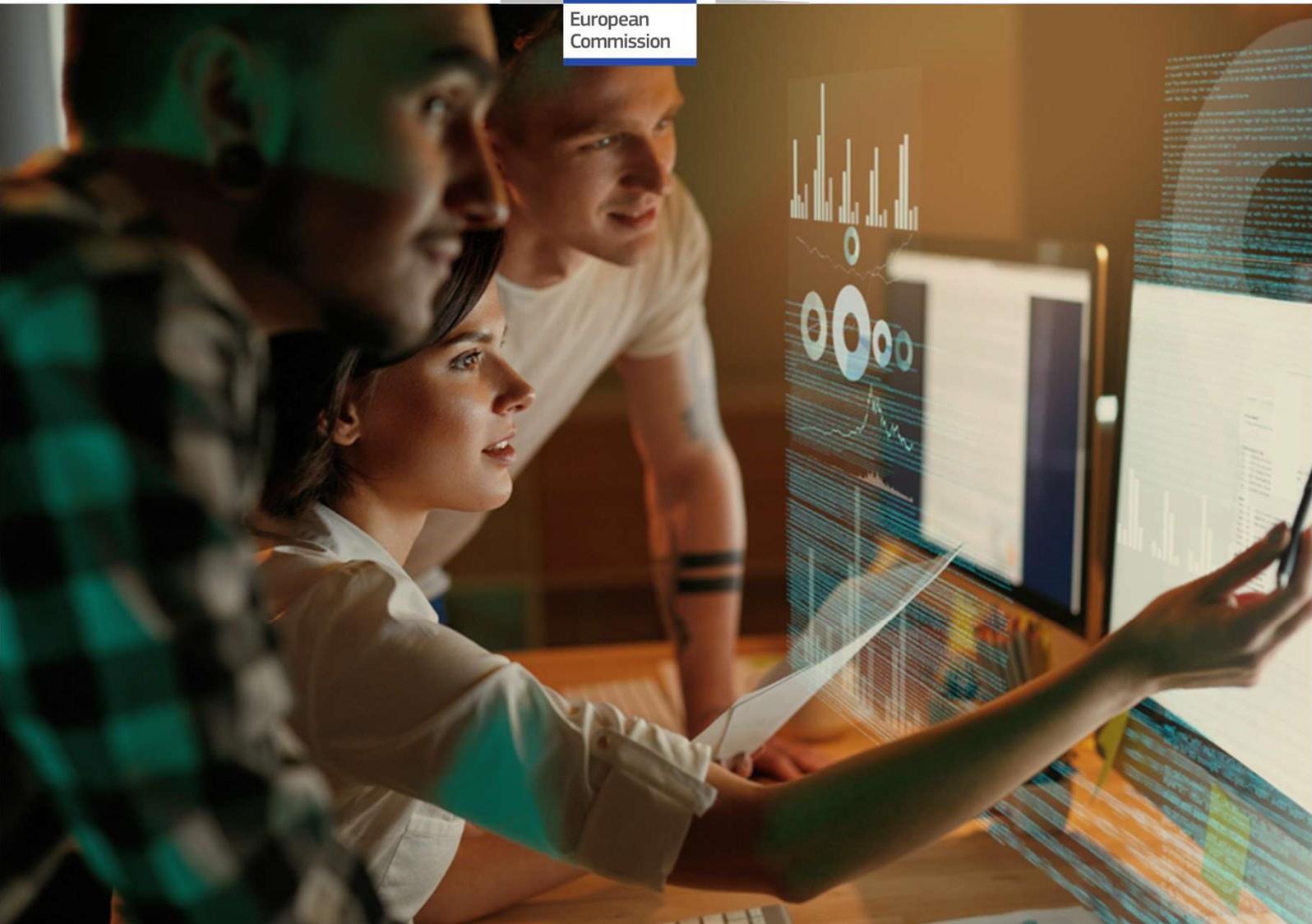




European
Commission



Skills for Industry

Skills for Smart Industrial Specialisation and Digital Transformation

October 2019

LEGAL NOTICE

This document has been prepared for the European Commission. However, it reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained herein.

More information on the European Union is available on the Internet (<http://www.europa.eu>).

Luxembourg: Publications Office of the European Union, 2019

© European Union, 2019

ISBN: 978-92-9202-579-3

doi: 10.2826/69861

Linguistic version: EN PDF

Media/volume: PDF/Volume_01

Catalogue number: EA-04-19-517-EN-N

4

78%
engine (ICE) the expansion of the high-temperature and high-pressure gases produced by combustion apply direct force to some component of the engine. The force is applied typically to pistons, turbine blades, or a nozzle

+15%

EUROPEAN COMMISSION

Executive Agency for Small and Medium-sized Enterprises (EASME)
Department A – COSME, H2020 SMEs and EMFF
Unit A1 – COSME

Contacts:

André Richier, Principal Policy Officer

DG for Internal Market, Industry, Entrepreneurship and SMEs
Unit for Advanced Technologies, Clusters and Social Economy
Tel: +32 2 29 69 110
Email: andre.richier@ec.europa.eu

Paola García Isaak, Project Adviser

Executive Agency for Small and Medium-sized Enterprises (EASME)
COSME Unit A1.5 Competitiveness
Tel: +32 2 29 81816
Email: paola.garcia-isaak@ec.europa.eu

This brochure was prepared by PwC EU Services, as part of the Skills for Smart Industrial Specialisation and Digital Transformation project for the Executive Agency for Small and Medium Enterprises (EASME) and the Directorate General for Industry, Growth & Internal Market (DG GROW) of the European Commission.

Editors: Laurent Probst, Bertrand Pedersen, Jill Wenger & Radu Cracan, PwC.

Table of contents

Foreword	5
State-of-play analysis on smart industrial specialisation and digital transformation	6
State-of-play analysis on high-tech T-shaped skills in Europe	8
Comparison of the high-tech skills situation between US and EU	10
Vision for a Skills for Industry Strategy 2030	12
Best practices in Europe	14
Skills for Industry Strategy 2030 modules	
- Leadership and Governance	16
- Territorial skills strategies	18
- Dedicated funding for re- and upskilling	20
- Incentives for individuals and businesses	22
- High-quality vocational education and training	24
- Accelerated world class curriculum	26
- Industry-led training infrastructures	28
- Talent detection and nurturing	30
- Communication at all levels	32

Foreword

A skills revolution is needed.

The political guidelines of President-elect Ursula von der Leyen open the way: “The best investment in our future is the investment in our people. Skills and education drive Europe’s competitiveness and innovation. But Europe is not yet fully ready. I will ensure that we use all the tools and funds at our disposal to redress this balance”.

In today’s world of rapid technological disruption, automation, climate change, globalisation, new trade patterns and demographic shifts we need to make sure people have the right skills.

Over 70% of European enterprises report that lack of skills hampers their investment. Half of the workforce may require upskilling in the next five years. And this is a particular challenge for small and medium enterprises (SMEs).

Supporting upskilling and reskilling for all is essential for Europe to make a success of our digital and green transitions and ensure no one is left behind. Action is needed across all types and levels of skills. Skills gaps, shortages and mismatches act as a brake on innovation and adoption of advanced technologies. Digital skills in particular are a pressing challenge. Moreover, a broader set of soft skills, such as problem solving, communication, creativity, readiness to learn and critical thinking, is increasingly demanded by employers.

A paradigm shift is needed. We need to re-think our educational models so that learning throughout life becomes the norm. While the main competence for skills lies at Member State level - and this is where action needs to be taken first and foremost - the EU also has a responsibility. Skills are at the heart of the European Pillar of Social Rights, the EU Single Market, the Industrial Policy and the SME Strategy. This report is a contribution to building a shared vision and strategy on skills for industry.



Slawomir Tokarski
Director
European Commission
DG Internal Market, Industry,
Entrepreneurship and SMEs



Manuela Geleng
Director
European Commission
DG Employment, Social
Affairs and Inclusion

Europe needs to increase advanced technologies uptake across sectors and geographies

Smart industrial specialisation and digital transformation in Europe

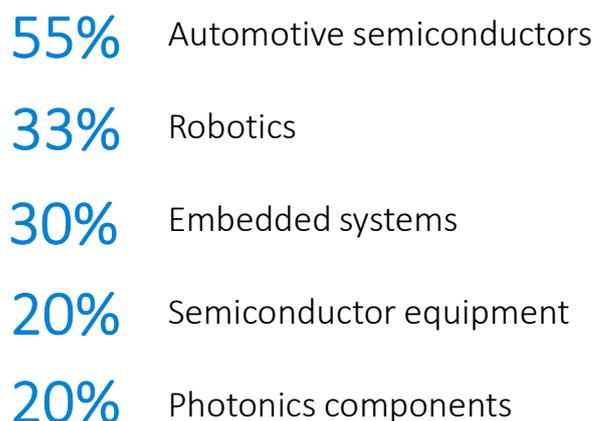
The European economy is going through major changes and stakeholders at all levels are aware of these transformations. Industry 4.0, new advanced technologies, digital transformation, and artificial intelligence, all influence industry as a whole, as well as individual enterprises.

In line with these trends, several challenges have been identified:

- Emerging technologies spread slowly (“valley of death”), especially across SMEs;
- Increased global competition results in growing pressure on European enterprises;
- Global value chains and digital transformation are impacting the workforce.

Global positioning of EU

The European Union holds remarkable competitive positions in several industrial sectors. Yet, when assessing the geographic adoption of new advanced technologies, the EU lags behind North America in additive 3D printing and artificial intelligence, and is positioned behind Asia-Pacific in robotics. The EU’s global market share on key sectors is the following :



Source: European Commission. 2018. Re-finding industry, Report from the High-Level Strategy Group on Industrial Technologies.

Elżbieta Bieńkowska, European Commission, delivered an Opening Message to the participants at the Skills for Industry Strategy 2030 Conference



“We need an ambitious strategy on skills. A strategy that ensures, at the same time, that individuals have access to jobs and career opportunities and that businesses have access to the talents they need.”

