



Skills on Smart Industrial Specialisation and Digital Transformation

6th Expert Workshop

22nd of May 2019, 10:00-16:30

Background Document

Context and goal of the sixth Expert Workshop

The ‘Skills for Smart Industrial Specialisation and Digital Transformation (SIS&DT)’ project has been focusing its efforts on the development of specific solutions grouped by modules to guide stakeholder groups at all levels the operationalisation of the ‘**Skills for Industry Strategy 2030**’.

This sixth, concluding, workshop aims to have a final in-depth discussion on the Skills for Industry Strategy 2030 and the accompanying implementation recommendations. Participants will be presented the key solutions developed and will subsequently be given the opportunity to directly share their feedback.

Key participants representing different stakeholder groups at all levels (i.e. Supra-national, National, Regional, City, Cluster, and Industry) have been invited to collectively discuss the proposed recommendations, structured under three main themes:

- Finalise the solutions that define and guide the implementation of the Vision – the **Leadership & Governance, Skills Strategy, and Communication** modules;
- Finalise the recommendations on financing a massive EU skills effort – the **Funding and Incentives** modules;
- Last but not least, define solutions for growing a competitive talent pool for Europe’s industry – namely the **Talent detection and nurturing, Accelerated world-class curriculum, Industry-led training infrastructures, and Quality-led EU-wide VET** modules.

Table 1. Expert workshop agenda

9.30	REGISTRATION AND BREAKFAST (30 min.)
10.00	Introduction and Objectives of the Meeting
10.15	From strategy to implementation: Focus on modules <i>Leadership & Governance, Skills Strategy, and Communication</i>
11.45	COFFEE BREAK (15 min.)
12.00	Financing a massive EU skills effort: Focus on modules <i>Funding and Incentives</i>
13.00	LUNCH BREAK (1 hr)
14.00	Growing a competitive talent pool for Europe’s industry: Focus on modules <i>Talent detection and nurturing, Accelerated world-class curriculum, Industry-led training infrastructures, Quality-led EU-wide VET</i>
16.00	Wrap-up

Introduction

This background document summarises the policy recommendations defined during the five previous Expert Workshop sessions. It provides an overview of all currently developed recommendations **to enable the finalisation of these solutions during the final, sixth session.**

The devised recommendations aim to facilitate the operationalisation of the Skills for Industry Strategy 2030 and to guide different stakeholder groups on developing and implementing their own skill strategies in alignment with their Industrial, RDI, Education, and RIS3 Strategies.

At its core, the policy recommendations encourage the **development of forward-looking, dynamic, interactive, multi-stakeholder driven and agile upskilling initiatives** that leverage on **real-time AI-based labour market assessments** and foresight tools for **evidence-based decision-making.**

To facilitate discussion, all recommendations have been regrouped into the following 9 modules:



The Skills for Industry Strategy 2030

The nine modules are based on the initially developed **Skills for Industry Strategy 2030**, which intends to foster the development of **skills for excellence, prosperity and personal development**.

The Skills for Industry Strategy 2030 aims **to mobilise resources** at the local, regional, national and EU level to make skills an opportunity for everyone. It further aspires **to raise widespread momentum** by inspiring all key players to take part in **collectively designing and implementing powerful skills strategies** and thus turn the potential challenges brought by digital transformation and industrial modernisation into opportunities.

The Skills for Industry Strategy 2030 wants to introduce **a paradigm shift** to the entire ecosystem of workforce planning, education and training provision for skills development; to revolutionise the way education and trainings have been provided. One of its main goals is therefore to encourage a switch from the 'Life Long Employment' towards the '**Life Long Employability**' concept by making individuals responsible for their own skills development.

To operationalise the Skills for Industry Strategy 2030, **new upskilling solutions** need to be developed and implemented. All individuals should benefit from lifelong learning opportunities, as well as from agile and modern education methods using tech-based tools and modern teaching methods. The key characteristics of the Strategy are illustrated below.

Figure 1. Key characteristics of the Skills for Industry Strategy 2030



Policy recommendations

As mentioned above, the Strategy is being accompanied by a set of recommendation regrouped by modules to guide different stakeholder groups on developing and implementing their own skill strategies.

