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Building capacity for excellence in service provision for people with disabilities

Briefing paper

Skills

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I. Introduction

The pace at which society is changing nowadays can be hardly found in humankind history. Technological developments over the last years have played a great role in transforming society and relationships as we knew it. Radical changes can be found in basically all aspects of human life, from the way we do shopping, see the emergence of e-commerce, the way we listen to the music, watch movies and human interaction in general, where social media are increasingly reshaping the way we communicate. Furthermore, the possibilities Artificial Intelligence (AI), machine learning and quantum computing will unfold in the upcoming years are yet to be fully understood and perhaps beyond our current knowledge. In 2015 Klaus Schwab from the World Economic Forum defined these fast and radical changes in society as part of the Fourth Industrial Revolution[1], where technology-driven factors lead to transformations in velocity, scope and systemic impact make this revolution unique and not comparable to any of the previous ones.

Due to these radical transformations prompt by the Fourth industrial revolution, one of the possible outcomes will be a disruption of current systems, including the labour market. The impact of technological innovation in the workplace creates uncertainty on what jobs will look like in the near future. The fear machinery will replace human workers in the British factories was at the basis of the luddism movement, whose main objective was the physical destruction of machinery during the third industrial revolution. History proved that a total replacement of the human workforce has never happened, but changes and diversification of the workforce did, especially in the industrial sector. Today and in the countries that first experienced the Third industrial revolution, the main change has been the increased number of people employed in the third sector (services), perhaps in jobs not even present at the time of the previous industrial revolution.

It is difficult to predict how the job market will look like in the upcoming years, what professions are likely to be most impacted by technological innovation and what jobs will be created. In an attempt to identify challenges of the Fourth Industrial revolution, some theorists and critics have mentioned job losses, increased inequality and reduced ability for state to tax labour incomes[2]. On the other hand, the same authors have identified opportunities the Fourth Industrial revolution will bring about. Education and training, among others, will play a more important role to meet new demands of the job market. In Schwab's reflection on the Fourth Industrial revolution, talents and individual skills will be the driving forces that enable human beings to thrive in the future.

Why this paper?

Considering the relevance of the skills and the role education and training play in developing and retaining valuable skills, this paper presents a general reflection on skills and competencies, what skills are likely to be most relevant in the future, how to assess, validate and recognise skills. Before the conclusions, a chapter focuses on selected methods or approaches companies may use to uncover individual talents of people with disabilities. References to European-wide initiatives, reports from international organisations, policies and legislation can be found in all chapters to ensure the papers highlights the theoretical underpinnings and latest international developments in the field of skills.

[1] Schwab, K. (2015). *The Fourth Industrial Revolution: what it means, how to respond* (link)
[2] Ward, M. (2016). *The Fourth Industrial Revolution.* House of Commons, Number CDP 2016/0153, 2 September 2016 (link)

II. Skills

II.I. Framing the concept

Considering the crucial role skills play in today's debate, definitions and classifications have flourished over the last decades. According to the European Centre for the Development of Vocational Training (CEDEFOP), skills can be defined as the ability to apply the knowledge and use the know-how needed to perform job-related tasks and solve problems [3]. This definition is widely used and describes the main features the term skills refer to, or rather the capacity all human beings have to link abstract knowledge to take action aimed at specific outcomes. However, it is important to note that the interplay of a variety of external factors might influence the ability to produce the desired results.

Humans' abilities are linked but hardly limited to performing specific tasks. To better understand the full extent of the meaning the term skills can be associated to, it seems relevant to present the distinction between *soft* and *hard* skills.

Hard skills: in a broader sense, hard skills can be considered those where a technical expertise or specific knowledge is required to perform a certain task. Cedefop's definition mentioned above, well represents this category. Technical proficiencies, mathematics, data analysis, which all involve specific knowledge, can be considered examples of hard skills[4] and are also referred to as *job-specific skills*[5].

Soft skills: this category includes skills that are cross-cutting across jobs, that might be useful to perform specific tasks, but not strictly necessary to. Soft skills are related to personal and social competences[6], focusing more on personal attributes and personality traits[7].