– Elżbieta Bieńkowska, European Commissioner for Internal Market, Industry, Entrepreneurship and SMEs

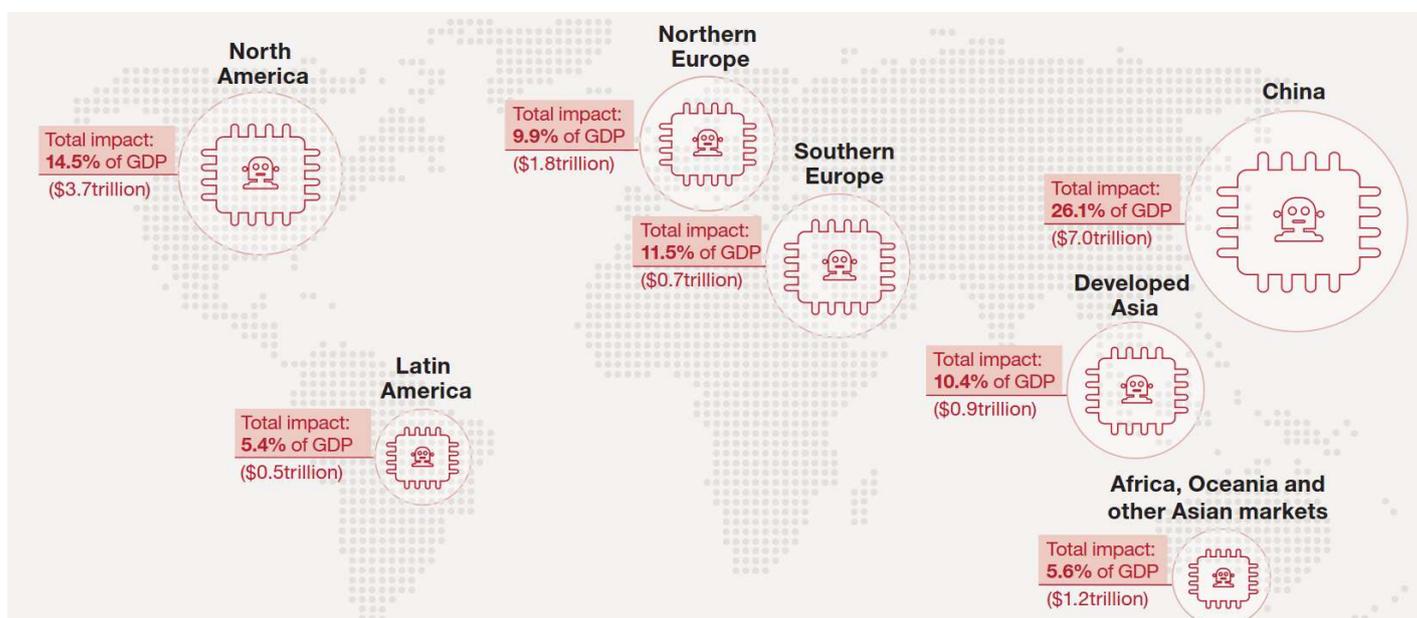
Focus areas of Member States and regions

Overall, performance in production technologies is high across the EU, while performance in digital and cyber technologies is relatively low. In general, the key focus areas based on the highest participation by the regions are the bio-economy and high performance production through 3D printing followed by efficient and sustainable manufacturing according to recent findings on the S3-Industrial Modernisation Platform and the Vanguard Initiative platform. The recent launch of numerous additional initiatives under the Platform is the true indication of the growing ambition led by EU regions to drive smart industrial specialisation further.

When analysing the incorporation of advanced technologies into research and innovation strategies for smart specialisation (RIS3) priorities at national and regional levels since 2013 to date, advanced manufacturing technologies, advanced materials and industrial biotech were among the leading application areas, while other new technologies, such as micro and nano-electronics, photonics, nanotech, cybersecurity had lower focus compared to the first group of technologies, followed by artificial intelligence (AI) to a lesser extent.

Moreover, the generation of patents on advanced technologies is developed across most regions, yet distribution across the EU remains heterogeneous. Most patents are introduced on advanced manufacturing systems, advanced materials, and micro- and nano-electronics, while nanotech has the smallest share.

Regions to heterogeneously benefit from AI



Source: PwC's Global Artificial Intelligence Study: Sizing the prize

Diverse performance across EU

Initiatives as well as the generation of patents are heterogeneously distributed across the EU, creating an innovation gap in Europe. According to the 'readiness for future production' of the World Economic Forum (WEF), Europe seems to be well positioned. Germany, the Netherlands, the United Kingdom, Denmark, Finland, Sweden, France, Ireland, Austria, Belgium, Spain, Estonia, Italy, Poland, Slovenia and the Czech Republic are ranked under the leading countries category. However, Portugal, Lithuania, Slovakia, Romania, Hungary, Latvia, Bulgaria, Croatia, Greece and Cyprus are relatively low on readiness for future production where improvements on drivers of production, as well as structure of production, are needed.

At city level, London, Munich and Paris are listed among the top five tech hotspots globally. They are also included in the top 10 cities of the EDCi index 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, Copenhagen.

There is a vast amount of initiatives spread all over the EU either lead by public, private or in the form of partnerships. The problem is not the lack of initiatives, but mainly the lack of coordination and coherence between all existing strategies and initiatives – vertically and horizontally. In order to tackle this, more orchestrated efforts for the co-development and co-implementation of industrial policies at all levels are needed.

The growing focus on advanced technologies increases demand for T-shaped high-tech skills

Labour market shifts

In line with current changes in the economy, and to some extent representing a cause, the labour market is experiencing similar transformations, moving towards more dynamic adjustments. The OECD considers that technological innovation, globalisation and an ageing population drive the polarisation of the labour market in Europe.

This polarisation, in the context of automation and changing jobs, is, on one hand, increasing demand for advanced skills and creating skills shortages, especially in ICT-related jobs.

On the other hand, low and especially middle-skilled jobs, which are susceptible to automation, are being crowded out, creating skills obsolescence. At the same time, jobs are being redefined at a faster rate given the increased pace of innovation.

Changing demand for skills

In line with these changes, industry increasingly seeks more advanced, or new, skills. For instance, 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.

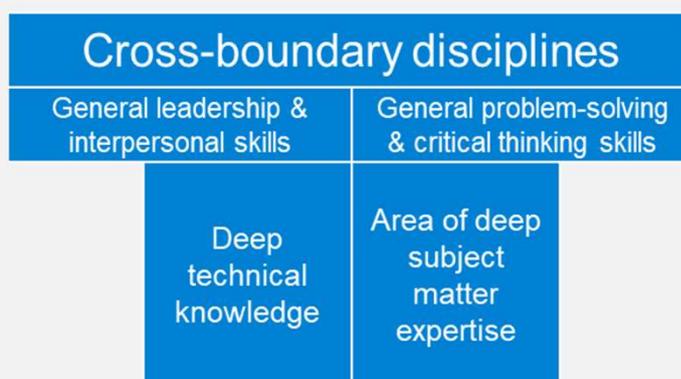
As such, industry will demand more comprehensive skills profiles, which will include science, technology, engineering, and mathematics subjects; literacy, numeracy and digital, data literacy; and a mix of cognitive and socio-emotional skills. Numerous studies find that with increasing non-routine jobs, transversal skills will become imperative.

T-shaped skills model

The skills requested by industry are not merely technical. The notion of high-tech T-shaped skills and the future professional can be recognised in current skills initiatives, policies and strategies in Europe.

However, they are not labelled, positioned or articulated as such, and their relation to the concept often needs to be inferred from the outside. Policymakers at the European level could consider promoting the concept more actively.

Source: PwC Analysis



Key findings of the state-of-play analysis

To address these challenges, there has been an emerging movement towards training high-tech skills. The existing initiatives display the following common features:

- The most dominant focus is currently on co-development of educational initiatives and materials between private and public sector;
- Initiatives that introduce high-tech topics to children starting from an early age, and initiatives that adapt University programmes to the highly-skilled human capital needs of industry, are common as well;
- These initiatives typically focus on technical aspects of the high-tech T-shaped concept, and combinations between technical skills and managerial and entrepreneurial skills are common, as are combinations with quality, risk and safety skills;
- Emotional intelligence and transversal skills are 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.

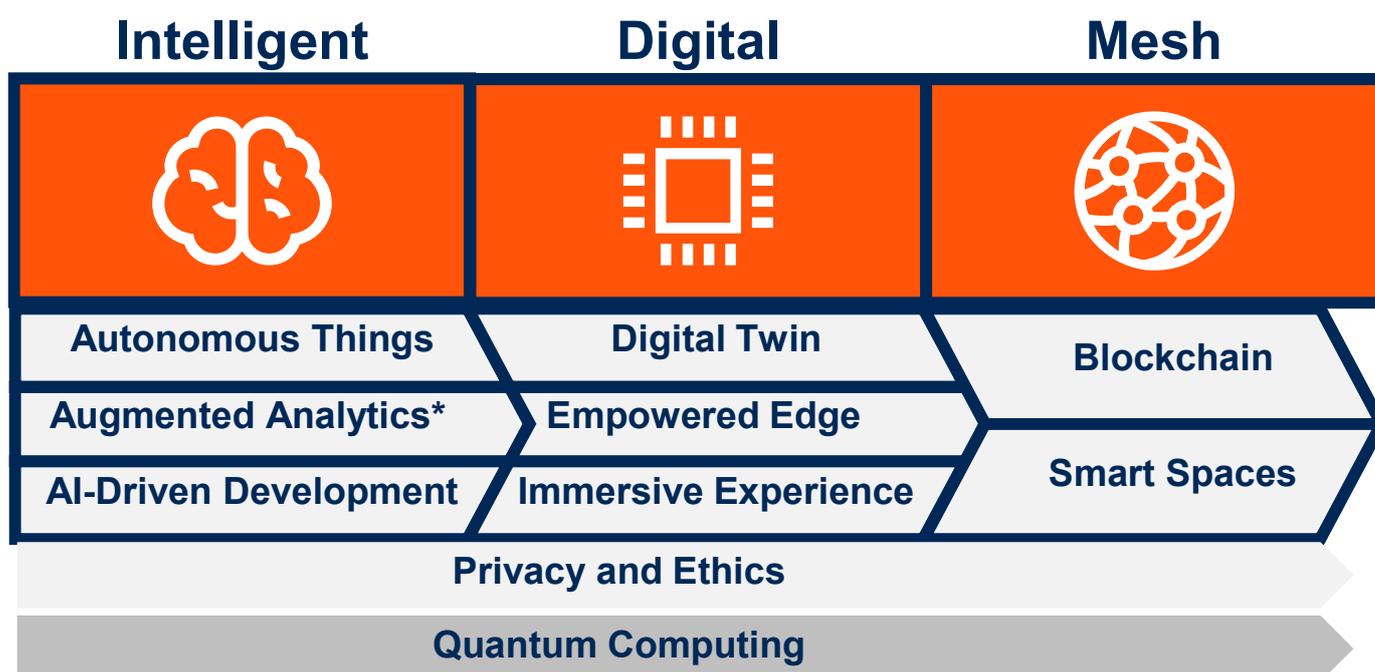
The identified initiatives have some common features in design and implementation, namely:

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

In addition, the analysis indicates that successful initiatives combine private and public funding, where private and academic partners also contribute non-financially (e.g. knowledge and materials), and in general these are industry-led approaches. Some initiatives also include user-friendliness of online platforms, are visible within and outside their ecosystem, and are evaluated by internal actors, external actors or users.