Each module was defined in dedicated Expert Workshop sessions in line with the collaborative and inclusive design approach set out in the EU 2030 Skills Vision. To facilitate the exchange of ideas and foster discussions between participants during the sixth Expert Workshop, a brief description of the nine modules has been prepared as ‘food for thought’.

We kindly encourage you to challenge these aspects and to share any comments you may have before the workshop by email to SIS-DT@lu.pwc.com, and during the workshop through active participation. For each module described below, you will find some free spaces dedicated to filling in your comments.

Module 3 – Funding

- **Recommendation A:**
 - The continued up/reskilling of the European workforce will require significant financial support at all levels (EU, national, regional and city) and rely on public and private initiatives. **Existing European funding schemes should be reviewed** to allow for the successful set-up and implementation of Territorial Skills Strategies. **Dedicated upskilling funding programmes** should be set-up that will be used with the sole intention to support the upskilling and lifelong employability of Europe’s workforce. Furthermore, **new pre-financing mechanisms** that will allow smaller businesses and SMEs in particular to upskill their workforce should be established.

- **Recommendation B:**
 - With the rising number of funding schemes available, a **one-stop-shop** providing stakeholders with a clear view on all the funds available for their skilling needs is recommended. To ensure the rightful use of funds offered and encourage a wider upskilling movement, those interested in advancing the upskilling of the European workforce require a clear view on the funds available, their target groups as well as on the application criteria to respect.

- **Recommendation C:**
 - Simultaneously a **rebranding of the funds available** should be considered. Skills funding schemes should be clearly branded as such and their target audiences easily identifiable. These ‘Skills Funds’ should be introduced at the regional, national and EU-level and would regroup the funding mechanisms available under a dedicated umbrella structure.

- **Recommendation D:**
 - In line with the reform of the existing EU funds, **the financial framework for the Blueprint for sectoral cooperation on skills** could be expanded. At present, the activities of the Blueprint are limited to the European-level. Yet, in line with the Skills for Industry Strategy 2030, the cooperation framework aims to **progressively expand its activities to the national and regional level**, working directly with national and regional authorities as well as key industrial stakeholders in the target areas. In a further instance, the scope of activities supported by the Blueprint could be restricted to the **testing of highly innovative** and thus **more risky upskilling initiatives**.

Your comments:

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Module 4 – Incentives

- **Recommendation A:**
 - One possible incentive might represent the **introduction of “lifelong learning and skills insurance plans”**, which would adopt a similar framework to traditional capital insurance plans with a specific focus on the acquisition of skills by individuals in case they lose their job or want to transition to a new position/field. Individuals would be given the opportunity to progressively build up a lump sum of money that they could use to finance their trainings and continued education. At the same time, individuals would benefit from advantageous tax arrangements and an attractive return on investment. “Lifelong learning and skills insurance plans” could be introduced at the national, individual or corporate level, depending on local conditions.

- **Recommendation B:**
 - A similar solution could represent the **introduction of “corporate skills insurance plans”** that would allow business owners to invest in the future skills development of their employees. Similar to existing “car fleet programmes”, companies could subscribe to corporate skills insurance programmes to ensure the continued upskilling of their workforce. To further encourage the uptake of these upskilling activities at the individual level, corporates could envision introducing a bonus system that would benefit those employees that regularly complete trainings/certifications offered at company level.

- **Recommendation C:**
 - Hand-in-hand with the “corporate skills insurance plan”, incentives encouraging the wider uptake of VET upskilling efforts should be highlighted. Employers should be encouraged to invest a certain percentage of their profit into dedicated **VET savings accounts** that would serve the later continued training of their employees. Governments could top-up the amounts committed to the lifelong employability of employees, facilitating employers’ investment into the continued training of their workforce. SMEs, on the other hand, could benefit from additional funding and support. Besides the financial contributions received, additional support could be offered in the form of advice on trainings needed or the optimised organisation of the workforce to allow for the inclusion of trainings into the company’s work culture.

- **Recommendation D:**
 - In line with the introduction of individual VET savings accounts, private actors should be increasingly encouraged to share their corporate VET programmes with non-employees. **Corporate academies should be opened to the wider public** to

encourage the exchange of knowledge among industries and facilitate the recruitment of available talent. Dedicated financial incentives could be envisioned at the European, national or regional level to support these efforts.