Based on this first distinction between hard/soft skills, some main differences among the two categories emerge:

Stable: some skills will be likely to change to a limited extent over time. Hard skills are considered to be more stable over the years and regardless the job position. An example could be *data analysis*. Regardless whether someone is working for a market research company or in a research institute, data analysis tasks can be very similar. Despite training and other courses might be deemed necessary to master new tools or update knowledge on the specific subject, the core knowledge is likely to stay the same. On the other hand, individuals can develop/ improve a set of soft skills in order to better match the needs of the company, which may strongly differ from another setting.

Measurable: it is easier to apply benchmarking and clear indicators to assess whether someone is excelling in a highly-technical or specific tasks. For instance, *proficiency in foreign language* can be considered a hard skill even if it used for communication purposes. The number of foreign languages a person is able to master and the level of proficiency for each language can be assessed and measured. International reference frameworks can be used as a reference for international comparisons[8]. Hence, it can be easier to measure hard skills rather than soft skills such as personal attributes.

Teachable: hard skills are better placed to be taught and learnt by using ad hoc materials, guidelines and instructions and can be easily categorised into different levels of knowledge. Some people are naturally talented in mathematics, which means they will have to invest less time than others in learning basic formulas. Despite some of them might have come up with the formula themselves (or invented new ones), the average

[3] Cedefop (2014). *Terminology of European education and training policy: a selection of 130 terms*. 2nd ed. Luxembourg: Publications Office (link).
[4] Russo, K. (2017). *Hard Skills vs. Soft Skills: What They Mean to Your Job Search and the Weight They Carry with HR*, The Blog, (link)
[5] http://skillspanorama.cedefop.europa.eu/en/glossary/J
[6] http://skillspanorama.cedefop.europa.eu/en/content/soft-skills
[7] Russo, K. (2017). *Hard Skills vs. Soft Skills: What They Mean to Your Job Search and the Weight They Carry with HR*, The Blog, (link)
[8] See for example the *European language levels - Self Assessment Grid* (link)

person is likely to learn *mathematics* in school settings and by studying from the books the education system offers.

Differences between hard/soft skills have been long discussed and many comparisons on this subject have been carried out over the years. For the purposes of this paper, it is relevant to refer to these differences and to shift the focus on another approach to classify human skills. In 2004, the European Civil Society Platform on Lifelong Learning has divided skills in two broad categories[9]:

Basic skills:

• Literacy: the ability to communicate through reading and writing in one's own language. This ranges from the ability to recognise letters and read very simple items, to 'functional literacy' – the ability to communicate at the level necessary to function socially and at work and to access education and training

• Numeracy: the ability to use number skills at the level necessary to function socially and at work and to access education and training

• First language: being proficient in the dominant or official language of the country in which one is a long term resident, for those for whom this is not the first language.

Life or key skills:

• Interpersonal: teamwork, cultural awareness

•Technology-related: use of ICT and the Internet

• Foreign languages

•Work-related: job seeking, motivation, entrepreneurship, and skills related to specific areas of employment

• Learning to learn: skills related to coping in everyday life, citizenship and participation in civil society leading to the capacity to attain personal fulfilment and social inclusion.

Furthermore, the European Skills/Competences, qualification and Occupations (ESCO), is a multi-language classification system developed by the European Commission in the framework of the European 2020 initiative. Using ESCO's classification, skills/knowledge and competencies can be categorized in four levels[10]:

1. Transversal: relevant for a broader range of occupations and sectors. Transversal knowledge, skills and competences include core skills, basic skills or soft skills. They are considered the cornerstone for the personal development of a person and essential to develop hard skills.

2. Cross-sectoral: this category includes occupation-related knowledge, skills and competences relevant across several economic sectors.

3. Sector-specific: knowledge, skills and competences relevant for more than one occupation within that sectors.

4. Occupation-specific: knowledge, skills and competences are usually applied only within one occupation and its specialisms.

