The EU Pact for Skills – Skills Partnership for the Digital Ecosystem

July 2022

1. The Pact for Skills as part of the new European Skills Agenda

In June 2020, the European Commission announced the new European Skills Agenda[1], building on the actions of its 2016 Skills Agenda. It announced 12 actions organised around four building blocks:

1. A call to join forces in a collective action through the Pact for Skills;
2. Ensuring the right skills for jobs;
3. Initiatives to support people in their lifelong learning pathways; and
4. a Framework to unlock investments in skills.

The European Skills Agenda complements the European Digital Strategy[2] and the Strategy for SMEs[3] (small and medium-sized enterprises). It is also embedded in the framework of the Recovery Plan for Europe.

The European Commission launched the EU Pact for Skills on 10 November 2020.[4] It is the first of the 12 flagship actions under the European Skills Agenda and is firmly anchored in the European Pillar of Social Rights. A Charter, which outlines a shared vision on quality training from industry, social partners, vocational education and training (VET) providers as well as national, regional and local authorities, forms the basis of the Pact for Skills. Signatories agree to respect and uphold the Charta's four key principles:

1. Promoting a culture of lifelong learning for all;
2. Building strong skills partnerships;
3. Monitoring skills supply/demand and anticipating skills needs; and
4. Working against discrimination and for gender equality and equal opportunities.

Based on this vision, the Pact aims to mobilise resources to make investments in skills and set up a shared engagement model between the various actors mentioned above to collectively take action to upskill and reskill the workforce in all 14 industrial ecosystems identified in the Industrial Strategy[5].

[1] https://ec.europa.eu/social/main.jsp?catId=1223&langId=en
[2] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en.
[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0103.
[4] https://ec.europa.eu/social/main.jsp?catId=1517&langId=en.
[5] In its updated version of the New Industrial Strategy (2021), the Commission has identified 14 industrial 'ecosystems', one of them being digital: EUR-Lex - 52021DC0350 - EN - EUR-Lex (europa.eu)

This policy document is the joint output of the Skills Partnership for the Digital Ecosystem under the Pact for Skills. It explains the context, summarises key ideas and prepares the way forward for a dynamically evolving partnership.

2. The digital ecosystem and its links with the other industrial ecosystems

The digital ecosystem includes three main subsectors: information and communication technologies (ICT) manufacturing, ICT services (excluding telecommunications), and telecommunications. ICT services account for 95% of the total ICT value added. Within the ICT services subsector, telecommunications play a key role, making up around 35% of the value added of the services sub-sector and 16% of its employment[6].

In 2019, the digital ecosystem, as defined above, registered in Europe an annual turnover of EUR 625 billion, which represented 5.17 % of EU value added[7]. Digital industries are prevalent in most EU Member States, employing 6.8 million workers[8] in 1.2 million firms, of which more than 99.8 % are SMEs.

Although the digital ecosystem has not been among the most hardly hit by the COVID-19 pandemic,[9] the aftermath of this crisis and current global tensions have a negative impact on investments. This risks to slow down the deployment of strategic digital capabilities, such as distributed-ledger technologies (DLT/blockchain), cybersecurity, supercomputing/high-performance computing (HPC), and artificial intelligence (AI). Such technologies present indispensable opportunities for growth, competitiveness and strategic autonomy of the European economy. In particular, the cybersecurity dimension gains importance by the day, not only for large enterprises but also for SMEs and public services.

Within all 14 industrial ecosystems, the digital ecosystem has a twofold importance, which makes it unique in the set-up and design of a skills partnership. On the one hand, the digital ecosystem is important in itself, covering the strategic aspects discussed above. On the other hand, it takes an important role beyond its own remit, as digital skills form an integral part of economic activities at all stages of value chains in all other ecosystems. As highlighted even more during the COVID-19 pandemic, digital technologies and infrastructure play a crucial role in all sectors,

[6] SWD(2021) 351, Annual Single Market Report 2021, Annex III, p. 106. swd-annual-single-market-report-2021_en.pdf (europa.eu).

[7] SWD(2021) 351, Annual Single Market Report 2021, Annex III, p. 105.

[8] SWD(2021) 351, Annual Single Market Report 2021, Annex III.

