-01017-00-01-ac-tra-en.docx>

<sup>4</sup> <http://www.eesc.europa.eu/?i=portal.en.ccmi-opinions.34826>

<sup>5</sup> <http://www.eesc.europa.eu/?i=portal.en.soc-opinions.39961>

<sup>6</sup> [https://ec.europa.eu/commission/priorities/digital-single-market\\_en](https://ec.europa.eu/commission/priorities/digital-single-market_en)

4. Stresses the need for job transitions and losses caused by technological development to be followed by job creation, and calls upon the relevant authorities to manage these transitions, in close cooperation with the social partners, so that enterprises and new industries can act as drivers of growth, better jobs and new occupations,
5. Expresses its concern that technological change is taking place in a context of rising inequalities and losses of low and medium-skilled jobs. In such a context of considerable changes to our economies and labour markets, social dialogue has a fundamental role to play, and collective bargaining should be promoted at all levels, especially in sectors and businesses that are affected by digitalisation,
6. Emphasises the importance of skills development to provide citizens and workers with the right skills and specific competences to unlock the full potential of digital technologies and transform them into jobs and growth, and calls on the EEA States to introduce innovative solutions and adequate policy measures in education and skills development, including validating professional and non-formal learning,
7. Stresses the need to invest in education and lifelong learning to develop a labour force with a combined mix of skills, which is important for innovation, higher productivity and increased competitiveness. Focus should be on basic, transversal and digital skills, as well as science, technology, engineering and maths (STEM) and entrepreneurial skills,
8. Underlines that investments in information and communication technology (ICT) infrastructure and new learning methods are important, including apprenticeships and workplace training. The EEA CC also calls on the relevant authorities and players to promote gender equality in education and training, and to pay special attention to the needs and potential of migrant and older workers,
9. Stresses the need to assess whether it is necessary to update the legal framework of the different new forms of work in order to maintain worker protection, including rules regarding working time, social protection and health and safety issues, and measures for the growing number of self-employed in these new jobs,
10. Stresses the need to assess whether mandatory social protection for the entire workforce, including those in atypical forms of employment is needed. In order to ensure the future sustainability of welfare systems, tax systems also need to apply similar levels of taxation for all forms of income, whether this be generated in organised sectors or in the sharing economy,
11. Also highlights the need to examine whether and to what extent workers' private lives require additional protection in a time of ubiquitous digital mobile communication, and which measures, at national or European level, are appropriate in order to limit constant availability and reachability,

12. Emphasises that the main actors, including authorities and social partners, need the necessary awareness and knowledge of the implications of digitalisation on the economy and the labour markets, and encourages increased efforts and funding, including under Horizon 2020, to develop better statistics and more research to support policymaking and decisions in this area.

## REPORT

on

### **Digitalisation and its impact on jobs and skills**

#### **1. Introduction**

1. Digitalisation is transforming all segments of society and the economy, and consequently also the labour market. This ongoing transformation is often called a fourth industrial revolution<sup>7</sup>, and it entails important implications for employment, education and skills, labour market regulations and social protection systems. It also has consequences for the relationship between employers and employees, and furthermore for the social dialogue<sup>8</sup>.

2. Digital technologies generate new business opportunities through new production processes, new products and the creation of jobs. The development of mobile phone applications has, for instance, created new opportunities for small and medium-sized enterprises (SMEs) and substantially reduced the cost of starting a business and creating innovative products. Online platforms could play a key role in the emergence of new forms of work and job creation, with more flexible work arrangements. At the same time, they raise concerns regarding the atypical nature of these forms of employment and the limited access to social protection. Digitalisation brings about transformations of tasks and jobs and changes working conditions. Robotisation and automation are replacing routine jobs and tasks, not only in factories but also in other sectors.

3. Digitalisation entails both opportunities and risks for the labour market, but its employment effects are not yet fully understood and remain difficult to predict. Forecasts predict the creation of eight and a half million knowledge and skill-intensive jobs and two million in more elementary occupations, while four million jobs will disappear, primarily in skilled manual work<sup>9</sup>. There is a risk of job polarisation, with increased demand at the upper and lower ends of occupations, and decreases or stagnation in the middle.

4. The transformation of work also implies different skills requirements. Almost half of the EU population lacks basic digital skills, with around 20% of EU citizens having none at all. This could lead to growing skill gaps and further mismatch in the labour market. In a fast-changing global economy, skills will, to a great extent, determine competitiveness and the capacity to drive innovation.