[9] European Civil Society Platform on Lifelong Learning (2014). DEVELOPING BASIC SKILLS AS KEY COMPETENCES. A GUIDE TO GOOD PRACTICE (link)
[10] ESCO, *Skill reusability level* (link)

In the past years, the term 21st century skills became widely used to identify a variety of skills deemed crucial to thrive in fast changing societies. In 2015, the World Economic Forum published a report presenting a detailed analysis of the research literature to define 16 most critical "21st-century skills", divided in three categories (*Foundational Literacies*, *Competencies* and *Character Qualities* (see Figure 1 for more details). [11]

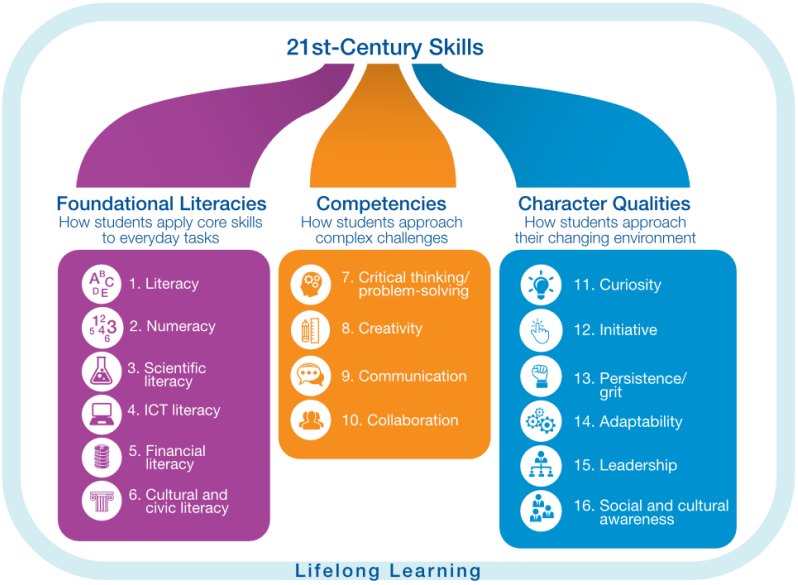

Figure 1

In 2016, in the report *New Vision for Education: Fostering Social and Emotional Learning through Technology*, the World Economic Forum stresses the importance of Social and Emotional Learning (SEL), which can better prepare today's students for evolving workplaces, with consequent benefits for individuals, businesses, the economy and society[12]. Effective social and emotional learning programming involves coordinated classroom, school wide, family, and community practices that help students develop the five key skills[13]:

Self-Awareness: involves understanding one's own emotions, personal goals, and values. This includes accurately assessing one's strengths and limitations, having positive mindsets, and possessing a well-grounded sense of self-efficacy and optimism. High levels of self-awareness require the ability to recognize how thoughts, feelings, and actions are interconnected.

Self-Management: requires skills and attitudes that facilitate the ability to regulate one's own emotions and behaviors. This includes the ability to delay gratification, manage stress, control impulses, and persevere through challenges in order to achieve personal and educational goals.

Social Awareness: involves the ability to understand, empathize, and feel compassion for those with different backgrounds or cultures. It also involves understanding social norms for behaviour and recognizing family, school, and community resources and supports.

Relationship Skills: help students establish and maintain healthy and rewarding relationships, and to act in accordance with social norms. These skills involve communicating clearly, listening actively, cooperating, resisting inappropriate social pressure, negotiating conflict constructively, and seeking help when it is needed.

[11] World Economic Forum (2015), New Vision for Education - Unlocking the Potential of Technology (link)
[12] World Economic Forum (2016), New Vision for Education: Fostering Social and Emotional Learning through Technology (Link)
[13] https://www.edutopia.org/blog/why-sel-essential-for-students-weissberg-durlak-domitrovich-gullotta

Responsible Decision-Making: involves learning how to make constructive choices about personal behaviour and social interactions across diverse settings. It requires the ability to consider ethical standards, safety concerns, accurate behavioural norms for risky behaviours, the health and well-being of self and others, and to make realistic evaluation of various actions' consequences.