[9] The digital ecosystem is heterogeneous; the magnitude and nature of the economic impact of COVID-19 vary depending on the market area. Some technology segments (such as PCs, tablets, and PC monitors) and infrastructure as a service (IaaS) are expected to experience continued growth. However, mid-term, a general decline in ICT spending, as companies put non-mission-critical investments on hold, might be expected (IDC, August 2020).

including those that have so far been the least digitised, allowing them to remain competitive and making them more resilient.

It is thus fair to say that the economic and political developments in recent years have been triggering an unprecedented demand for digital technologies and infrastructures. Connectivity in the EU is steadily improving, businesses are increasingly taking up digital solutions, and citizens are using more digital tools. However, significant variations still exist across sectors, Member States and regions, large businesses and SMEs. More importantly, significant gaps exist in all Member States when it comes to digital skills, which are a key enabler of digitalisation, not only in the digital industries but also for all the other ecosystems.[10] On top, despite the ever more strategic role of digital technologies, many parts of the digital ecosystem observe a net outflow of skilled workers. This places up- and reskilling in a particularly intense spotlight.

3. Up- and reskilling in the digital ecosystem under the Pact for Skills

In order to prepare the basis for a skills partnership in the digital ecosystems under the Pact for Skills, Commissioners Breton and Schmit organised a High-Level Roundtable with about 30 stakeholders on 19 July 2021. They explained that the objective of the Pact for Skills is to promote joint actions to maximise the impact of investing in improving existing skills (upskilling) and training in new skills (reskilling). They also called on enterprises, social partners, chambers of commerce, public authorities, vocational education and training providers, higher education institutions and employment agencies to work together and develop a set of clear commitment to invest in training for all working age people across the EU in the form of a large-scale skills partnership.

The digital skills group convened to discuss the way forward in a first workshop on 23 November 2021 hosted by the European Commission. On this basis, many participants started designing commitments as well as defined their key interests and issues, which are to be reflected in the group's final policy and commitment package. This work is on-going.

A second workshop hosted by the European Commission on 22 March 2022 agreed on a joint approach as summarised in this document, which is being updated regularly to reflect further progress in discussions. To enhance decentralised self-organisation within the ecosystem, three partner organisations volunteered to co-lead the discussion process, which provides an important contribution and incentive for others to join.

[10] Only 56% possess at least basic digital skills and only about one third of Europeans possess above basic digital skills (31%). In parallel, there remains a shortage of ICT specialists on the labour market: In 2019 55% of the EU enterprises that recruited or tried to recruit ICT specialists reported difficulties in filling vacancies. (Digital Economy and Society Index 2021).

4. The challenges for the digital ecosystem

The digital ecosystem is experiencing major changes on a global scale, which is exacerbating the disparities between sectors and regions, thus creating polarisation. Among the multiple challenges that the digital ecosystem needs to tackle, the digital skills partnership identified the following as being of utmost relevance and thus priorities for future activities.

4.1. Shortage of ICT specialists and other technology experts

Demand for skills has significantly increased in the past years, raising the need for digital skills and competences at different levels and across all ecosystems. In particular, ICT specialist jobs have been among the fastest growing occupations since 2010. However, all Member States, including the front runners, currently face a critical shortage of digital experts,[11] which hampers the development, uptake and use of emerging key digital technologies and exposes them increasingly to cyber risks. Moreover, in all key areas such as cybersecurity and data analysis demand is higher than supply.[12]

ICT occupations are expected to grow at four to five times the average rate over the course of this decade, as jobs requiring programming are growing 50 % faster than the job market overall. The 2021 Digital Economy and Society Index (DESI) published in November 2021 showed that only few countries are set to meet the digital skills goal provided by the Digital Decade. Similarly, the proportion of the general workforce employed in ICT roles remains low in most countries. Given the current situation, a systemic lack of ICT experts could be a significant risk that could slow down the digital transformation of all European industrial ecosystems.

4.2. Shortage of digital experts in traditional companies of all sizes and in all ecosystems

The shortage reported above does not only relate to ICT specialists and dedicated experts e.g. in breakthrough technologies. It more fundamentally includes the uptake of digital technologies and related digital skills in all types of enterprises, notably SMEs, in all 14 ecosystems. This endangers the ambition to foster digitalisation and competitiveness everywhere in the EU. In recent years and in all sectors, a steady growth in the demand for professionals combining sectoral knowledge with digital skills emerged, with the view to enable the use of digital solutions for specific business cases. This for example applies to employees in the manufacturing sector, who must be able to use automated reality/virtual reality (AR/VR) tools to repair engines whilst at the same time understand the data leakage and cybersecurity risks involved.