The analysis also shows the importance of dual-track education from a lifelong learning perspective, which is seen as the key instrument in bridging the skills gap.

Top Strategic Technology Trends presented by Gregor Petri, Research Vice-President, Gartner, at the Skills for Industry Strategy 2030 Conference



Source: Gartner

The way ahead – upskilling and reskilling

Building on the existing initiatives, the way ahead for Europe is to ensure that the right policies are in place to enable the workers to upskill and develop relevant competences to thrive in a digitalised workplace.

Estimates indicate that upskilling, especially within enterprises, is a rational investment and public and private stakeholders must concentrate on scaling-up initiatives focused on upskilling the current workforce.

“Should upskilling become the mainstream solution, when €1 invested can bring about €2 in savings for corporates and governments?”

– Laurent Probst, Partner, PwC

Laurent Probst, PwC, at the Skills for Industry Strategy 2030 Conference



Upskilling initiative in a multinational professional services company

PwC is launching a new program, entitled “New World, New Skills,” that will focus on the growing mismatch between people’s existing skills and the new skills demanded by the digital economy. The firm will invest \$3 billion over the next four years in upskilling — primarily in training PwC staff, but also in developing and sharing technologies to support clients and communities.

The four focus areas of the program are:

- Upskilling all of PwC’s 276,000 people. The firm will roll out different programs that meet their particular needs, from skills academies to digital fitness apps and leadership development. A proportion of PwC’s workforce will develop specialist skills in areas including data analytics, robotics process automation and artificial intelligence for use in their work. For others, it’s about understanding the potential of new technologies so they can advise clients, communities and other stakeholders.



3bn

Investment in upskilling over the next four years



276k

employees will benefit from the program worldwide

- advising clients on the challenges posed by rapid technological change and automation. This includes identifying skills gaps and mismatches against likely future needs, workforce planning, upskilling programs and cultural change.
- PwC will work with governments and institutions to reach a much broader group of people.
- PwC will make upskilling a focus of its non-profit initiatives as well. This includes working with students and teachers, which will help ensure opportunities are more evenly spread and the firm reach people who may otherwise be left behind.

“The traditional system is changing, as people will need to continuously upskill to move from one job to another or even to remain in jobs that will be profoundly transformed.”

– Montserrat Gomendio, Head of the Centre for Skills, OECD

Montserrat Gomendio, OECD, at the Skills for Industry Strategy 2030 Conference



90% of jobs now require IT skills

Source: European Commission, AI The future of work? The work of the future



53% of EU enterprises that tried to recruit IT specialists had hard-to-fill vacancies in 2017

Source: Eurostat

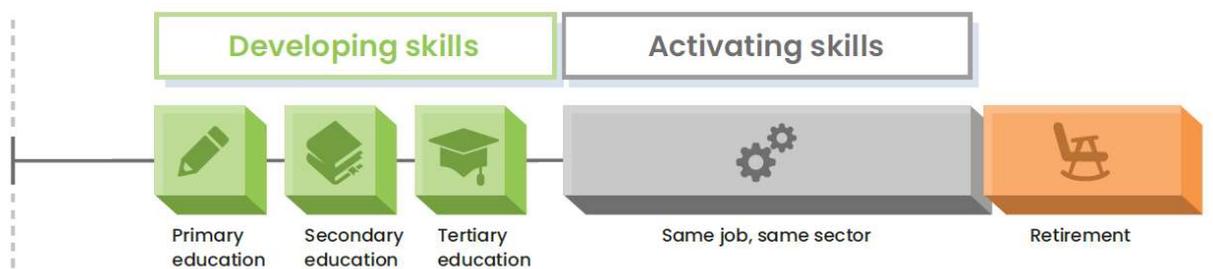


79% of EU manufacturing firms report lacking workers with the right skills

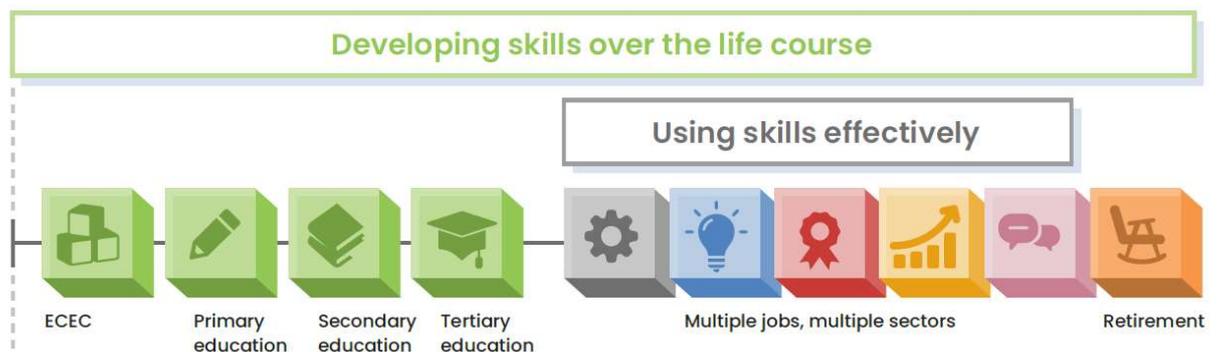
Source: EIB, Investment Survey 2018/2019

A new way to re-engineer skills systems presented by the OECD at the Skills for Industry Strategy 2030 Conference

From this:



To this:



Source: OECD

As developed economies, the US and EU face similar skills challenges

The US and EU face similar skills challenges

High-tech T-shaped skills challenges and their policy response in the United States largely resemble those in the European Union. High-tech areas that receive significant policy attention are similar across the US and the EU – technology domains that relate to 21st century IT, advanced manufacturing, systems biology and life sciences, and innovative materials.

The challenges in the US resemble those targeted by EU policymakers:

- Having high-tech careers seen as attractive and prestigious;
- Generating high-tech awareness a decade before students enter the workforce;
- Introducing technical education early in a young student's curriculum and introducing high-tech topics to children at an early age;
- Encouraging co-development of educational initiatives and materials across stakeholders;
- Adapting University programmes to the human capital needs of industry; preparing a future generation of researchers, engineers, designers and business leaders to the latest technologies;
- Promoting training activities aimed at improving transversal high-tech skills.

Second, both the US and EU discourses on skills gaps emphasise the importance of multidisciplinary research and education. Also, there appears to be overlap in the demand for non-technical skills, and the ambition to instil non-technical skills in high-tech workers and students in the US and in the EU.

Another similarity can be seen in policy thinking on this matter, both in the problem analysis and in the operational response. The high-tech labour markets in the US and the EU are highly credentialed. At the same time, credentials for transversal and non-technical skills typically do not exist. In response, relatively small-scale and scattered initiatives have sprung up to develop and implement skill and competence certificates for non-technical skills and for technical skills generated outside of formal education. The reach, coverage and recognition of these certificates can differ widely.

In the US and in the EU, public sector organisations struggle to hire and retain high-tech talent. At the same time, across the globe, governments and public sector organisations will have increasing demand for experts and other high skilled high-tech workers. To complement initiatives from government and from educators, private sector initiatives have been implemented. In the US, these private sector initiatives appear to be more prevalent than in the EU.

Solveigh Hieronimus, McKinsey, at the Skills for Industry Strategy 2030 Conference



37%

Growth in STEM occupations by 2030 in the US

Source: McKinsey Global Institute. 2019. The future of work in America

Tackling grand societal challenges

Both at federal and state levels, US public policy relevant to skills challenges mostly targets workers below tertiary education.

Policy instruments such as Career Pathways and Cluster Skills Development are coordinated at the vocational, post-secondary level by community colleges that work together with social service providers, economic development agencies, employers and labour unions, but not necessarily with Universities, high-tech enterprises or start-up communities. It is also predominantly the focus of the initiatives of large IT companies.

A clear difference appears to exist between the US and the EU regarding the political support for policymaking for grand societal challenges.

Where the EU develops and implements multi-annual research and innovation as well as regional development programmes around specific societal challenges, the US Government seems to significantly adapt the direction of policymaking depending on short-term changes in the composition of its political bodies.

Christoph Peylo, Bosch, at the Skills for Industry Strategy 2030 Conference

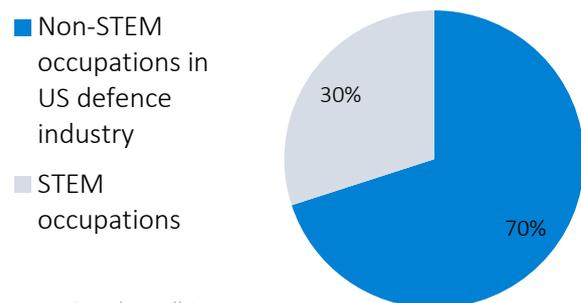


The role of the US defence industry

A major point of difference in the high-tech T-shaped skills domain between the US and the EU can be found in the US defence ecosystem.

The US military for decades has invested heavily in the design, development and manufacture of weapons capabilities, and has had a stake in a steady supply of a highly skilled US workforce. At the same time, investments in defence-related research in the EU have not been as significant, and have been decided on at the Member State level.

Nevertheless, EU defence-related enterprises are increasingly becoming more digitalised and require new skills sets to realise this digital transformation. As the figure below illustrates, Airbus expects a significant increase in recruiting talent with IT-related competences.



Source: Brandon Hall Group

“It is in the best interest of every individual to gain new skills. Europe needs to give them the right framework to do so.”

– Christoph Peylo, Global Head of Bosch Centre for Artificial Intelligence

Building a comprehensive Vision for a Skills for Industry Strategy 2030

A forward-looking vision for EU industry

Based on the previous analysis and stakeholder consultations, a vision has been elaborated to define the objectives and priorities of an ambitious Skills for Industry Strategy 2030 for Europe.

The core objective of this vision is to reinforce the global competitiveness of industry and strengthen social cohesion.

The key to capitalise on the new technological opportunities is a workforce that is capable and motivated to realise its full potential.

Key dimensions of the vision

The vision covers all three sets of skills:

- Sector-specific,
- High-tech and digital skills,
- Transversal skills, conceptualised as high-tech T-shaped skills.