Furthermore, research into successful non-technology based SEL approaches, the World Economic Forum's report identifies several good practice learning strategies to develop the competencies and character qualities that define SEL, including strategies aimed at creating an environment conducive to developing social and emotional skills in general and strategies that are specific to the development of individual social and emotional skills (see Figure 2[14]).

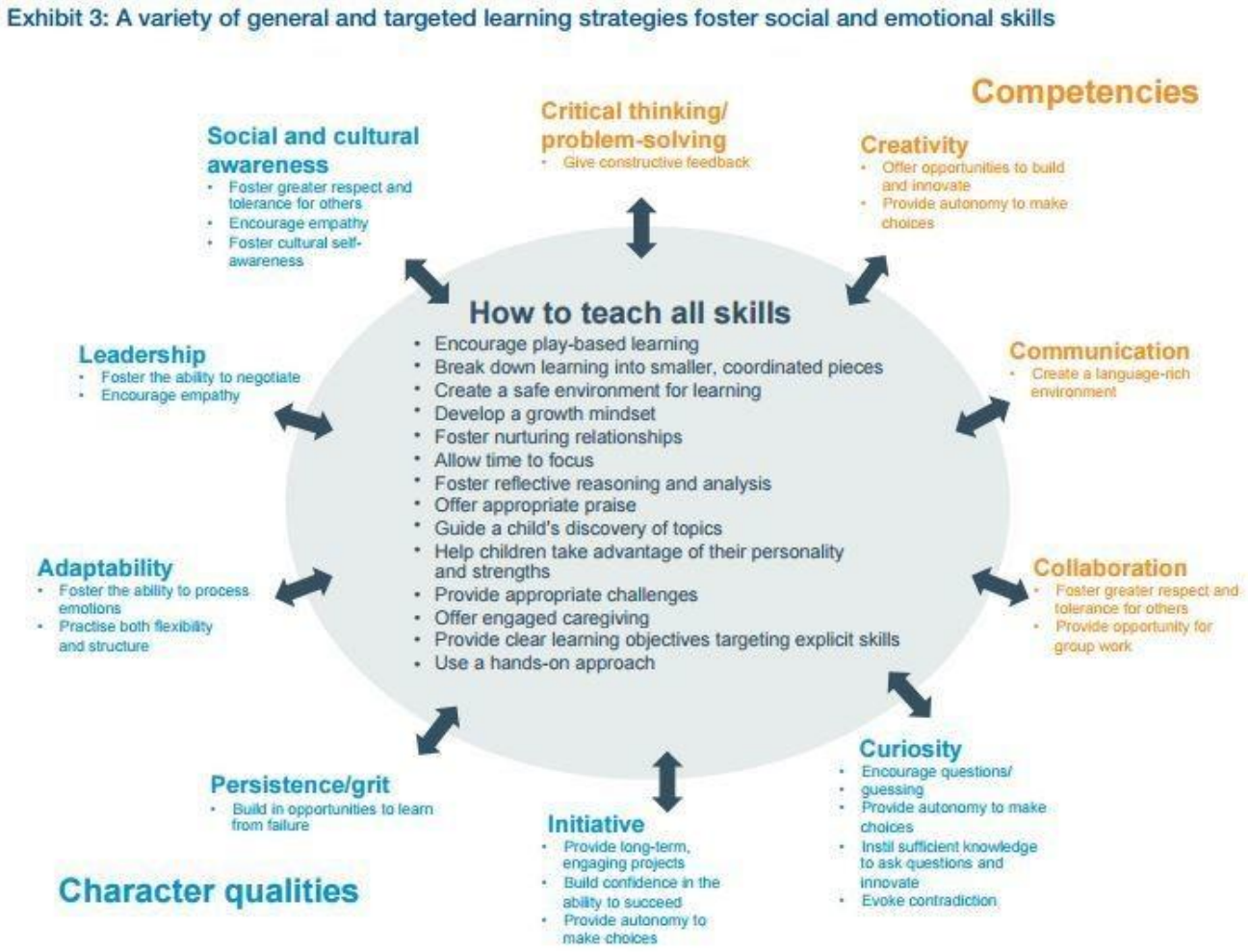

Figure 2

II.II **European initiatives**

Each EU country is responsible for its own education and training systems yet EU policy supports national action and helps address common challenges, including skills deficits in the workforce.