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<sup>7</sup> <http://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=7952&visible=0&>

<sup>8</sup> [http://www.europarl.europa.eu/RegData/etudes/STUD/2015/569967/IPOL\\_STU\(2015\)569967\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/569967/IPOL_STU(2015)569967_EN.pdf)

<sup>9</sup> CEDEFOP

## 2. New ways of working and employment relationships

5. Digitalisation transforms the organisation of work and employment relationships. Consequences that can be seen as positive are more flexible work arrangements such as telecommuting or telework, freelance work or the status of “independent professional (iPro)”, crowdsourcing and employment in the sharing economy. However, negative side effects are work intensification and the obligation to be permanently available, which may cause stress and burnout with considerable costs on workers and employers.

6. These new flexible employment relationships result in atypical career patterns, which also imply challenges for social protection. Most new ways of working are characterised by limited access to social protection, for example crowdworking and employment in the sharing economy are exempt from national labour law and are not covered by fundamental social rights. Some surveys suggest that those providing services in the collaborative economy tend to be relatively young and more highly educated than the general population, but often earn below or just above the minimum wage<sup>10</sup>. A large proportion have no form of social insurance, and some people appear to work long hours on several platforms. In many EU countries there are also important restrictions on the entitlement of self-employed professionals and freelancers to social protection, and more specifically to unemployment insurance and benefits related to sickness and disability. The increasing share of outsourced work could also form a risk to freedom of association and collective bargaining.

7. At a macro-economic level, digitalisation is leading to the gradual polarisation of employment in terms of work autonomy and wages, thereby reinforcing inequalities. Jobs are more likely to be situated at either the high or the low end of the wage and autonomy distribution, with a declining number of jobs between the extreme poles<sup>11</sup>. 70 million Europeans lack adequate literacy skills, and even more have poor numeracy and digital skills, putting them at risk of unemployment, poverty and social exclusion<sup>12</sup>. More than half of the 12 million long-term unemployed are considered to be low skilled.

8. Demand for high-skilled workers will increase, since they are needed to handle new technology and to interpret the data that new technology produces. The increasing automation of business processes reduces jobs targeting medium-skilled workers, therefore the number of jobs is expected to decrease in industries that traditionally employ many medium-skilled workers. Growth in organisations providing low-skilled services, such as app-based taxi services, as well as the decline of medium-skilled jobs, will boost demand for lower-skilled workers<sup>13</sup>. In such a polarised labour market, medium-skilled workers will need to upgrade their skills in order to be employable and to qualify for higher-skilled jobs.

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<sup>10</sup> ILO

<sup>11</sup> CEDEFOP, 2010. This evolution has been confirmed by many other studies (e.g. Goos et al. 2013).

<sup>12</sup> COM(2016) 381 final

<sup>13</sup> [http://www.europarl.europa.eu/RegData/etudes/STUD/2015/569967/IPOL\\_STU\(2015\)569967\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/569967/IPOL_STU(2015)569967_EN.pdf)

## **New forms of work**

### *Independent professional (iPro)*

Digital technologies enable information to be shared across large distances and audiences at lower cost. As a result, businesses can now hire specialists on demand and keep their workforce flexible in response to fluctuations. Independent professionals such as self-employed or freelance workers represent an important part of the labour market<sup>14</sup>: 25% of professional, scientific and technical jobs and 22% of jobs in arts and entertainment. IPros are the fastest growing group in the EU, increasing from 6.2 million in 2004 to 8.9 million in 2013, which represents an increase of 45%. This increase is especially evident in France, the Netherlands and Poland.

### *Crowdworking*

Crowdworking means transferring tasks to a pool of online workers, i.e. the “crowd”, via an online platform<sup>15</sup>. Workers who qualify for the task and want to carry it out can participate, and freelancers can compete for published tenders for work assignments.

Crowdworking provides both opportunities and risks when it comes to working conditions<sup>16</sup>. The level of autonomy of the workers is often indicated as the main advantage of crowdworking. It also includes a risk of stress induced by the need for self-organisation and the blurred line between work and private life. Crowdworking can enhance social mobility in regions or countries where the local economy has not yet reached its full potential.

The main risks associated with crowdworking are the lack of regulatory framework. Crowdworkers are not eligible for benefits such as training or regular social protection because they are considered to be self-employed or freelancers, and intellectual property rights are often owned by the employers, so crowdworkers are unable to build a portfolio. The other main risk is associated with low wages. Workers from countries with a lack of social protection and low wages have a competitive advantage and put a downward pressure on working conditions.