The vision aims to foster the development of skills for excellence and personal development.

It also seeks to mobilise and combine resources at city, regional, national and EU levels to make skills an opportunity for everyone and bridge the large investment need in upskilling the workforce.

Key characteristics of the vision for Skills for Industry Strategy 2030



It further aspires to raise widespread momentum by inspiring all key players to take part in collectively designing and implementing powerful territorial skills strategies and thus turn the potential challenges brought by digital transformation and industrial modernisation into opportunities.

The vision wants to introduce a paradigm shift to the entire ecosystem of workforce planning, education and training provision for high-tech skills development, as well as to revolutionise the way education and trainings are provided.

One of its main goals is therefore to make the 'Lifelong Learning' concept a reality for all by empowering individuals and giving them a greater responsibility for their own skills development.

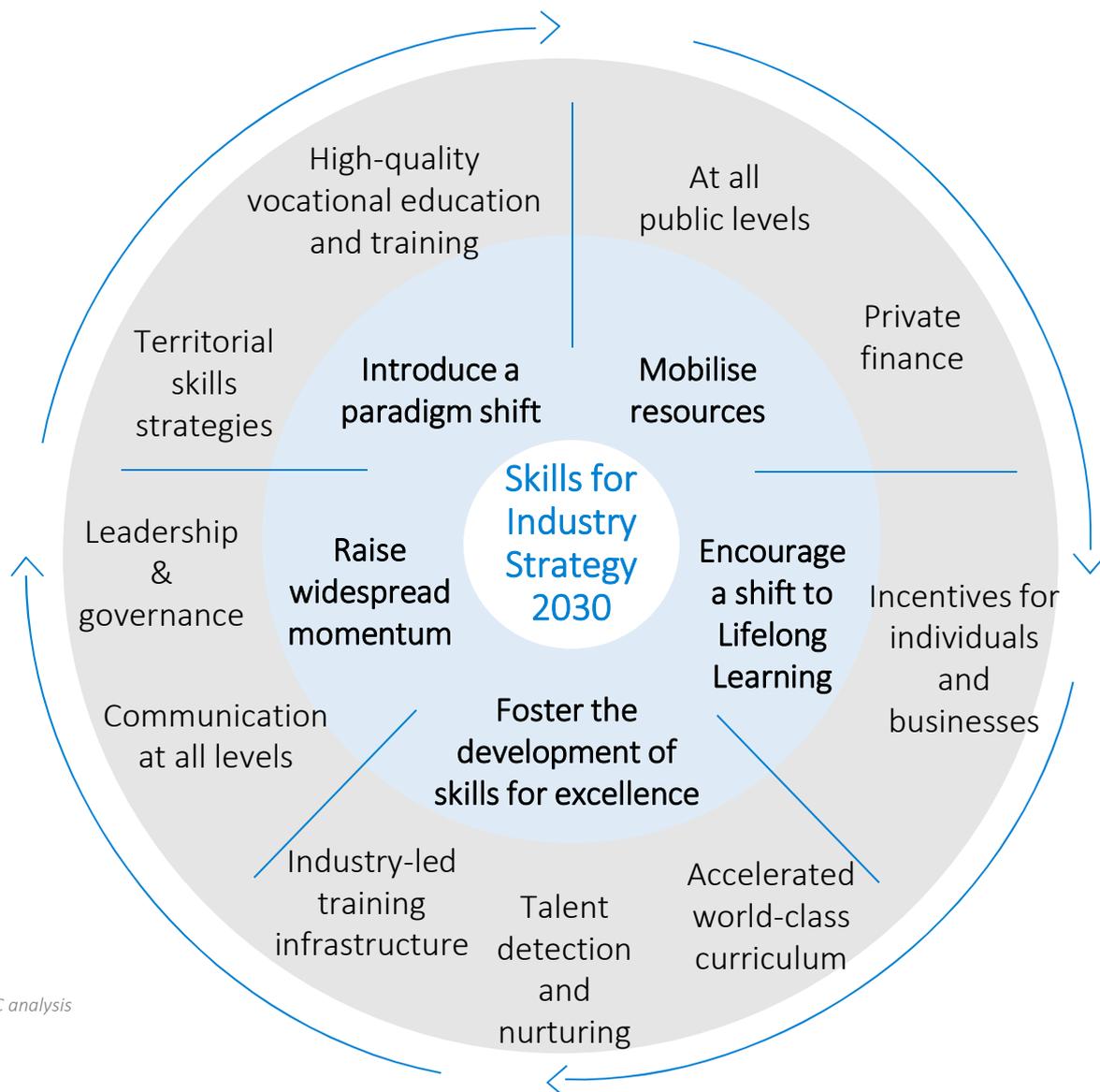
Operationalising the Vision

To facilitate the operationalisation of the vision, a proposal for a Skills for Industry Strategy 2030 has been developed. It includes nine modules, each including a set of key policy recommendations.

These nine modules have been developed to guide different stakeholder groups on developing and implementing their own skill strategies aligned with their industrial, research and innovation strategies for smart specialisation initiatives.

They offer food for thought and aim to encourage a wider debate on Europe's growing skills gap and how to meet the industry's need for workers with the necessary high-tech skills to drive innovation.

The Skills for Industry Strategy 2030



Source: PwC analysis

Current efforts can serve as a solid basis for the skills upgrade of the EU workforce

Scope of the analysis

Following the state-of-play analysis that identified the existing initiatives in the EU, a selection of best practices shortlisted 20 cases. These aim to:

- 1 Inspire the operationalisation of the Skills for Industry Strategy 2030;
- 2 Identify lessons learned for developing policy recommendations;
- 3 Highlight best practices that other stakeholders could implement or scale up.

100+

initiatives led by industry, governments, and hybrid organisations in smart industrial specialisation and digital transformation have been screened

Christian Hoffman, Siemens, at the Skills for Industry Strategy 2030 Conference



Methodology employed

Based on desk research, expert consultation, and the identification of success signals, the identified cases were then further assessed based on the following criteria:

- Replicability – defined as the ease with which the initiative can be emulated;
- Scalability – refers to the potential of upscaling the initiative or implementing it to a higher policy level;
- Transferability – the potential of implementing the policy in another context (region/industry);
- Vision alignment – the extent to which the case study aligns with the defined objectives and characteristics of the Skills for Industry Strategy;
- Policy recommendations alignment – the extent to which the case study can inform action at different policy-making levels and stakeholder groups.

“We need to develop a joint master plan that defines clear responsibilities and supports the launch of innovative upskilling pilots.”

– Christian Hoffman, Senior Director Government Affairs, Siemens AG

Overview of the best practices

20 best practices that serve as food for thought and inspiration for other actors interested in developing dedicated skills strategies were analysed. In line with the vision, special attention has been paid to selecting best practices that break with traditional siloed organisational structures and encourage transversal activities. The figure below maps the best practices and presents key information.

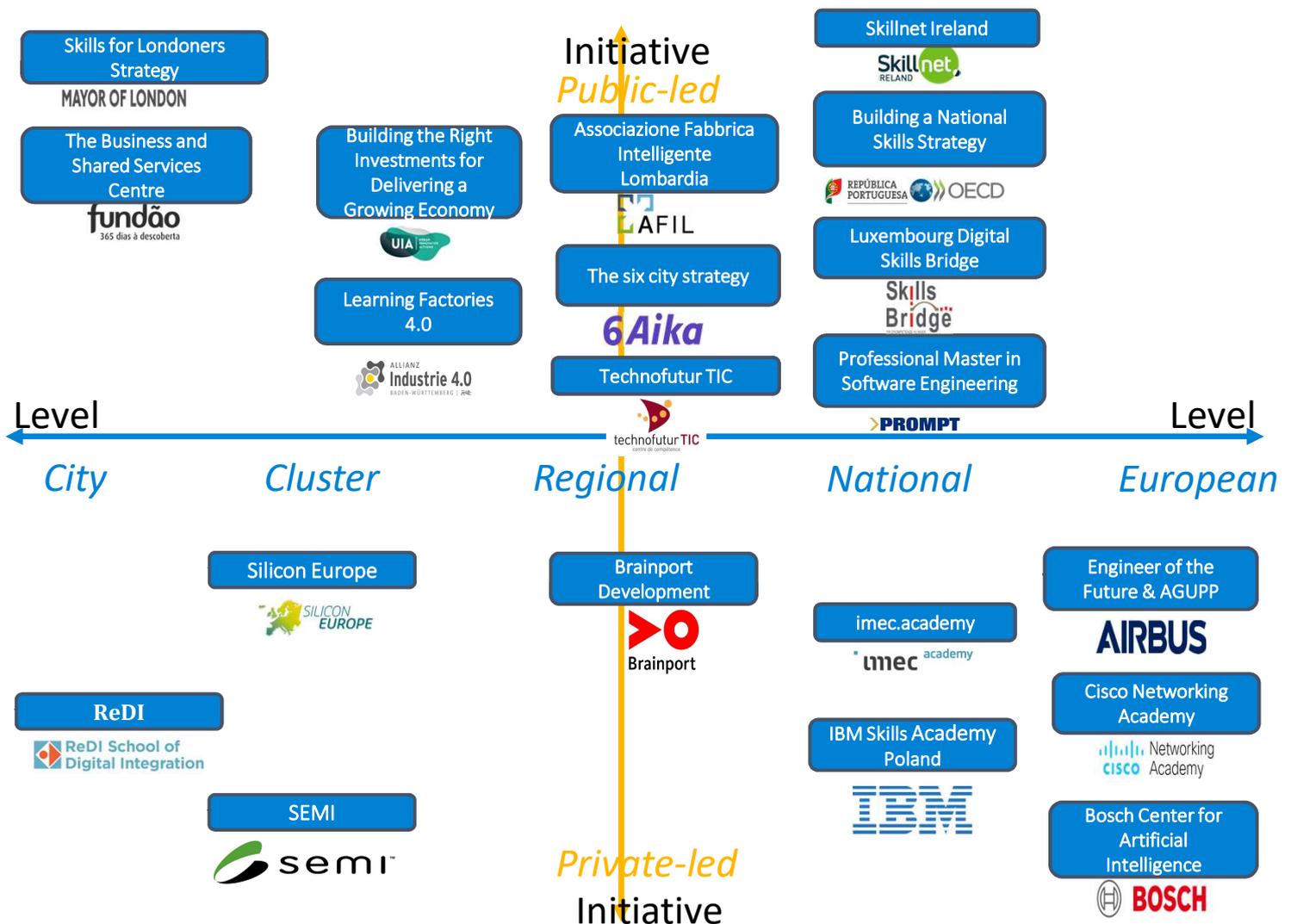
Two complementary categories of initiatives can be distinguished:

1. Best practices that address the supply of skills, i.e. trainings and upskilling of the workforce (e.g. Technofutur, IMEC Academy, PROMPT),
2. Initiatives that focus on skills needs to further innovation and enhance the competitiveness of key sectors, with particular focus on SMEs (e.g. Silicon Europe, Brainport Development, CNSP).