[14] World Economic Forum (2016), New Vision for Education: Fostering Social and Emotional Learning through Technology (Link)

A) Education and training 2020 (ET 2020) is the framework for cooperation in education and training. ET 2020 is a forum for sharing practices, mutual learning, gathering and dissemination of information and evidence of what works, as well as advice and support for policy reforms[15].
In 2009, ET 2020 set four common EU objectives to address challenges in education and training systems by 2020 and EU benchmark for 2020 for education:

Objectives

- Making lifelong learning and mobility a reality
- Improving the quality and efficiency of education and training
- Promoting equity, social cohesion, and active citizenship
- Enhancing creativity and innovation, including entrepreneurship, at all levels of education and training

EU benchmarks for 2020

- At least 95% of children (from 4 to compulsory school age) should participate in early childhood education
- fewer than 15% of 15-year-olds should be under-skilled in reading, mathematics and science
- the rate of early leavers from education and training aged 18-24 should be below 10%
- at least 40% of people aged 30-34 should have completed some form of higher education
- at least 15% of adults should participate in lifelong learning
- at least 20% of higher education graduates and 6% of 18-34 year-olds with an initial vocational qualification should have spent some time studying or training abroad
- the share of employed graduates (aged 20-34 with at least upper secondary education attainment and having left education 1-3 years ago) should be at least 82%

In the framework of the ET2020, the Commission and Member States cooperate in the form of **Working Groups**. The primary focus of the Working Groups is to benefit the Member States in the work of furthering policy development through mutual learning and the identification of good practices, as well as understand what works in education. Working Groups produce outputs linked to the objectives of the ET2020 in order to actively contribute to the Europe 2020[16]. In 2016, six new Working Groups were formed and will be active until 2018:

1. Working Group on Schools
2. Working Group on the Modernisation of Higher Education
3. Working Group on Vocational Education and Training
4. Working Group on Adult Learning
5. **Working Group on Digital Skills and Competences**
6. Working Group on Promoting Citizenship and the Common Values of Freedom, Tolerance and non-Discrimination

For the purposes of this paper, it is relevant to have a closer look at the topics the **Working Group 5** –Digital Skills and Competencies-, listed below:

- Digital skills gap and the link to education planning and curriculum planning.
- Teacher training for digital education.
- The role of management and leadership in promoting modernisation of education.
- Quality assurance, validation and accreditation of digitally-acquired skills.
- Quality of digital and online educational material.

[15] http://ec.europa.eu/education/policy/strategic-framework_en
[16] http://ec.europa.eu/education/policy/strategic-framework/expert-groups_en

- Use of Open Educational Resources (OER) and open education.
- New, potential and current technologies and their role in the classroom, to support teachers, or for independent learners.
- Policy level issues and initiatives.
- The role of computational thinking/skills and coding.
- Learning Analytics and data in education.

B) New Skills Agenda for Europe: Skills pave the way to employability and are needed to fulfil people's potential in society[17]. Acknowledging the crucial role of skills in today's society, in 2016 the EU Commission launched the New Skills Agenda for Europe, including 10 actions for EU countries, employers' associations, trade unions, industry and other stakeholders to continue working together and ensuring that these initiatives produce the best possible outcomes[18]:

10 actions:

1. Upskilling Pathways: New Opportunities for Adults (link)
2. European Qualifications Framework
3. Digital Skills and Jobs Coalition
4. Blueprint for Sectoral Cooperation on Skills
5. EU Skills Profile Tool Kit for Third-Country Nationals
6. Vocational education and training (VET)
7. Europass
8. Graduate Tracking
9. Key competences
10. Analysing and sharing of best practice on brain flows

Aims of the 10 actions:

- improve the quality and relevance of training and other ways of acquiring skills
- make skills more visible and comparable
- improve information and understanding of trends and patterns in demands for skills and jobs (skills intelligence) to enable people make better career choices, find quality jobs and improve their life chances.