It also clearly comes out from various sectorial blueprints (other than the ones in the ICT ecosystem) that ICT skills become an integral part of all other, more traditional, sectors. As such,

[11] Digital Economy and Society Index 2021:The Digital Economy and Society Index (DESI) | Shaping Europe's digital future (europa.eu)

[12] Investment Report 2019/2020 - Building a smart and green Europe in the COVID-19 era (eib.org)

it is important to understand the skills needs identified in the blueprints and suggest activities, identify good practices and ways to support respective upskilling. Various strategies could be taken to achieve this, e.g. by integrating the skills dimension into the sectorial transition pathways, promoting digital tools and best practices available for other sectors[13] as well as organising matchmaking between the ICT and more traditional sectors to enhance peer-to-peer exchange among them on digital upskilling and reskilling.

Having a skilled workforce capable to understand new technological trends and how to implement them in the company strategy and operations is an indispensable condition to move forward with the digital and green transition. It is at the same time a prerequisite to allow traditional industries to remain globally competitive.

Recent developments exacerbate these problems, including cyberattacks that exploit weaknesses and lack of digital skills in all types of enterprises. They underline the need to not only focus on advanced digital skills but – at least equally importantly – basic digital skills that everyone should possess, not only digital experts. These basic digital skills range beyond cybersecurity and include data skills (awareness of the GDPR and its implications, knowledge on where to store and how to move data), insights into how digital crowds function and can be managed, in contrast to analogue ways of doing business, to name but some very important ones.

4.3. Fast pace of transformation of the industry and effect on jobs and skills

There is a coherent view among stakeholders that a key factor – if not the most important one – for exploiting digital opportunities (and addressing risks) is speed, which in many instances is more important than e.g., access to finance. The fast pace of technological development and the challenges created by accelerating innovation render traditional ways to do business increasingly obsolete. This requires updated and more flexible approaches to learning, both in terms of structure and content.

An additional consequence of the ever-faster speed of innovation is accelerating automation. Jobs are increasingly subject to substitution by automation, while at the same time new jobs are constantly being created. This implies on the one hand an increasing demand for advanced skills to address skills shortages and, on the other hand, the risk for some types of skills to become obsolete because of automation, especially in low and medium-skilled jobs.

[13] For example, Digital SkillUp materials on upskilling pathways and best practices from the SMEs: https://www.digitalskillup.eu/assets/assets/vrvkmouiew3i/13O3xH93YfBFuOahqHjcW3/b39e1f91259cd61240eb4651b81b6ea6/Learning_Pathways_DigitalSkillUp.pdf and https://www.digitalskillup.eu/assets/assets/vrvkmouiew3i/6fhxnLS7Iq2Y87RFOpRNSm/de16b02cd7fe9d3cbe1b254a50e92577/DSU_SMEs_business_cases_final.pdf.

Estimates suggest that around 9 to 14 % of jobs in the EU face an elevated risk of automation and that a further 32 to 40 % of jobs are likely to be transformed by automation, entailing corresponding changes in skill requirements.[14] There is not yet sufficient investment in reskilling and upskilling, although this would be important to accompany and mitigate the transition in skill sets required for workers affected by technological skills obsolescence.[15]

4.4. Lack of lifetime and gender balance

In the light of all the above, it is essential to activate resources across Europe wherever they exist. As noted, the digital ecosystem is currently characterised by a net outflow of digital experts, *i.e.,* more experts leave their jobs than start new ones. A considerable part of this stems from the lack of a lifetime perspective, in particular for older employees that at times face discrimination in the job market purely because of their age, which are often a consequence of (perceived) lack of modern digital skills. Initiatives to rebalance up- and reskilling and to foster a lifetime learning perspective are therefore particularly welcome.

The lack of women in the ICT sector and more broadly among graduates in science, technology, engineering and mathematics (STEM) constitutes a further challenge that the digital ecosystem needs to address. Only one in five employees in the ICT sector is female, and among STEM graduates, it is only one in three[16]. These figures have remained steady for several years, demonstrating the lack of progress in addressing the issue. In 2021, women accounted for more than 25% of workers in the ICT field only in Bulgaria, Greece and Romania.[17] Beyond creating labour and skills shortages, this gender imbalance also has a negative impact on the way digital solutions are devised and deployed.