The selected best practices demonstrate that all stakeholders – public, private, academia, clusters and international organisations – need to be aware of the expanding skills challenges.

All parties need to undertake a concerted approach to addressing the problems at city, regional, national and EU levels. Stakeholders need to increasingly work together to define problems and develop common solutions, mostly in the form of public-private partnerships.

The coordination is necessary to make sure that all initiatives and policies are effective, complement each other and are not duplicates. On the other hand, comprehensive policies need to be implemented to support SME development.



Leaders at all levels must ensure effective governance of skill strategies

Skills Leadership

The multi-dimensionality of skills systems requires both dedicated leadership and strong governance across stakeholder groups and public policy levels.

The successful implementation of the vision for a Skills for Industry Strategy 2030 requires leadership and a clear governance structure. All actors involved at the city, regional, national and EU levels need to be assigned a set of roles and responsibilities to assure the efficient execution of comprehensive and coherent skills strategies.

The definition of the following key roles at distinct level is recommended:

- Vice-President or Commissioner responsible for Skills in the European Commission;
- National Minister responsible for Skills;
- Regional or Cluster Skills Leader;
- And where appropriate, City Skills Leader.

The Vice-President or Commissioner responsible for Skills in the European Commission would be tasked with the development, coordination and execution of the EU overarching skills strategy.

At the national level, a dedicated Skills Minister should be defined, embodying a shift in paradigm from lifelong employment to lifelong learning.

Lastly, regional or cluster skills leaders should be named to ensure the adaptation of the activities/initiatives to local needs and priorities. Large cities may also need to have a Skills leader.

Nicolas Schmit, MEP (Luxembourg), at the Skills for Industry Strategy 2030 Conference



“We do not have an alternative. We have to be able, as business leaders, as politicians, as trade unions, to organise and manage this change for the good of everybody.”

– Nicolas Schmit, MEP, at the Skills for Industry Strategy 2030 Conference

Territorial Skills Councils

To facilitate collaboration between the different level of intervention (city, regional, national and EU), Territorial Skills Councils could be introduced. Their main objective would be to align the efforts of all key players involved to ensure the development and the efficient implementation of relevant territorial skills strategies. They would actively facilitate and monitor the implementation of short-, medium- and long-term reskilling and upskilling initiatives.

Members should include industry (including SMEs), trade union, research, education and training representatives. The structures should remain agile, independent and well resourced.

The successful execution of the skills strategies will require significant investments and the necessary funds need to be made available to enable large scale reskilling and upskilling efforts.

By bringing together all stakeholders concerned under a clear motivated leadership, territorial skills councils will greatly facilitate the implementation of the Skills for Industry Strategy 2030 for Europe.

Bianca Dragomir, AVAESN Cluster, at the Skills for Industry Strategy 2030 Conference



The important role of clusters

Skills gaps vary depending on the industries, specialisations and demographics present in each region. Local actors have a deep understanding of the challenges and needs faced by their population and will be able to ensure the introduction of territorial skills strategies that best meet all requirements.

In this sense, local clusters can take this role and ensure that these structures remain agile, independent and well financed.

“We need exponential solutions, the linear ones are simply not enough anymore. Clusters can catalyse this change at speed and scale and be the leaders we must have.”

– Bianca Dragomir, CEO, AVAESN Cluster

“Clusters play an important role as key enablers of regional and national skills strategies.”

– Julien Guerrier, Director, Executive Agency for Small and Medium-sized Enterprises (EASME)

Best Practice: Ireland's Department of Education and Skills and National Skills Strategy 2025

The National Skills Strategy 2025 was developed to ensure a more dynamic, responsive and high quality system that provides all learners with the knowledge and skills they need to participate fully in society and the economy.

The skills strategy is complemented by a national and regional skills architecture that enables collaboration and effective implementation. Prioritisation of skills needs will be overseen by the new National Skills Council. The new Regional Skills Fora will facilitate ongoing employer-educator dialogue to match identified needs with sustainable provision in each region, thereby optimising the return on Irish investment in education and training.

The National Skills Council and the Regional Skills Fora will be supported by The Department of Education and Skills, which will oversee the implementation and collaboration between different governance levels.

Initiatives will be monitored by existing mechanisms and regular impact evaluations.

Source: Department of Education and Skills. 2018. Ireland's National Skills Strategy 2025.

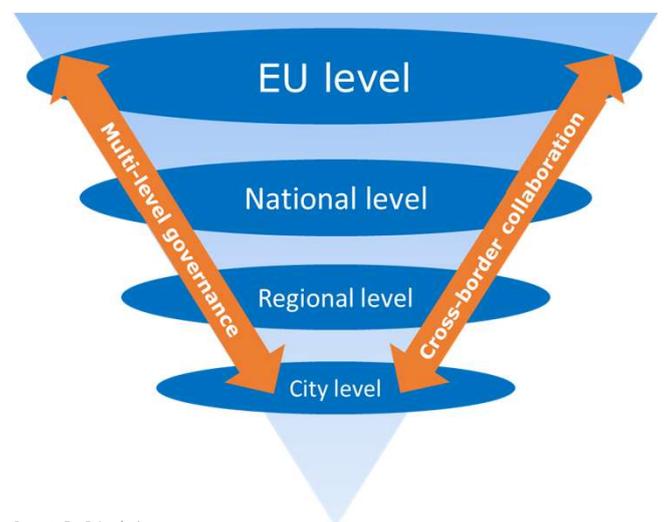
Antonio Ranieri, CEDEFOP, at the Skills for Industry Strategy 2030 Conference



Skills governance

Given the multi-faceted nature of skills systems, strong leadership must be complemented by an effective governance system, both vertically and horizontally.

As emphasised by the OECD, strengthening the governance of skills systems must start with a whole-of-government approach by promoting coordination, cooperation and collaboration across the government institutions. This should be implemented by first mapping the entire skills system, building the right institutions and improving the evaluation and monitoring systems.



Source: PwC Analysis

“Given the multi-layered, multi-dimensional nature of skills systems, the solution is skills governance.”

– Antonio Ranieri, Head of Department for Learning and Employability, CEDEFOP

Thierry Baril, Airbus, at the Skills for Industry 2030 Conference



“The spirit of an open innovation world is to be transparent on our actions. We are looking for working with others - if you are interested.

We think it is time to create an international forecasting group together with institutions and education and companies in order to work with this prospective view of the next five, ten years on the future of skills.”

– Thierry Baril, Chief Human Resources Officer, Airbus

Best practice: Airbus’ Engineer of the future and Global University Partner Programme

Airbus’ Engineer of the Future is a yearly evolving whitepaper started in 2014 by the Airbus Global University Partner Programme (AGUPP). Its purpose is to capture key points from the ongoing dialogue among AGUPP stakeholders about the skills and competencies needed by future Airbus engineers, and how Airbus can work together with Universities to develop them.

In its essence, the whitepaper defines the skills needs of the company in the short to medium-term. It is a mechanism by which Airbus articulates a clear vision of the graduate engineering skills it needs, partner Universities remain informed of this vision, and Airbus and partner Universities work together to develop and realise this vision.

Airbus’ vision of the future engineer is based on four pillars:

- (1) Technical skills;
- (2) Transversal disciplines;
- (3) Generic disciplines; and
- (4) Soft skills.

As such, the T-shaped engineer is becoming a Pi-shaped engineer, with the extension to the ‘π’ shape representing an engineer’s transferable skills and commercial awareness.

Soft transferrable skills are of great significance, given the need to work together in flatter, more complex environments, with an emphasis on interpersonal, team work, as well as cross-cultural skills.

Source: Airbus, *The Engineer of the Future White Paper 2018*. Airbus, 2017 Annual Report AGUPP

Skills strategies are needed at all policy levels in line with economic specificities

Context

According to the 2019 OECD Skills Outlook, only a few countries are prepared to fully reap the benefits of digitalisation, as most of them lack the skills and lifelong learning systems necessary to allow their citizens to thrive in the digital world.

Most EU Member States thus lack sufficiently developed skills strategies to drive their workforces' future development and strengthen their competitiveness.

In addition, besides national skills strategies, as exemplified by Portugal's experience with working with the OECD, Member States, especially regionally diverse ones, also need more localised strategies. These should be in line with the smart specialisation strategies defined at regional level.

Definition and implementation of Territorial Skills Strategies

Member States should therefore be encouraged to develop comprehensive Territorial Skills Strategies to ensure, on aggregate, the continued competitiveness of the European industry. These are characterised by:



Leadership by the Territorial Skills Councils



Clear, measurable and achievable objectives with clear deadlines



Forward-looking regarding technology trends and based on data and facts

Best practice: Portugal – Building a National Skills Strategy

The Portuguese National Skills Strategy, developed by the cross-ministerial Portuguese National Project Team with the support of the OECD, is built on the in-depth analysis of the existing education system and the skills gaps noted.

The OECD Skills Strategy initiative provides a strategic approach to skills policies to strengthen countries' skills strategies through the coherent development, activation and effective use of skills. Its objective is to promote economic prosperity and social cohesion, reflecting a strong focus on 'lifetime employability'.

The Portuguese project started in 2014 with a diagnostic phase that included numerous workshops and stakeholder consultations, and resulted in the 2015 Diagnostic Report that identified key challenges to be addressed by Portuguese policymakers.

The key challenges identified for Portugal and which are critical to an effective skills system were: developing relevant skills, activating the supply of skills, using skills effectively and enabling conditions.

In line with this initiative, the Portuguese government launched a number of concrete actionable programmes between 2014 and 2018, which resulted in the reduction of school dropouts in basic and early education and decreased the number of students leaving education early.

Furthermore, the country saw a significant decrease of youth unemployment, an increasing number of adults in qualification programmes (20,000 to 110,000), and an increase in students entering higher education.

Source: OECD. 2018. Skills Strategy Implementation Guidance for Portugal.