### *Sharing economy*

With the digitalisation of the economy, the sharing economy has become a new business model consisting of digital online platforms where customers and providers share their own goods, services and skills. The sharing economy model works for items that are expensive to buy and are not fully used by their owner, such as bedrooms (Airbnb) and cars (Uber). The sharing economy also brings together people who need

<sup>14</sup> Leighton and Brown (2014)

<sup>15</sup> Examples of tasks often commissioned through crowd employment are web content and software development, database building and cleaning, classifying web pages, transcribing scanned documents and audio clips, classifying and tagging images, reviewing documents, checking websites for specific content, validating search results, and designing logos and drafting of slogans for the advertising industry

<sup>16</sup> [https://www.eurofound.europa.eu/sites/default/files/ef\\_publication/field\\_ef\\_document/ef1461en.pdf](https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1461en.pdf)

specific skills, e.g. a housecleaner or handyman with providers willing to supply these skills. This model is thus linked to the concept of crowdsourcing.

There is no clear definition of the sharing economy and even less clear a definition of employment in the sharing economy. In many cases, the nature of the employment relationship and legal status of the parties involved remains uncertain, which makes it difficult to monitor these phenomena. According to a study by PwC in 2015, 7% of adults in the United States said that they were working on sharing platforms. There is no similar data available for the EU.

As the nature of the employment relationship and legal status of the parties involved in the sharing economy is unclear, it is difficult to evaluate working conditions. Even if employment in the sharing economy may be attractive to different groups of people, it is clear that the legal status and access to social protection in relation to this employment is very limited.

### 3. New business opportunities and job creation

9. Digitalisation has the potential to create jobs by generating new business models, developing new products and machines, and increasing competitiveness. Various studies show that ICT development and digitalisation have an impact on productivity<sup>17</sup>. The impact on job creation per sector varies strongly, and could have a positive impact on sectors such as retail and hospitality<sup>18</sup>. Moreover, ICT investment has a greater positive effect on productivity when coupled with investment in complementary assets, such as organisational and human capital.

10. Digitalisation presents both opportunities and challenges for job dynamics, working conditions and skills needed, but European countries will be affected differently as there is a “digital divide”<sup>19</sup> across Europe. Scandinavian countries and the Netherlands are performing better than some Eastern and South European countries, which are lagging behind. The “digital divide”, which can be defined as inequality in the integration of ICT, should be taken into account when analysing the impact of digitalisation on the European labour market.

11. According to the Organisation for Economic Co-operation and Development (OECD)<sup>20</sup>, employment in ICT occupations grew between 16% and 30% for 25 European countries from 2003 to 2013, and it is expected to continue to grow. During this period, an extra two million ICT specialist jobs were created; one million in the last three years alone. It has been estimated that four to five jobs are created in the economy for each new ICT job. Demand for medical robotics is expected to grow massively over the next few

<sup>17</sup> Brynjolfsson, 2003; Bloom et al., 2012

<sup>18</sup> Applied to the different sectors, digitalisation is estimated to **create jobs** in services subsectors, particularly in hospitality and retail (especially e-commerce). In both sectors, because of the enhanced reach, the supply chains become more complex and require more people to manage them. It is also expected to **reduce jobs** in the financial and manufacturing sectors because the productivity gains surpass the output gains.

<sup>19</sup> [http://europa.eu/rapid/press-release\\_IP-17-347\\_en.htm](http://europa.eu/rapid/press-release_IP-17-347_en.htm)

<sup>20</sup> <http://www.oecd.org/employment/future-of-work.htm> ]



years, leading to a 21 to 24% increase in new jobs associated with the manufacturing and marketing of service robots. However, there is a shortage of skilled ICT professionals: 39% of companies that recruited or tried to recruit ICT specialists in 2014 reported difficulties in filling the vacancies. Estimates suggest that by 2020 there could be around 756 000 unfilled vacancies for ICT specialists in the EU. Over half of ICT professional jobs are now outside the ICT sector, as the whole economy becomes digital.

12. It is difficult to quantify the emerging digital economy in terms of revenues or the number of individuals directly involved. In 2015, there were at least 20 platforms worth more than USD 1 billion. Uber is valued at USD 50 billion and is active in 230 cities in 60 countries, while Airbnb is worth USD 20 billion and is active in 34 000 cities in 190 countries. A recent French study estimated that in France alone, Airbnb activities generated a turnover of EUR 2.5 billion and created 13 000 permanent jobs.