C) Youth Guarantees: is a commitment by all Member States to ensure that all young people under the age of 25 years receive a good quality offer of employment, continued education, apprenticeship, traineeship within a period of four months of becoming unemployed or leaving formal education. Partnership-based approach, early intervention and activation, supportive measures for labour market integration and availability of funding have been some of key factors to achieve results in terms of youth unemployment and participation of NEETs[19], despite the difficult economic period in the EU between 2013-2016.

D) Digital Skills and Jobs Coalition (Under New Skills): this coalition brings together Member States, companies, social partners, non-profit organisations and education providers, who take action to tackle the lack of digital skills in Europe[20]. The Governing Body is composed of 12 members representing pledging members, national coalitions and social partners. The first meeting took place in late 2017. Partners and pledgers of this coalition carry out different actions to reduce digital skills gaps among European citizens and in particular:

[17] European Commission (2016). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A NEW SKILLS AGENDA FOR EUROPE Working together to strengthen human capital, employability and competitiveness, COM/2016/0381 final (link)
[18] http://ec.europa.eu/social/main.jsp?catId=1223&langId=en
[19] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013H0426(01)&from=EN
[20] https://ec.europa.eu/digital-single-market/en/digital-skills-jobs-coalition

- Digital skills for all – developing digital skills to enable all citizens to be active in our digital society
- Digital skills for the labour force – developing digital skills for the digital economy, e.g. upskilling and reskilling workers, jobseekers; actions on career advice and guidance
- Digital skills for ICT professionals – developing high level digital skills for ICT professionals in all industry sectors
- Digital skills in education – transforming teaching and learning of digital skills in a lifelong learning perspective, including the training of teachers

E) Rethinking Education[21]: set up in 2012 to reform education systems across the EU so as to meet growing demand for higher skills levels, reduce unemployment and better allocate educational resources to future demands[22]. The initiative focuses on three areas in need of reform:

- quality
- accessibility
- funding

Reforms should be designed to:

- raise basic skills levels
- promote apprenticeships
- promote entrepreneurial skills
- improve foreign language skills

F) The Entrepreneurship 2020 Action plan[23]: this a blueprint for action designed to unleash Europe's entrepreneurial potential, which identifies three main areas of actions:
immediate intervention:

- entrepreneurial education and training to support growth and business creation;
- removing existing administrative barriers and supporting entrepreneurs in crucial phases of the business lifecycle;
- reigniting the culture of entrepreneurship in Europe and nurturing the new generation of entrepreneurs.

In the report on the results of the public consultation, entrepreneurial behaviour, skills and mindsets should embedded in national/regional curricula at all levels – primary, secondary, vocational, higher education and non-formal education and training, alongside integration of work-based teaching and learning in all disciplines and curricula (64.5%).

II.III Skills and/or key competencies

In 1997, the Organisation for Economic Co-operation and Development (OECD) member countries launched the Programme for International Student Assessment (PISA), with the aim of monitoring the extent to which students near the end of compulsory schooling have acquired the knowledge and skills essential for full participation in society[24]. Considering the volatile context already at that time, the OECD refers to competencies that individuals need to meet their goals, requiring more than the mastery of certain narrowly defined skills. There is an ongoing debate on whether the term "skills" and "competencies" can be used interchangeably. Based on the Recommendation 2006/962/EC, eight key competences have been defined at

[21] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0669&from=EN
[22] https://ec.europa.eu/education/policy/multilingualism/rethinking-education_en
[23] https://ec.europa.eu/growth/smes/promoting-entrepreneurship/action-plan_en
[24] OECD (205). THE DEFINITION AND SELECTION OF KEY COMPETENCIES (link)

EU level, which represent a combination of knowledge, skills and attitudes that are considered necessary for personal fulfilment and development; active citizenship; social inclusion; and employment[25]:

1. Communicating in a mother tongue: ability to express and interpret concepts, thoughts, feelings, facts and opinions both orally and in writing.