Territorial Skills Strategies features

Territorial Skills Strategies should be aligned to the key characteristics defined in the vision for the Skills for Industry Strategy 2030 and address the following themes in particular:

- The development of new world-class curricula allowing students to gain the skills required by industry;
- The review and modernisation of VET available to encourage innovative thinking;
- The development of territorial methodologies, systems and infrastructures to facilitate the detection and nurturing of talent;
- The increased introduction of industry-led training infrastructures and their opening to SMEs and the wider public to facilitate the sharing of knowledge;
- The introduction of programmes targeting the needs of specific demographics (e.g. women, NEETs - Not in Education, Employment, or Training - elderly people, and migrants);
- The continuous assessment of the effect major external factors, global warming, economic downturns and technological revolutions will have on the skills required by the workforce.

Joost Korte, European Commission DG EMPL, at the Skills for Industry Strategy 2030 Conference



Best practice: 6Aika – The six city strategy

6Aika - open and intelligent services - is a flagship joint development strategy focused on the sustainable urban development of the six largest cities of Finland which are home to almost 30 % of Finland's overall population (Helsinki, Espoo, Vantaa, Tampere, Turku and Oulu). The strategy covers the period 2014-2020 and aims to create new competences, businesses and jobs in Finland.

The strategy is based on co-operation between municipalities, enterprises, citizens, and Universities in a quadruple helix model.

Given the broad scope of developed projects in urban development, four training and education-related projects have been approved, with a specific focus on smart learning solutions and training citizens in innovative sectors. With schools acting as platforms for innovation and experimentation, a strong collaboration can lead to better products and, in turn, better learning outcomes.

Moreover, teachers actively participate in the pilot projects, and can offer valuable input, while pupils can familiarise themselves with new technologies.

Source: 6Aika, 2019.

Increased cross-border collaboration

To avoid creating silos across EU Member States, collaboration between regions and states is necessary to share resources and expertise. As exemplified by Silicon Europe (cross-border), but also by the 6Aika initiative, which is an example of collaboration between cities, similar cooperation models could be employed in implementing skills strategies. This will allow to:

-  Expand existing synergies between regions;
-  Facilitate the active implementation of territorial skills strategies;
-  Include common initiatives between regions to split costs and share resources;

Funding at EU level should be organised to maximise investment uptake

Context

The continued reskilling and upskilling of the European workforce will require significant financial support at all levels (EU, national, regional and city) and rely on public funding and private investment.

At present, general limited awareness of existing EU funds and how to leverage them hinders the uptake of reskilling and upskilling solutions. Many different schemes with varying purposes and eligibility criteria exist. Yet, they often lack a clear entry door that would ensure their widespread utilisation.

In other instances, the accompanying guidelines and criteria to respect might be too restrictive to allow for their use by innovative approaches. Regional leaders and business owners often struggle to find the information they need to apply for the funding schemes available or do not possess sufficient resources to complete the entire application process.

Pre-financing mechanisms are often missing and private funding needs to be leveraged. Finally, the general public still considers skills as intangible assets that cannot be invested in or do not offer a clear return on investment (ROI). A shift in the way society sees skills and their centrality to the continued competitiveness of European industry thus needs to be encouraged and facilitated.

Review and expansion of EU funding schemes

Funding and investment tools need to allow for the successful set-up and execution of comprehensive territorial skills strategies. Dedicated reskilling and upskilling funding should be earmarked and used with the sole intention to support of reskilling, upskilling and promote the lifelong employability of Europe's workforce.

The development and rollout of new skills strategies and initiatives will require the provision of dedicated funding and investment tools that will allow industry large and small, as well as individuals (e.g. individual learning accounts) to invest in their skills and ensure the adoption of a lifelong learning mind-set. Finally, new pre-financing mechanisms that will allow smaller businesses and SMEs in particular to upskill their workforce should be established.

To align efforts, simplify access and thus improve the efficient use of funds available, a dedicated working group should be set up, representing each fund and Directorate Generals (DGs) involved in the implementation of the future multi-annual financial framework (2021-2027).

Set-up of a one-stop-shop

The introduction of 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.

Clusters might play an enabling role in this regard. Acting as an interface between industry, academia and governments, cluster organisations are well positioned to assume an enabling role in the definition and execution of territorial skills strategies. They can serve as an initial point of contact between all actors (e.g. public authorities, industry, SMEs representatives, training providers, individuals) and provide them with an overview of all the funding schemes available. A further key actor to promote the set-up of one-stop-shops might be regional bodies such as for example the ESF Agency Flanders.

Development of a new skills funding branding

Simultaneously, a common branding of the funds available should be considered. Funding schemes should be clearly branded as such and their target audiences easily identifiable. 'Skills Funds' would be introduced at the regional, national and EU levels and would regroup all the funding mechanisms available under a common umbrella.

The regrouping of the funds contributing to skills development would facilitate the visibility of skills funding available and allow industry leaders, education and training providers as well as individuals to identify easily the funding tools they might be eligible for.

Expand the Blueprint for sectoral cooperation on skills

Launched in 2018, the activities of the Blueprint for sectoral cooperation on skills are broadly in line with the proposed vision. The concept of the Blueprint aims to progressively rollout the initial pilot activities at EU level to the national and regional levels, working directly with national and regional authorities as well as key stakeholders. This expansion would increase the potential impact of the Blueprint and encourage a comprehensive sectoral skills strategy at all levels of governance.

Moreover, the concept could eventually expand to support important strategic sectors of common European interest and value chains, as well as world-class best practices and innovative upskilling solutions developed by stakeholders.

Best Practice: ESF Agency Flanders

The ESF Agency Flanders is responsible for the management and implementation of the new Flemish European Social Fund programmes (ESF), the Asylum, Migration and Integration Fund (AMIF) as well as the European Globalization Fund (EGF).

The ESF has three defining roles:

- Reinforce existing programmes,
- Upgrade and innovate policies and
- Encourage the dissemination of best practices and learned lessons cross-region and among Member States.

In this sense, the agency only finances actions that are additional to the Flemish policy, and works closely with the unemployment agency to support the development of skills among the unemployed. Similar support is offered to the employed, but is focused on skills for the future and usually for those working in SMEs.

Source: ESF Vlaanderen. 2019.

“The EIB, as the bank of the EU, wants to increase its financing support towards projects that address skills gaps or upskilling.”

– Laura Piovesan, Director, Innovation and Competitiveness Department, EIB



EUR 1.5bn

of EFSI funding has been allocated to the area of human capital, culture and health, **only 4%** of total invested EFSI.

Source: European Parliament. 2018. Skills development: The potential of the European Fund for Strategic Investments.

Incentive mechanisms should be adopted to encourage lifelong learning

Context

Making lifelong learning a reality for all will require a significant change in the way we see and deliver education and training. To encourage its widespread adoption in society, human-centric incentives need to be proposed. Enterprises, SMEs, workers, training providers and academic institutions will also need to be encouraged to change the way they work.

At present, the incentives offered do not align with the needs of employees and employers, leading to a slow uptake of reskilling and upskilling solutions. Individuals are not being sufficiently helped to invest in the development of their skills to ensure lifelong employability. Many are still reticent to proactively learn new skills continuously and to expand their knowledge to fields of interest beyond their chosen specialization / trade. This lack of willingness to invest time and effort into one's personal development is often linked to the still limited awareness of the wider population on the skills trends marking Europe's workforce and the trainings offered. Others, however, might lack sufficient incentives to do so outside of work.



11%

of EU adults participate in lifelong learning

Source: Eurostat



35%

of Europeans don't have basic digital skills

Source: European Commission, Digital Skills and Job Coalition.

“Proper incentives are needed to encourage individuals and companies.”

– Maxime Cerutti, Director Social Affairs, BusinessEurope

Lifelong Learning and Skills Insurance Plan

The concept of the proposed lifelong learning and skills insurance plan would be based on 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 or to be geographically mobile.

Each working adult would be given the opportunity to progressively build up a lump sum of money that could be used to finance training and continued education. In addition, individuals could also benefit from advantageous tax arrangements. Lifelong learning and skills insurance plans would be introduced at EU level and implemented at national, individual or corporate levels, depending on local conditions.

Best Practice: UK Apprenticeship levy

The Apprenticeship Levy is a levy on UK employers to fund new apprenticeships. The levy is charged at a rate of 0.5% of an employer's payroll. Each employer receives an allowance of GBP15,000 to offset against their levy payment. Only companies with annual paybills in excess of GBP3 million are required to pay it, which means that less than 2% of UK employers are charged.

The levy helps deliver new apprenticeships and supports quality training by putting employers at the centre of the system. Employers who are committed to training are able to get back more than they put in by training sufficient numbers of apprentices.

The levy is co-financed by the government and a monthly sum is made available for companies to use for offering trainings. For non-levy paying firms, the co-investment rate is set at 5% of available funds, stimulating trainings in SMEs. Companies can also share funds between each other, allowing transfers of up to 25% of the annual value of the paid funds.

Source: Education & Skills Funding Agency. 2019. Guidance Apprenticeship funding: how it works.

Corporate Skills Insurance Plan

Industrial leaders have been investing significantly in the skills development of their employees over the past years and have been continuously assessing the skills they will require in the future. Airbus, for example, reviews the company's skills needs on a yearly basis with its Global Workforce Forecast and works closely with its global University partners to ensure a talent pipeline.

Other enterprises invest in the set-up of R&D centres that drive innovation and support talent development. Both cases demonstrate the motivation of industry leaders to invest in the skills development of their employees. They also suggest that large enterprises might find it easier to dedicate the required amounts of funding to invest in dedicated upskilling initiatives, while smaller enterprises often struggle to dedicate the required means. Corporate skills insurance plans might facilitate these investments and provide business owners with interesting incentives.

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. The more skills an individual acquires, the higher the bonus or additional benefits received would be.

Incentivise VET Upskilling

Hand-in-hand with corporate skills insurance plans, incentives encouraging the wider uptake of training and upskilling efforts should be highlighted. France introduced Personal Training Accounts that put the individual at the centre of his/her upskilling journey and dedicated a fixed budget to their future skills development. The UK Apprenticeship Levy incites businesses to offer new apprenticeships and boost the development of vocational training. Both programmes underline the need to incentivise upskilling and encourage the active participation of employees and training providers.

USD 7,000 per worker will be spent by Amazon in the next six years to reskill a third of its US workforce

Source: Wall Street Journal

Employers should be encouraged to invest a certain percentage of their profit into dedicated VET savings accounts that would serve the regular 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 financial contributions, support should be offered in the form of guidance and advice on trainings needed or on the optimised organisation of the workforce to allow for the inclusion of lifelong learning in the company's work culture.