4.5. Cybersecurity

The reflections so far indicate that cybersecurity skills should play a central role in the work of the future digital skills partnership, the more so as the partnership will be “cross-ecosystem”, since digital and cybersecurity issues are transversal and relevant to all ecosystems. This is also illustrated by a Capgemini report, which finds that 68% of the surveyed companies (within different sectors) in Europe report a high demand for cybersecurity skills, comparably more than other highly demanded skills, such as big data skills (61%)[18].

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[14] Pouliakas (2018), Automation risk in the EU labour market: a skill-needs approach; Nedelkoska, L. and G. Quintini (2018), "Automation, skills use and training", OECD Social, Employment and Migration Working Papers.

[15] Cedefop (2020), Assess*ing the employment impact of technological change and automation: the role of employers' practices*. Luxembourg: Publications Office of the European Union. Cedefop research paper; No 79. http://data.europa.eu/doi/10.2801/173340.

[16] Women in Digital Scoreboard (Digital Economy and Society Index 2021).

[17] Women in Digital Scoreboard (Digital Economy and Society Index 2021).

[18] https://www.capgemini.com/news/press-releases/business-leaders-report-urgent-need-for-cybersecurity-skills-as-digital-talent-gap-widens/

Numerous EU initiatives address cybersecurity, but a coherent focus on the required skills could be further strengthened. In particular, the challenge is to ensure easy access to and high take-up of high-quality cybersecurity skills trainings, which match the needs of the labour market. Cybersecurity for SMEs deserves special attention. Awareness raising goes beyond regular up- and reskilling; it requires a culture that enables and rewards a joint effort, as an enterprise is only as strong as its weakest link in the face of ever more elaborated cyber-attacks. Moreover, cyber threats are often linked to privacy related issues, questions of data storage and access etc., which necessitates a coherent approach including for workers that – often wrongly – consider themselves as not exposed to such risks.

At this stage, it remains an open question whether cybersecurity merits an own partnership or not. Independent of these policy considerations, the topic will have to play an important part also in the digital skills partnership as discussed here.

4.6. Other challenges

There are important other challenges worth mentioning in the digital ecosystem, many of which relate to the issues above but also go beyond and/or complement them. They include the following:

- *There is a clear global dimension in the supply of and demand for digital skills. The difficulty to attract and maintain experts in European companies is magnified though strong competition by global tech companies.*
- *A similar challenge applies to universities, especially small and medium-sized European universities that face global competition in educational services. Attracting good students in a reliable and predictable manner is a difficulty.*
- *The integration of digital technologies (e.g. AI, blockchain, data management, cybersecurity) into the curricula of higher education courses outside of ICT programmes is not well developed. Reasons are lack of resources, notably teachers, as well as missing understanding of the demands of industrial ecosystems.*
- *The argument was made that there is a lack of a common nomenclature to assess and evaluate digital skills, which leads to a fragmented situation in Europe as well as to the difficulty of evaluating skills for recruiters and companies.*
- *It would be desirable to have shorter courses with flexible modes of study (e.g., part-time, distance) in key digital technologies.*

Against this background, in 2021, only 54% of people in the EU aged 16 to 74 had at least basic overall digital skills[19], while 90% of all jobs have some digital content. This major imbalance must be addressed. In fact, there is an urgency for upskilling and reskilling due to changing job markets

[19] How many citizens had basic digital skills in 2021? - Products Eurostat News - Eurostat (europa.eu)(March 2022)

and a technology landscape moving with relentless speed. Half of the workforce may require upskilling in the next five years. This is particularly challenging for SMEs.

To boost the uptake of digital technologies and solutions across the economy, it is necessary to increase advanced digital skills levels of the workforce and to attract and train people also from non-ICT-sectors. Moreover, it is important to use the full potential of the EU workforce and provide accessible and relevant upskilling and reskilling opportunities to satisfy the needs of more ICT specialists, advanced digital technology users and lower skilled employees with basic digital skills needs.

5. The ambition for the digital ecosystem under the Pact for Skills

This partnership will have a broad ambition, which should cover the objectives of the Pact for Skills but might also go further, for instance by setting good practice examples and by providing support that can assist European enterprises and citizens in digital up- and reskilling, building upon already available resources and initiatives.