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Module 7 – Accelerated World Class Curriculum

- **Recommendation A:**
 - In a first instance, a **comprehensive review of curricula offered and their alignment to current industry/market needs** should be envisioned. Each course/degree offered should be set-up to target specific skills needs of industry and the general labour market. The introduction of comprehensive AI tools assessing market and labour trends could be used to this advantage. Furthermore, traditional education and training providers should work increasingly with industry leaders to directly exchange on the adaptation of curricula in line with market needs.

- **Recommendation B:**
 - In line with the continuous adaptation of curricula, universities and training providers need to be given the opportunity **to easily and rapidly change the structure and content of the courses** offered. The application process to ensure the official recognition of the degrees/certifications provided thus needs to be streamlined and recognised EU-wide. The quality criteria to be respected need to be easily understood and their application supervised by a dedicated body/institution. At the same time, the criteria defined should be mindful of the changing educational system and thus need to remain highly flexible and open to innovation.

- **Recommendation C:**
 - Private-public collaborations are becoming increasingly important to ensure the courses/trainings offered align with industry needs. By directly cooperating with industry leaders and experts in the field, academic institutions and training providers can adapt the courses/trainings offered to respond to concrete needs market needs. **Universities that sign collaboration frameworks with industry leaders and directly include industry knowledge/input into their curricula could benefit from prioritised public funding** to recognise the efforts made. Curricula with little impact on the continued employability of students should thus be slowly phased out and discouraged.

- **Recommendation D:**
 - The modernisation of traditional education requires the **re-imagination of the entire educational profession**. Teachers and professors will have to be onboarded on this new vision of education and skills development. They will need to be upskilled to better understand the demands of the market and adapt new training methodologies. **Traditional educators should collaborate with industry professionals** to give their students the opportunity to learn directly from those that are currently

working in the field and can teach them not only the technical skills required but can also prepare them for the realities they will face on the market place.

Your comments:

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Module 9 – Talent Detection and Nurturing

- **Recommendation A:**
 - **A new approach to both early talent detection** in traditional education as well as in corporate settings should be developed and implemented. A dedicated working group should be created at EU-level to investigate new ways of detecting talent at both an early and later stage, as well as on how best to support these individuals that are highly gifted. In this regard, **the retention of elderly talent and youth in Education, Employment or Training (NEET)** should be particularly considered.

- **Recommendation B:**
 - In line with the development of a new talent detection and retention methodology/system, identified **best practices** in the field should be **widely disseminated** to encourage the broader up-take of talent detection and retention practices. Best practices should be clearly highlighted in the upskilling promotion campaign introduced above. By spreading information on innovative solutions and facilitating the exchange of new ideas, the talent detection and retention system developed will be continuously challenged and improved.

- **Recommendation C:**
 - EU, national and regional efforts should pay special attention to targeting demographics that until today have received less support. **Female talent**, especially, should be increasingly encouraged and supported in its development of high-tech t-shaped skills. Programmes dedicated to the detection of female high-tech talent should be introduced to tap into this under developed talent pool. Women in STEM need to be given the opportunity to continuously expand their knowledge and to keep expanding their talents. Dedicated talent detection and retention systems should thus be envisioned and implemented.

- **Recommendation D:**
 - A further solution to the continuous encouragement and development of talent might represent the **introduction of “Work-Life Schools”** which would be similarly accredited to Business Schools and would concentrate on the provision of high-tech t-shaped skills. Contrary to traditional educational bodies, “Work-Life Schools” would be flexible in the provision of their courses and could allow students to go back to school throughout their working life without having to deal with the requirements and eligibility criteria demanded by the traditional academic system.

Annex: Interim report - Executive summary

On behalf of the European Commission (the Directorate General for Internal Market, Industry, Entrepreneurship and SMEs), the Executive Agency for Small and Medium-sized Enterprises (EASME) has launched a two-year project aimed at developing a common vision towards 2030 and supporting actions in the form of a toolbox boosting high-tech skills development for smart industrial specialisation and digital transformation. Professionals with high-tech skills have the potential to serve the growing needs created by smart industrial specialisation and digital transformation and to offer a solid foundation for tomorrow's worker. This 'Interim Report' provides the state of play in the EU with regard to the presence of policies, initiatives and strategies in support of smart industrial specialisation and digital transformation at city, regional and national levels, as well as those aiming to foster the development of high-tech skills and future professionals.