13. CEDEFOP's<sup>21</sup> latest forecast (2010) of the skills demand and supply in Europe estimates that the net growth of jobs will be around seven million by 2020. Digitalisation is not the only driver in this growth, but it is considered one of the key factors explaining the creation of these new jobs. Most new jobs, projected to be around eight and a half million, will be in knowledge and skill-intensive occupations, such as high level managerial and technical jobs. At the lower end of the skills spectrum, demand for elementary occupations is expected to increase by around two million.

14. On the other hand, digitalisation and automation can lead to job losses, but the net impact and exact role of digitalisation is debated and unclear<sup>22</sup>. Estimates indicate that 35% to 60% of jobs in the EU are at risk due to digitalisation-induced automation. Four million job losses are forecast for skilled manual workers, of which many are likely to be routine jobs replaced by new technologies<sup>23</sup>. Medium-skilled jobs, such as office and administrative support work, manufacturing, transportation, etc. are considered to be most at risk.

15. Automation and digital technologies, such as cloud technology, also make it easier to outsource jobs and tasks, not only to emerging countries with lower labour costs but also to more specialised locations and workers. This could possibly cause direct job losses in one country, but job gains in another. However, the impact so far should not be overestimated: studies show that the overall impact of offshoring on ICT jobs is limited to 0.8% of the total ICT jobs that were lost in 2012. The same goes for crowdworking, which could also lead to jobs moving internationally, but is at the moment relatively new and marginal in Europe. Its growth potential is large, however, since portions of almost all jobs could be performed by the crowd.

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<sup>21</sup> <http://www.cedefop.europa.eu/en/publications-and-resources/statistics-and-indicators/statistics-and-graphs/esjsurvey-insights-no-9>

<sup>22</sup> The jobs most at risk are considered as medium-skilled jobs: office and administrative support work; sales and services; transportation; construction and extraction; and production (manufacturing).

<sup>23</sup> Estimates by the think tank Bruegel (2014) based on similar assumptions indicate that 40 to 60% of jobs in the EU Member States are at risk during the next 20 years due to digitalisation-induced automation. In the former stages of industrial development, productivity gains resulted in overall employment growth. According to Bruegel, because of the drastic and fast nature of digitalisation, it remains doubtful if a fully digitalised economy produces sufficient demand for labour to compensate for the expected job losses.

#### 4. Transformation of skills requirements

16. Europe has a basic skills challenge. Around a quarter of the European adult population struggles with reading and writing, and has poor numeracy and digital skills. More than 65 million people in the EU have not achieved a qualification corresponding to upper secondary level. This rate varies significantly across EU countries and reaches 50% or more in some countries. As most jobs increasingly require complex skills, low-qualified people have fewer employment opportunities available to them. They are also more vulnerable to precarious jobs and are twice as likely as better qualified people to experience long-term unemployment. Moreover, the recruitment process increasingly makes use of digital methods, and jobseekers need e-skills for gathering information on job vacancies and applying for jobs.

17. Another challenge for Europe are skills gaps and mismatches, which hinder productivity and growth. Many people work in jobs that do not match their competences, and at the same time, 40% of European employers have difficulty finding people with the skills they need to grow and innovate.

18. Workers will need to have both generic and specialised e-skills to accomplish their tasks at work and capture potential productivity gains. Data from the Commission<sup>24</sup> show that almost half of workers in the EU have insufficient e-skills, which is highly problematic because of the positive relationship between e-skills and competitiveness<sup>25</sup>. Digitalisation also creates a demand for specialised workers with strong interpersonal and cognitive skills, and generic and soft-skills such as creativity, communication, teamwork and perseverance are becoming more important. Encouraging STEM studies is also important in order to tackle the increasing bottleneck in vacancies for ICT, health, science and engineering professionals.

19. Policies focusing on education mainly aim at adapting school curricula and ICT infrastructure at all educational levels to the needs imposed by the rapid pace of digitalisation. OECD<sup>26</sup> research concludes that e-skills are especially promoted in higher education and to a lesser extent in vocational and on-the-job training. They receive the least attention in primary and secondary education.

20. The new skills needed require reforms in vocational education and lifelong learning in order to deliver more general and specific digital capabilities, but also new models of learning, including workplace training. E-learning, web-based educational material, distance studies and online university programmes are ways to offer flexible learning pathways to students and workers.