As such, first, the partnership will contribute to reach the targets of the Digital Decade policy programme, especially those of equipping 80 % of people with basic digital skills, of achieving gender convergence and of having 20 million ICT specialists employed in the EU by 2030. The partnership will also work to achieve the objectives of the EU Skills Agenda and the European Pillar of Social Rights Action Plan calling for collective action to support the development of digital skills in the adult population and to reach the 2030 targets of 60 % of adults participating in learning every year.

Second, by proposing and implementing concrete commitments in all areas of digital up- and reskilling, the partnership could create a series of good practice examples that inform, steer and motivate enterprises – including our 25 million SMEs – and citizens to improve their digital skills. Therefore, the content of up- and reskilling measures will be as important as their quantitative amount, and even the smallest initiative can serve as a blueprint for others and help digital training scale in Europe. An inspirational example of such stakeholder-driven initiatives of various scale can be taken from the Digital Skills and Jobs Coalition pledges[20].

To achieve these objectives, the partnership aims at developing a joint strategy to design and implement an ecosystem-wide upskilling and reskilling framework, improving the competitiveness of all the actors involved as well as enhancing job retention and job attractiveness of the digital ecosystem within the frame of the Pact for Skills. The partnership would moreover aim to create synergies among its participants and to allow collaboration among its members in a range of projects that they design and implement together. By this, the partnership will become a central point for networking, setting up examples and scaling up best

[20] https://digital-skills-jobs.europa.eu/en/about/pledge-viewer.

practices to encourage other actors and stakeholders in the digital ecosystems to take up similar actions and thus to develop solutions that contribute to the upskilling and reskilling challenge Europe needs to face.

An additional objective to be obtained by the partnership is to seek synergies and collaboration with existing initiatives in order not to duplicate the work already done elsewhere, but also to use existing best practices and guidance as an inspiration for the partnership (e.g. the Digital Skills and Jobs Platform as well as the Pledge Viewer, the work of the European social partners on the skills matching in Europe, etc), to build upon existing initiatives, tools and resources which are available to include them into partnership partners' activities and, potentially, to further expand them (e.g., sectorial blueprints, Digital SkillUp resources, etc.). The Partnership will be also informed by the outcome of the Structured Dialogue with Member States on digital education and skills initiated by the European Commission in the end of 2021.

Another important goal for the partnership, as well as a direct channel to promote its activities and best practices, is to engage with as many European Digital Innovation Hubs (EDIHs) as possible, since the EDIHs are one of the key instruments to provide training to European businesses and their workforce. The partnership shall look into ways to collaborate with the Digital Transformation Accelerator in order to engage its coordinated EDIHs into the Partnership. Furthermore, in the future, it could serve as a platform (or working group) for the EDIHs to discuss the development of (advanced) digital skills.

By defining and monitoring specific Key Performance Indicators (KPIs) that will measure progress towards these objectives and help overcome the challenges identified, the partnership can transform its up- and reskilling ambitions into concrete deliverables. The European Commission will assist in informing on available resources from its various programmes.

The partnership will remain open to new members. It will promote its activities with the goal to have a broad impact in the ecosystem.

6. The proposal by the digital ecosystem under the Pact for Skills in detail

The partners commit to respect and uphold the key principles of the Charter. In addition, the signatories intend to implement the upskilling and/or reskilling actions to deliver upon the principles of the Pact in a concrete manner.

Based on their different organisation structures and territorial outreach (e.g., whether organisations are active at a European, national, regional and/or local level), signatories can choose commitments which are the most appropriate to match their own interests, strengths and needs in terms of upskilling and reskilling. The Partnership will also formulate a partnership programme aimed, among other things, to develop common initiative among its members and guarantee an effective implementation thereof.

The signatories will also indicate Key Performance Indicators (KPIs) – quantitative and/or qualitative ones – to help monitoring their commitments.

By way of example, KPIs could include the following elements:

- The number of persons being trained within the digital industry in their respective country;
- The geographic coverage of DIHs and similar training providers and the type of activities and opportunities created in a regional context;
- The participation of women in upskilling and reskilling activities;
- The number of students participating to summers schools/educational activities on new advanced technology (e.g., blockchain, data, AI, robotics);
- Trainings offered in advanced digital technologies and the percentage of people employed as direct effect of such activities;
- The number of users registering and completing online training courses on digital technologies; and/or
- The number of traditional SMEs that included digital technologies in their business models after their staff underwent training.

The signatories align by the aforementioned objectives and support the ambition of this joint skills partnership for the digital ecosystem.

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