The competitiveness of industry is highly dependent on the knowledge, skills, competencies and creativity of its workforce. It is widely recognised in industry that potential shortages and gaps in skills development, combined with mismatches between labour supply and demand, directly harm job creation. The Fourth Industrial Revolution brings major disruption to the scale at which upskilling and reskilling efforts currently take place, and is therefore likely to widen these potential gaps. Moreover, it is likely that advanced economies characterised by large consumer markets, such as the European Union (EU), will be confronted with the highest skills mismatches.

State of play for smart industrial specialisation and digital transformation

Smart industrial specialisation refers to the concept of coordination within specific geographical regions in Europe between industrial, governmental and academic players to develop a collective strategy for regional economic development by prioritising the industrial sectors where the region has key strengths and advantages. This concept emerged in conjunction with the European Commission's Smart Specialisation strategy, according to which regions should develop their own Smart Specialisation strategies. These are based on their strong key industrial sectors with a competitive advantage for ensuring high growth and job creation. In this process, the European Cluster Observatory has provided invaluable evidence by defining newly emerging industries and relevant sector-specific framework conditions needed for boosting their development.

Thus, industry clusters have become one of the key catalysts in support of industrial specialisation. Given the limited financial resources and the need for critical mass on R&D and innovation, the Industrial Modernisation platform¹ has been launched to allow for cross-border and cross-sector partnerships all across the EU and to establish strong industrial capability and specialisation for smart industrial specialisation.

¹ <http://s3platform.jrc.ec.europa.eu/industrial-modernisation>

The European Commission launched the Vanguard Initiative² in 2015 to join forces for investment in the future of Europe. These investments aim at strengthening the competitiveness of European industry and developing lead markets that offer solutions to common challenges at global level. The European Observatory for Clusters and Industrial Change³ was launched in January 2018 to place more focus on key enabling technologies (KETs), digitisation, creativity and eco-innovative, resource-efficient solutions as the key drivers of industrial change.

We are at a time where all businesses across all sectors, and even all individuals, have been going through a digital transformation process. Among other things, this requires the transformation of business activities/functions; business processes; business models; business ecosystems; business asset management; organisational culture; ecosystem and partnership models; and customer, worker and partner approaches.⁴ The importance of digital transformation is highlighted under the 'digitisation of EU industry' strategy, whereby to support industry in this adoption, digital innovation hubs have been established under the Digitising European Industry initiative.⁵

Our analysis indicates that the EU holds a remarkable global market share, especially in automotive semiconductors (55%), followed by robotics (33%), embedded systems (30%), and semiconductor equipment and photonics components (20% each). When we look at the adoption of four technologies at global level, the EU holds the highest market share in enterprise wearables (40%) and scores second in 3D printing (28%) when compared among a group consisting of North America, Asia-Pacific and the rest of the world. However, artificial intelligence in the EU (15%) falls well behind North America (77.5%), while in advanced robotics, the EU (20%) falls well behind Asia-Pacific (63%).

Regarding the EU's competitive positioning on readiness for future production, the majority of Member States (Germany, Sweden, Austria, the Czech Republic, Ireland, Finland, France, Belgium, Italy, Poland, Slovenia, Spain, Estonia, Denmark and the Netherlands) fall into the 'Leading Countries' category worldwide, together with the US, Japan, South Korea, China, Singapore and Canada. However, Portugal, Lithuania, Slovakia, Romania, Hungary, Latvia, Bulgaria, Croatia, Greece and Cyprus are further behind in readiness for future production when using the World Economic Forum's (WEF) measure of drivers of production against structure of production.

To strengthen the analysis on key enabling technologies in Europe, two main EU initiatives have been examined – the Industrial Modernisation platform and the Vanguard Initiative – in order to see the key strengths, interests and thus performance of particular regions across different technological domains. Both attracted a lot of interest from the regions in the deploying new technologies collaboratively across thematic topics. The highest level of participation has been seen under the bio-economy and high-performance production through 3D printing, while the highest interest was noted under SME integration into Industry 4.0. New nano-enabled products and photonics currently have a

² <http://www.s3vanguardinitiative.eu/>

³ <https://www.clustercollaboration.eu/eu-initiatives/european-cluster-observatory>

⁴ https://www.i-scoop.eu/digital-transformation/#Digital_business_transformation_8211_a_holistic_approach

⁵ <https://ec.europa.eu/digital-single-market/en/policies/digitising-european-industry>

relatively low level of participation. These findings were complemented by analyses of the incorporation of key enabling technologies into RIS3 priorities at national and regional levels. Since 2013, advanced manufacturing technologies, advanced materials and life sciences have been among the leading key enabling technology application areas, while other key enabling technologies – such as micro and nano-electronics, photonics, nanotech and cybersecurity – have a lower focus compared to the first group of technologies, followed by AI to a lesser extent.