Piotr Pluta, Cisco, at the Skills for Industry Strategy 2030 Conference



Best Practice: Cisco Networking Academy

The Cisco Networking Academy is an IT skills and career-building programme for learning institutions and individuals worldwide, providing education, technical training and career mentorship services. Main themes covered by the courses are networking, programming, IoT, cybersecurity, operating systems and IT, and packet tracer.

Since its inception in 1997, over 8 million students in 180 countries have been through the programme - 1.3 million in Europe alone. The total in-kind contribution in Europe amounts to EUR 492 million.

Source: Cisco Networking Academy. 2019.

The VET system needs a stronger alignment with industry trends

Context

Europe is still missing a commonly recognised VET system focused on the provision of high-tech skills. While enterprises design their own VET trainings, they are often not widely shared and focus on their particular needs. They can thus not be easily adapted to the wider needs of the public workforce.

Check the relevance of VET curricula compared to market needs

In a first instance, the relevance of the VET curricula offered needs to be compared to market needs. VET education faces similar struggles as the traditional educational system. Many of the trainings currently offered do not respond to actual market needs. Curricula need to be reviewed to provide students with the skills necessary to remain competitive.

Innovative VET curricula should incorporate the technologies of the future and keep an eye on emerging trends. They should be market driven (meet industry needs), have high impact (facilitate job transition) and allow individuals to improve their self-learning autonomy.

Closer collaboration between industry leaders and VET training providers needs to be ensured to allow for the development of trainings that directly meet market demands. The Skills for Industry Strategy should align with the vision for the Future of VET¹.

At the same time, the way in which the trainings are provided should be reviewed to allow for the best balance of practical and technical education.

Develop a new set of quality criteria for VET in line with market needs

In line with the review of the relevance of the VET curricula offered, a new set of quality criteria should be established to allow for the objective assessment of VET trainings offered. VET education needs to be of high standard to allow for the acquisition of innovative high-tech T-shaped skills. Employers and individuals often struggle with selecting the best trainings to meet their needs and would benefit from an EU-wide set of standards that would facilitate the selection of high quality trainings. The European Quality Assurance in Vocational Education and Training (EQAVET) has been very active in this context and can offer some interesting insights on how to develop a new set of quality criteria for VET.

The quality criteria to be implemented need to be clearly defined and very easily understandable to facilitate their integration into the VET curricula offered. The end user should face little difficulty when assessing the quality of trainings offered and should be able to easily integrate the quality criteria defined into their personal skills development plan. Lastly, the quality of VET curricula should be directly linked to the impact they have on the individual trained and his/her skills portfolio.

¹ Advisory Committee on Vocational Training. 2018. Opinion on the future of vocational education and training post 2020.

“There will never be education providing ready-made human capital unless industry and training work together and become shareholders of what education and training is all about.”

- Joachim James Calleja, President, European Forum of Technical and Vocational Education and Training, EfVET

Box 1: European Quality Assurance in Vocational Education and Training

European Quality Assurance in Vocational Education and Training (EQAVET) brings together EU Member States, Social Partners and the European Commission to develop and improve quality assurance in European VET systems within the context of the implementation of the European Quality Assurance Reference Framework by:

- Assisting Member States in developing effective approaches to support the implementation of the Reference Framework;
- Developing a culture of quality, to be embedded at European level and other levels with the help of the Quality Assurance National Reference Points and other Network members;
- Supporting Member States and the European Commission in the monitoring and implementation of the Reference Framework within the context of the Education and Training 2020 Strategy;
- Supporting the quality assurance dimension of work in EQF and ECVET.

Markku Markkula, European Committee of the Regions, at the Skills for Industry Strategy 2030 Conference



Stakeholders emphasise the need for a stronger link between industry, education and training. Constant communication and cooperation must ensure that VET remains relevant, especially in this accelerated environment. To facilitate a more relevant VET system, emerging technologies as well as online learning resources could be taken up, given their efficiency and proven effectiveness.

Build a stronger ECVET as an established certification entity for all players in VET

VET education across the EU would further benefit from the expansion and reinforcement of the European Credit System for Vocational Education and Training (ECVET). Dedicated communication efforts to reinforcing awareness of ECVET and its functioning could be envisioned as well as a review of its processes.

This would streamline the certification criteria to be respected across all Member States but also facilitate the mobility of skilled workers across Europe as well as the exchange of knowledge and trainings across borders.

Box 2: European Credit System for Vocational Education and Training

The European Credit System for Vocational Education and Training (ECVET) is a technical framework for the transfer, recognition and (where appropriate) accumulation of individuals' learning outcomes with a view to achieving a qualification. ECVET relies on the description of qualifications in units of learning outcomes, on transfer, recognition and accumulation processes and documents such as a Memorandum of Understanding and Learning Agreement.

ECVET is intended to facilitate the recognition of learning outcomes in accordance with national legislation, in the framework of mobility, for the purpose of achieving a qualification.

- ECVET aims to support the mobility of European citizens, facilitating lifelong learning - achieved in formal, non-formal and informal settings - and providing greater transparency in relation to individual learning experiences, making it more attractive to move between different countries and different learning environments;
- At a systems level, ECVET aims towards greater compatibility between the different vocational education and training (VET) systems in place across Europe, and their qualifications.
- From a geographical mobility perspective, ECVET aims at facilitating the validation, recognition and accumulation of knowledge and skills acquired during a stay in another country, with a view to ensuring that such achievements can contribute to the achievement of vocational qualifications.

Source: European Commission. 2019. The European Credit system for Vocational Education and Training (ECVET).

An accelerated world-class education system will ensure a pipeline of talent

Adapt curricula to market needs to ensure employment

Firstly, a comprehensive review of curricula offered and their alignment to current industry needs should be envisioned. Each course and degree offered should be set up to target specific skills needs of industry and the general labour market. Artificial intelligence (AI) tools assessing market and labour trends could be used to this advantage.

Furthermore, traditional education and training providers should work increasingly with industry to directly exchange on the adaptation of curricula in line with market needs. The Territorial Skills Councils mentioned earlier might serve as a first point of reference to facilitate public private collaboration in the educational system.

In line with the development of new curricula, their impact on the employability of students should be reviewed and assessed. Data on the time before employment, their retention rate as well as their continued learning could be envisioned. Universities could also request employers to provide information on the profiles recruited from the respective curricula and the alignment of skills.

“We must embrace lifelong learning and use AI-based insights, moving beyond the four-year degree towards recognised and accredited alternate educational pathways, and certify skills learned on the job.”

- Gian Luigi Cattaneo, Vice-President Human Resources, IBM Europe

Best Practice: IBM Skills Academy

The IBM Skills Academy is a private initiative launched by IBM that offers trainings to students enrolled in Universities.

Through partnerships with Universities, students and educators in IT or IT-related fields can participate in 11 career tracks that range from data scientist to predictive analytics modeller. Each career track has a number of distinct skill-focused learning objectives that are based on market research and in line with high-demand jobs in the IT market.

The teaching is done through a blended learning module that is partly web-based (80%) and partly classroom based (20%).

The IBM Skills Academy started as a pilot in a number of African countries, but has now expanded to different regions, including Asia, the Pacific, and the US. In Europe, the initiative is active in Poland, and will likely expand to other Member States.

Source: IBM. 2019. IBM Skills Academy.

Gian Luigi Cattaneo, IBM, at the Skills for Industry Strategy 2030 Conference



Prioritise public funding to private-public cooperation

Private-public cooperation is becoming increasingly important to ensure the courses and trainings offered align with industry high-tech skills needs. By directly cooperating with industry experts in the field, academic institutions and training providers can adapt the courses and trainings offered to respond to concrete industry and market needs.

Universities signing cooperation agreements with industry (while keeping their independence) and directly include industry knowledge and input into their high-tech curricula could benefit from prioritised public funding to recognise their efforts. Curricula with little impact on the employability of students should be revised and improved or discouraged and phased out.

Empower Universities to review and change their curricula more easily and rapidly

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 their courses. The process to ensure the official recognition of the degrees and certifications provided 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 and training systems and thus need to remain flexible and open to innovation.

Best Practice: Codecool

Codecool is a private company, which acts as an organisation between schools and the workplace, where industry experts act as mentors who are able to also offer business insights. The 1-year course thus focuses on skills that are needed on the job, while being based on projects and peer learning.

The company offers a post paid model, in which trainees pay for the course after 18 months and only if they have been hired full-time, ensuring that the organisation is truly inclusive. Codecool currently has five campuses across Hungary, Poland and Romania and is looking to expand from 450 students per year to 5,000 graduates by 2023.

Source: Codecool, 2019.

Upskill academic teachers and include more professionals in the provision of education

The modernisation of education requires the re-engineering of the profession. Teachers and professors will have to be educated on the new vision of skills development. They will also have to be continuously upskilled to better understand the demands of the labour market and adopt new innovative teaching and training methodologies.

The expertise developed by decades of academic excellence should not be rejected but needs to be translated into concrete applications to ensure the review of students' skills development plans. Educators should cooperate with industry experts and professionals to give their students the opportunity to learn directly from those that are actively working in the field and can teach them both technical and transversal skills.

Innovative education leaders should be recognised to encourage the widespread review of curricula offered. An "innovative educator" award could be introduced at EU level to recognise the efforts being made by educators to adapt the education sector to the fourth industrial revolution.

Sophia Eriksson Waterschoot, European Commission DG EAC, at the Skills for Industry Strategy 2030 Conference



Industry needs to invest more in education and ensure up-to-date training infrastructure

Context

Education and training infrastructures have been designed in a pre-digital world. Yet, students need to have the opportunity to acquire the latest high-tech skills and knowledge on the latest innovative technologies in an environment that enables them to do so. They also need to be able to experiment with these new technologies in a safe environment.

Both industry leaders and local authorities need to work closely together to drive the review of existing training infrastructures and encourage greater collaboration between all actors to share the costs.

While existing industry-led training infrastructures often boast state-of-the-art equipment and thus facilitate the acquisition of new skills, the scope of these activities often remains limited to the immediate workforce of enterprises. Innovative training infrastructures should be made available to students and the wider industrial workforce.

“Enterprises and industrial associations must be fully involved in the educational process: stronger networks between VET institutions, Universities and businesses are an essential response for the EU demand of digital and STEM skills.”

– Giovanni Brugnoli, Vice President for Human Capital, Confindustria

Develop new partnership models

New partnership models between industry leaders, SMEs, education and training providers need to be encouraged to develop and build new learning infrastructures. New joint training methodologies can be established and the provision of curricula expanded. Industry leaders need to invest in the overall skills development of Europe’s workforce to guarantee the sufficient availability of talent necessary to drive in-house innovation.