21. Tackling these skills challenges will require significant policy efforts and systemic reforms in education and training, and investments in human capital from both public and private sources will be needed. This will require the action and commitment

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<sup>24</sup> <https://ec.europa.eu/digital-single-market/en/news/digital-skills-core-new-skills-agenda-europe>

<sup>25</sup> According to Eurostat's glossary, e-skills or electronic skills include "those skills needed to make use of Information and Communication Technologies (ICT) as well as those skills required to apply and develop them".

<sup>26</sup> <https://www.oecd.org/els/emp/Skills-for-a-Digital-World.pdf>

of many players: national governments, regions, local authorities, businesses and employers, workers and civil society, and social partners will have a key role to play.

## **European and national measures**

### *Digital Agenda for Europe*

Several initiatives at European level support the evolution towards a digital economy and society. One pillar of the Europe 2020 Strategy concerns the Digital Agenda for Europe<sup>27</sup> seeking to fully exploit the potential of digital technologies in order to stimulate innovation and foster growth within the EU by 2020. The primary focus of the Digital Agenda is on the development of a Digital Single Market (DSM). Maximising the growth potential of the digital economy requires investment in ICT infrastructures and technologies such as Cloud computing and Big Data, and research and innovation to boost industrial competitiveness as well as better public services, inclusiveness and skills.

Monitoring data of the Digital Agenda Scoreboard show that the EU is progressing, especially in the fields of connectivity and human capital. However, EU citizens should be able to use the internet to a larger extent, whereas companies and industries should increase integration of digital technology. Even though EU citizens' basic digital skills have improved, they still lack essential skills and competencies to exploit the potential of the digital economy as much as possible.

### *New Skills Agenda for Europe*

In June 2016, the Commission presented a New Skills Agenda for Europe<sup>28</sup> which aims at making better use of the skills that people have available and equipping them with the new skills that are needed, in order to help them find quality jobs and improve their ability to participate fully in society. The Commission invited Member States, social partners, industry and other stakeholders to work together to improve the quality and relevance of skills formation, make skills more visible and comparable, and improve skills intelligence and information for better career choices. Member States need to invest more in digital skills formation, including coding and computer science, since such skills are vital to use new technologies and innovate. Research and innovation hubs can also help develop and transfer such skills, acting as catalysts for investment and for business and job creation.

Social partners will have a central role to play in the successful development of this agenda, building on initiatives at European and national level, drawing on specific sectoral expertise and working within sectors and across industry.

The Commission is launching the Digital Skills and Jobs Coalition to develop a large digital talent pool and ensure that individuals and the labour force in Europe are equipped with adequate digital skills. Member States are invited to develop comprehensive national digital skills strategies by mid-2017 on the basis of set targets.

<sup>27</sup> <https://ec.europa.eu/digital-single-market/en>

<sup>28</sup> <http://ec.europa.eu/social/main.jsp?catId=1223>

This includes establishing national digital skills coalitions connecting public authorities, business, education, training and labour market stakeholders, and developing concrete measures to bring digital skills and competences to all levels of education and training, supporting teachers and educators and promoting the active involvement of businesses and other organisations. The Commission will bring together Member States and stakeholders, including social partners, to pledge action and identify and share best practices, so that they can be more easily replicated and scaled up.

*More work-based learning and business-education partnerships*

Work-based learning, such as apprenticeships, are a proven springboard to good jobs and to developing labour market-relevant skills, including transversal and soft skills. This is an area where social partners can play a key role<sup>29</sup>. Social partners in several sectors, including commerce, construction and telecommunication, have reached joint positions on skills, including specific initiatives on traineeships. Furthermore, business-education partnerships, involving all sectors and levels of education and training, can enable more people in education to acquire work-based experience. The European Alliance for Apprenticeships has so far mobilised 250 000 in-company training and job opportunities for young people. Through the European Pact for Youth, one million young people will be trained in digital skills, and a “smart classroom” programme will reach 100 000 students. Through the Grand Coalition for Digital Jobs, companies and other organisations have offered millions of additional training opportunities.

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<sup>29</sup> Several EU social partners in different economic sectors have also made joint pledges under the Alliance for Apprenticeships to provide more and better apprenticeships. This is also a priority in the European social partners’ 2015-2017 joint work programme. The Commission will help social partners take forward the results of their joint projects, for example exploring the cost-effectiveness of apprenticeships and establishing a possible Quality Framework for Apprenticeships.