Several Member States (Spain, Sweden, Italy, Belgium, Germany, Finland, France, the Netherlands and Portugal) are most active across both initiatives, while nine Member States did not participate in either platform.

Regarding the generation of patents on key enabling technologies, we found that these are developed across most EU regions, while distribution is heterogeneous across the EU. The main focuses of the patents are advanced manufacturing systems, advanced materials, and micro and nano-electronics, while nanotech has the smallest share, as mentioned in the 2015 report published by the High-Level Group on Key Enabling Technologies.

At city level, London, Munich and Paris are listed among the top five tech hotspots worldwide, together with Tel Aviv and Singapore. They are also ranked in the top 10 cities⁶ based on the framework conditions they provide for digital transformation in support of start-ups and scale-ups, together with Stockholm, Helsinki, Amsterdam, Dublin, Vienna and Copenhagen.

In conclusion, major efforts have been made to implement specialisation and digitisation strategies at city, regional, national and EU levels. Industry-led initiatives appear to have been quite intensive and successful. What is needed is to design and implement a skills strategy collectively by actively involving all relevant stakeholders at territorial level for achieving successful strategies. In this process, the influencers are essential in maintaining momentum as they provide vision, communication and trust for developing consensus for economic development through their roles as intermediaries. The influencers may be established universities, entrepreneurs and/or policymakers. The skills strategy should be in line with industrial, R&D and innovation, economic development and education strategies at each level, and should seek to establish defined partnerships between existing efforts put in place by public and private parties. The cluster organisations are seen as a key policy instrument to leverage across this whole process of SIS&DT.

⁶ EDCI aims to support digital entrepreneurship and digital startups across Europe, by describing what environment matters to startups: <https://digitalcityindex.eu/>

State of play for high-tech skills

Our work contributes to successfully shaping workforce transformation in the EU by developing a common vision of high-tech skills and future professionals and designing actions to foster them. The skills requested by industry are not merely technical. Over the last decade, the notion of “T-shaped” skills has emerged, referring to an individual worker having a combination of both general skills across multiple domains and specialist skills within one domain. Future professionals are likely to be creative, innovative and entrepreneurial, and capable of building relationships, advancing research and strengthening their organisations. The breadth of the future professional reflects the individual’s willingness and ability to collaborate across industries, sectors and disciplines. The depth of the future professional refers to the depth of the industry-related and sectoral skills and knowledge that the individual possesses.

Behind current and future gaps lies a changing demand for various skills. CEDEFOP, the OECD and the World Economic Forum forecast that elementary work, manual and low-skilled jobs, and jobs consisting of routine tasks will decline, while non-manual and highly skilled jobs will increase. At the same time, reports show that demand for jobs that include programming is growing 50% faster than the job market overall, and workers with skills that fit hybrid jobs are particularly sought after.

As such, this report considers high-tech T-shaped skills an imperative for the EU’s competitiveness now and in the future. Our conceptualisation of high-tech T-shaped skills primarily focuses on programmes, projects and curricula that combine high-tech skills with specific complementary skills. These complementary skills are:

- Technical skills in an adjacent technology domain or system of thought;
- Skills related to quality, risk and safety;
- Management, leadership and entrepreneurial skills;
- Communication skills;
- Innovation skills;
- Emotional intelligence skills; and
- The ability to consider ethical implications.