Best practice: Learning Factories 4.0

Allianz Industrie 4.0, launched by the State of Baden-Württemberg, is an organisation that aims to share resources and know-how of production, information and communication technologies to help businesses in their digital transformation process.

Within Allianz Industrie 4.0, Learning Factories 4.0 is one of the most prominent and effective initiatives. In the context of digital transformation and the subsequent skills gap, the Learning Factories are government-backed labs implemented in vocational schools.

They have two objectives:

- (1) To teach students and train employees by providing real-life practice opportunities;
- (2) To act as a research factory for demonstrating and testing new technologies and approaches.

These learning labs have been established in 16 training centre projects in vocational schools across Baden-Württemberg, involving 30 vocational schools and 250 companies and industrial organisations.

The regional government supports the investment costs, the expenses related to teacher trainings, and other associated costs. The estimated budget of the initiative is EUR 6.8 million.

Source: Lernfabriken 4.0 Karlsruhe. 2019.

Industry-led training infrastructures offer students the opportunity to gain new skills through practical exercises and the active testing of new technologies. They mobilise industry leaders to become engines of the transformation of the training ecosystem.

At the same time, students need to be given the freedom to train with the right equipment in a highly innovative high-tech environment. By working with other businesses, employers can facilitate exchange of knowledge, skills and expertise while reducing overall costs for continued education.

“Universities should want to collaborate with the industry and want to be agile. .”

– **Stephane Pallage, Rector, University of Luxembourg**

John Higgins, Global Digital Foundation, Stephane Pallage, University of Luxembourg, Peter Nielsen, Aalborg University, at the Skills for Industry Strategy 2030 Conference

Strengthen the efforts of the European Cooperation for Accreditation (EA)

In line with the need for EU-wide quality criteria for VET, the accreditation of industry-led training infrastructures and the trainings offered should be widely disseminated to facilitate the wider uptake of reskilling and upskilling efforts.

The European Cooperation for Accreditation (EA) is enshrined in EU regulation 765/2008 and counts national accreditation bodies as its members. It oversees accredited bodies that give certifications to persons and is thus directly involved in the control the quality of industry trainings provided.

To further facilitate the accreditation process and thus drive the introduction of industry trainings, the processes and procedures to respect to become an accredited training provider should be reviewed and where possible streamlined.



Talent detection and nurturing practice need to emphasise both excellence and inclusiveness

Context

To ensure the development of a larger and more diversified talent pool in Europe, talent needs to be nurtured and encouraged once detected. Both young as well as experienced talent needs to be identified and its future development supported.

Untapped high-tech talent pools such as women, migrants and youth not in employment, education or training (NEETs) need to be increasingly integrated into the workforce of the future. As such, inclusiveness is a key element in implementing the Skills for Industry Strategy 2030.

Best practice: ReDI School of Digital Integration

ReDI School of Digital Integration is a non-profit digital school for tech-interested locals and newcomers in Germany, offering trainings in English and German. The school has the aim to offer students valuable digital skills and a strong network of tech leaders, students and alumni to help create new opportunities for all.

The organisation offers IT and programming courses, workshops, company visits as well as hackathons, primarily to migrants, refugees and asylum seekers. Special courses are dedicated to women that have little background in IT.

Teachers are usually volunteers from the tech industry. While teaching technical skills, they also share important insights on the industry and the practical applications of theory. With around 500 students, the school can take a personal approach and help each individual find a job according to his/her skills and interests.

Source: ReDI School of Digital Integration, 2019.

Develop a new approach to talent detection and career progression

A new approach to both early talent detection in education as well as in corporate settings needs to be developed. A dedicated working group should be created at EU level to investigate new ways of better detecting talent at both an early and later stage, as well as on how best to support individuals that are highly gifted, especially if they are not benefiting from the social capital inherent to privileged groups.

Another important point to underline concerns the retention of older workers. While their jobs might be changing and they might be forced to acquire a completely new set of skills, the experience they have acquired over the years should be valorised, especially their transversal skills. They tend to possess in-depth knowledge on the functioning of the sector, the company, the decisions made in the past and their main motivators. Their departure thus represents a significant loss to the working environment in given businesses.

Encourage the dissemination of best practices

In line with the development of a new talent detection approach, best practices should be widely disseminated to encourage the broader up-take of talent detection and retention practices. They should be clearly highlighted in upskilling promotion campaigns. By spreading information on innovative solutions and facilitating the exchange of new ideas and methods, talent detection and retention could be continuously improved.

Encourage talent development and detection among women

EU, national and regional efforts should pay special attention to targeting demographics that until today have received less support. In particular, female talent should be increasingly encouraged and supported in its development of high-tech skills. Currently, women outnumber men by ten to seven in occupations with high risk of automation. Simultaneously, men outnumber women in high-tech jobs and the female employment share in IT occupations continues to fall.

Moreover, based on the latest data available from LinkedIn, the WEF assessed that only 22 % of AI professionals globally are female. While slight variations can be noted across countries, female representation in AI does not surpass 28 % in the best cases (e.g. Italy, Singapore, and South Africa).

Sadly, the gender gaps noted in the AI field reflect broader gender gaps within specialisations in STEM. Programmes dedicated to the detection of female high-tech talent thus need to be introduced to tap into this under-developed talent pool.

Claus Lønborg, Copenhagen Capacity, at the Skills for Industry Strategy 2030 Conference



Introduce the concept of Lifelong Learning Centres

A further solution to the encouragement and development of talent might be the introduction of Lifelong Learning Centres, which would be similarly accredited to Business Schools and would concentrate on the provision of high-tech skills. Any organisation could apply and seek funding from both private and public actors. Contrary to traditional educational bodies, Lifelong Learning Centres 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. Instead of basing the assessment of candidates on previous degrees or certifications, these schools would be open to everyone sufficiently motivated to gain new high-tech skills.

Remain attractive to outside talent

While supporting the development of the skills of the European workforce as much as possible, the EU also needs to be prepared to attract talent from abroad as it is difficult to foresee the future skills demand to such a precise extent. There is a global competition for talent and areas with limited local talent available will need to attract highly skilled individuals from abroad.

Europe's cities and regions thus need to remain attractive to the global workforce. Foreign workers are not only interested in the job opportunities offered, but also in the local quality of life.

“Europe still needs to be prepared to attract talent from abroad, as it is difficult to foresee the future skills demand. In areas where we will fall short, we will need to find solutions to attract global talent against global competitors.”

– Claus Lønborg, CEO, Copenhagen Capacity

Effective communication will be needed to raise awareness and catalyse change

Context

While awareness for the need to upskill their workforce is rising among CEOs, many SME owners offer few training opportunities to their employees. Only 21% of businesses training budgets are dedicated to the development of digital skills.

At individual level, people have limited awareness of the growing skills gap marking the European labour market and its impact on the competitiveness of Europe's industry.

A comprehensive communication strategy will be necessary to ensure the wider uptake of upskilling initiatives across Europe. The public needs to have a clear understanding of the changes affecting the local labour market and the new skills that will be required to ensure their continued employability.

Launch of a dedicated promotion campaign to highlight the tools, trainings and jobs

At EU level, a dedicated promotion campaign under a common umbrella and clear branding should be envisioned. It should highlight wider EU trends and underlining the EU funding mechanisms available to support enterprises and individuals in their upskilling journey. The Erasmus branding can serve as inspiration when developing a well-known high-tech skills promotion campaign. Strong synergies should be established with the European Vocational Skills Week, which promotes the development of vocational skills across Europe. A similar approach should thus be used to promoting lifelong learning and the skills for industry strategy.

Moreover, an interactive platform allowing for the widespread access to the tools, trainings and jobs available across Europe could be developed. By collecting relevant information on the platform, valuable knowledge relating to the growing skills gap affecting Europe and potential solutions would be facilitated and easily shared among the public.



40%

of EU workers are worried about not having the digital skills needed in the future

Source: European Commission. Digital Economy and Society Index 2018

Best practice: Erasmus

Erasmus has long been considered a success story in terms of branding and of promoting an EU programme or initiative. Erasmus+ acts as a strong and well-established brand for all education, training, youth and sport initiatives in the EU.

Even within the website, the distinct visual identity reflects the objectives of the programme. The website also includes multiple explanatory videos, tools and supporting information.

The effective dissemination of the programme's opportunities has resulted in a wide use of the very popular student mobility initiative, which has provided over three million European students with the opportunity to go abroad and study at a higher education institution or train in a company.

Erasmus has been very effective in promoting its goals and also in improving citizens' perceptions and attitudes towards the EU in general.

Source: European Commission. 2019. Erasmus+.

National and/or regional communication campaign to promote public and private initiatives

At the national, regional and city levels, the vision, strategy and the available tools should be widely communicated among the public and stakeholders to boost industrial modernisation and new skills acquisition. By raising awareness of infrastructures, education and training offerings, as well as benefits to individuals, SMEs and industry, the execution of the skills for industry strategy will be accelerated.

In line with the EU-wide campaign addressed above, national and regional communication campaigns should highlight national and regional particularities and industries. National and regional skills trends should be underlined, and relevant incentives and funding mechanisms widely promoted. Moreover, information on public and private initiatives should be easily accessible. Simultaneously, the trainings available as well as any open positions could be shared via local communication platforms, as close as possible to the concerns of the public.

Best Practice: European Vocational Skills Week

European Vocational Skills Week is an initiative that aims to promote vocational education in the EU. The weeklong series of events organised across Europe range from open doors and information campaigns to conferences and exhibitions.

Besides the regional events, high-level discussions take place in a European city, as well as the VET Excellence Award. The contest awards best practices in various categories and thus helps disseminate good practices as well as foster innovation in the VET sector.

Source: European Commission. 2019. European Vocational Skills Week 2019

During the Skills for Industry Strategy 2030 Conference, effective communication at different levels and between stakeholders has also been emphasised in the discussions.

In general, stakeholders, such as industry, social partners, education, training institutions, and policy makers must constantly exchange and cooperate to ensure alignment of actions.

Europe needs a more personalised dialogue with its citizens to promote lifelong learning, as well as high-tech skills and career paths for young people and the workforce.

Yves Magnan, Le Forem, at the Skills for Industry Strategy 2030 Conference



“Skills development is not a cost, it is an investment in human capital that public and private sector must support to make competitiveness and social inclusion sustainable.”

– Yves Magnan, General Manager Products and Services, Le Forem, Public employment service for Wallonia