1 <i>Technical</i> 	2 <i>Quality, risk & safety</i> 	3 <i>Management & entrepreneurship</i> 	4 <i>Communication</i> 	5 <i>Innovation</i> 	6 <i>Emotional intelligence</i> 	7 <i>Ethics</i> 
competences related to practical subjects based on scientific principles (e.g. characterisation, systems integration, mathematical modelling and simulation, top-down fabrication etc.)	competences related to quality, risk & safety aspects (e.g. quality management, computer-aided quality assurance, emergency management and response, industrial hygiene, risk assessment etc.)	competences related to management, administration, IP and finance (e.g. strategic analysis, marketing, project management, IP management, deal negotiation skills etc.)	competences related to interpersonal communication (e.g. verbal communication, written communication, presentation skills, public communication, virtual collaboration etc.)	competences related to design and creation of new things (e.g. integration skills, complex problem solving, creativity, systems thinking)	ability to operate with own and other people's emotions, and to use emotional information to guide thinking and behaviour (e.g. leadership, cooperation, multi-cultural orientation, stress-tolerance, self-control etc.).	ability to consider the ethical impact of job tasks and new technologies and applications on society.

The category of technical skills relevant to smart industrial specialisation and digital transformation covers the following technology domains, in line with recent publications on key enabling technologies and digital skills:

- Skills relevant to researching and developing production technologies (e.g. advanced manufacturing technologies, advanced materials and nanotechnologies, life-science technologies);
- Skills relevant to researching and developing digital technologies (e.g. micro-nano-electronics, photonics and artificial intelligence);
- Skills relevant to researching and developing cyber-technologies (e.g. digital security and connectivity);
- Basic digital technology skills (e.g. digital user skills, DigComp Framework⁷); and
- Advanced digital technology skills (e.g. skills relevant to IT professionals' occupations, European e-Competence Framework⁸).

Our stakeholder survey indicated that skills shortages are expected in all these domains, and that to address them, new educational curricula and teaching methods will be needed across all educational levels – from university programmes down to primary education.

Our analysis of the state of play of current-day policies, initiatives and strategies relevant to high-tech T-shaped skills has led to the following preliminary findings:

- The dominant focus is currently on co-developing educational initiatives and materials;

⁷ <https://ec.europa.eu/jrc/en/digcomp>

⁸ <http://www.ecompetences.eu/>

- Initiatives that introduce high-tech topics to children starting from an early age, and those that adapt university programmes to the highly-skilled human-capital needs of industry, are also common;
- These initiatives typically focus on technical aspects of the high-tech T-shaped concept, while combinations of technical skills and managerial and entrepreneurial skills are common, as are combinations of quality, risk and safety skills;
- Emotional intelligence as a skill type is not apparent in the policies and initiatives that have been analysed;
- The systems-thinking aspect of the high-tech T-shaped concept is also not apparent in the initiatives encountered so far.

Common features of initiatives relevant to high-tech and crosscutting skills include:

- Involving and mobilising industrial partners and local government;
- Targeted delivery methods of specific skills-development initiatives; and
- Sectoral coordination of policies and initiatives across Europe.

The findings regarding the identification of the key attributes are bundled into six main headings. The key attributes of the analysed initiatives are:

- Private and public funding of initiatives;
- Non-financial contributions by private and academic partners (e.g. knowledge and materials);
- Industry-led approaches;
- User-friendliness of online platforms;
- Visibility of the initiative within and outside its ecosystem; and
- Evaluation of the initiative by internal players, external players or users.

Regarding scalability and transferability, two key aspects appear to stand out:

- E-platforms show a high potential for scalability and transferability; and
- Classroom programmes show a lower level of scalability, but good potential for transferability if contextual conditions are taken into account.

Leading education providers

Top universities play a crucial role in training tomorrow's technology leaders. In order to understand which academic institutions dominate academic fields relevant to KETs and digital transformation, we have attempted to connect KET-related and digital areas to the classification of technology domains used by the Times Higher Education⁹, QS World University Ranking¹⁰, and Academic Ranking of World Universities¹¹rankings. Subsequently, we have analysed the rankings for these technology domains.

Our analysis shows that some elite universities score well in all KET-related areas. These include Oxford, Cambridge, Stanford, Harvard and MIT. Two Swiss universities consistently make the top 20 in engineering, natural sciences and computer science. Though Europe is very well represented in the top 500 of universities worldwide, Europe relies largely on UK universities to enter the top 20.

The relevance of dual-track education

In this report, we describe dual-track education and its relevance to the transversal nature of high-tech T-shaped skills. Dual-track education organises formal education in a way that combines in-school classroom-based education with workplace experience and on-the-job learning. Dual-track education leans on three concepts that are important for its functioning as a national or regional education system: integration, standardisation and recognition.

Continuous education and retraining the labour force

We also highlight the importance of continuous education for working adults in an economy undergoing digital transformation, and we pay attention to the empirical impact that continuous education can be said to have. We emphasise that continuous education is important for working adults. The World Economic Forum forecasts estimate a significant shift on the frontier between humans and machines when it comes to existing work tasks. The numbers show that there is a large-scale decline in some roles as tasks within these roles become automated, and large-scale growth in new products and services and associated new tasks and jobs.

Digital transformation changes professions, occupations and job tasks throughout sectors and markets. Consequently, betting on upcoming graduates and prospective workers to fulfil labour demand in the coming years may not be enough. Considering the sheer numbers involved, retraining current workers may prove vital to preparing enough people for working both in new jobs and in new sectors. Subsequently, future-oriented education and training efforts will need to include current workers in the European labour force.

⁹ <https://www.timeshighereducation.com/world-university-rankings>

¹⁰ <https://www.topuniversities.com/university-rankings>

¹¹ <http://www.shanghairanking.com/>

In broad strokes, something can be said of the cost of reskilling and upskilling workers, which appears popular, especially among high-skilled workers. Assuming that the speed at which technology domains change and develop would require a retraining programme every 3-5 years, the annual expenditure for regularly retraining a department of 100 workers would be EUR 240-400K.

Towards a common vision for 2030

This section outlines the core aspects of a longer-term common vision to develop high-tech skills for achieving smart industrial specialisation and digital transformation. This, of course, includes reskilling and upskilling the workforce.

Our proposal for the vision is about mobilising all resources at local, regional, national and EU levels collectively to make it an opportunity for everyone. It aims to raise widespread momentum by inspiring all key players to take part in collectively designing and implementing powerful skills strategies to turn the potential challenges brought by digital transformation and industrial modernisation into opportunities. It aims to foster the development of skills for excellence, prosperity and personal development.

The vision will be accompanied by a toolbox to guide different stakeholder groups on developing and implementing their own skills strategies aligned with their own industrial, R&D and innovation, education and training, and RIS3 strategies with proven methodology and tools. At its core, it will be forward-looking, dynamic, interactive, multi-stakeholder-driven and agile, and will leverage real-time AI-based labour-market assessment and foresight tools for evidence-based decision-making.

The core objectives are to reinforce the competitiveness of EU industry and to ensure its global leadership position among the rising competitors in the Fourth Industrial Revolution. This vision aims to support and help European industry to embrace new technological breakthroughs to upscale its initiatives, and thus leverage the opportunities that these technologies bring. The key to capitalising on these new technical opportunities is a workforce that is capable and motivated to work intensively with them. Thus, corporates, governments and territories need to implement skills strategies according to their contextual needs and circumstances, which will empower and ensure skills development for excellence, prosperity and personal development by pursuing the following objectives:

- Collaborative training programmes – Creating and supporting joint training programmes between universities and research institutions, vocational education and training (VET) and industry;
- World-class curriculum – Ensuring world-class, hands-on curricula to teach the skills required for upcoming technological advances;
- Smart education methodologies and technology-based tools – increasing the effectiveness and efficiency of conventional training programmes with rising smart education methodologies; and

- Dual-track system – fostering a dual-track training system in most industries, inspired by good practices that are established in Germany and elsewhere.

This vision will be successfully realised through the guiding recommendations and tools to be designed specific to different stakeholder groups under the toolbox to be developed over the next phase of this project. Below, we briefly introduce each of the toolbox’s nine modules as ‘food for thought’ regarding their particular objectives aiming to tackle key issues, with the involvement of key stakeholder groups based on the good practices identified.

Particular solutions under each module, including funding, will be developed over the course of the study, with particular attention paid to SMEs as being the main beneficiaries. Additionally, clusters will be seen as a main policy instrument to leverage so that particular roles and responsibilities are assigned to cluster organisations.

1. Skills strategy
2. Leadership and governance
3. Funding (EU/national/regional and private funding)
4. Accelerated world-class curriculum
5. Industry-leading training infrastructures
6. Quality-led EU-wide VET
7. Incentives
8. Communication
9. Talent detection and nurturing system