2. Communicating in a foreign language: as above, but includes mediation skills (i.e. summarising, paraphrasing, interpreting or translating) and intercultural understanding.

3. Mathematical, scientific and technological competence: sound mastery of numeracy, an understanding of the natural world and an ability to apply knowledge and technology to perceived human needs (such as medicine, transport or communication).

4. Digital competence: confident and critical usage of information and communications technology for work, leisure and communication.

5. Learning to learn: ability to effectively manage one's own learning, either individually or in groups.

6. Social and civic competences: ability to participate effectively and constructively in one's social and working life and engage in active and democratic participation, especially in increasingly diverse societies.

7. Sense of initiative and entrepreneurship: ability to turn ideas into action through creativity, innovation and risk taking as well as ability to plan and manage projects.

8. Cultural awareness and expression: ability to appreciate the creative importance of ideas, experiences and emotions in a range of media such as music, literature and visual and performing arts.

It is important to note that in the framework of the New Skill Agenda for Europa, the Commission expects to adopt a proposal on *Key competences* for revision in early 2018.

II.IV Conclusions

According to the resources used so far, the very definition of skills has evolved over time to include an increasing number of competencies and other qualities linked to personal characteristics of each individual, in addition to the work-related ones. Individuals are best described as a combination of learning experiences and qualities, including but not limited to those taught in school settings.

The rapid changes in society requires higher degree of flexibility and adaptability of the individuals to new environments and demands, some of which are presented in the next chapter.

[25] Recommendation 2006/962/EC of the European Parliament and the Council of 18 December 2006 on key competences for lifelong learning, OJ L 394, 30.12.2006 in European Commission/EACEA/Eurydice, 2012. Developing Key Competences at School in Europe: Challenges and Opportunities for Policy. Eurydice Report. Luxembourg: Publications Office of the European Union (link)

III. **The Future and skills**

What are the skills most likely to be in high demand in the upcoming years? How can we best prepare future students for tomorrow's job market demands to be competitive in ever demanding scenario? What are the implications of technological developments for the job market? And lastly, what will be the jobs in next decades?

These are just few of the most common questions most people are trying to answer. From parents trying to help their offspring to have a better future, to employers in order to attract the right talent in their companies and retain them, to service providers to be able to stay ahead of trends and deliver effective services for their clients, to policy-makers, to identify priorities and allocate public resources accordingly. The list could be much longer, but a common reason may apply to all groups: anticipating trends gives a distinctive advantage to anticipate future challenges and being better prepared to address them.

From the questions above it emerges that skills demands are strongly linked to changes in other fields too, such as education and the employment market. In addition to more evident links, such as the employers' requests in terms of skills, consumers' choices might ultimately influence what industries/sectors will grow in the future. On the other hand, education systems in general, can shape the mind-sets of the future generations – and therefore consumers' choices too. For instance, if ethics is included in pupils' curricula, it seems plausible to think that as customers they will pay more attention, for example, to labour quality standards in the production of a given product. If more consumers share these ideals and values, companies employing children are likely to either change or disappear to survive. This is indeed an oversimplified example, but it can give an idea of how different forces come into play and are interlinked. The next sections briefly present some of possible trends in the job market, general and consumers trends' and lastly, to skills demand.

III. I Trends in the job market

Mapping and understanding what skills will be most demanded in the future has been a field extensively explored over the last years. A study focusing on the UK workforce situation in 2030 suggests there will be two major shifts in the pattern of employment. First, continuation of the decrease in the number of jobs in manufacturing and an increase in the number of service sector jobs. Second, the continued polarisation of the workforce – with an increase in higher-skilled and lower-skilled jobs at the expense of middle-skilled jobs[26]. The authors of this study identify five major drivers to bring about these changes: Globalisation, Decarbonisation, Technology, Demography and Brexit (impact on UK). Despite the conclusions are from the UK workforce outlook in the upcoming years, other countries might experience similar changes.

Similarly, the findings of another recent report on how the employment market in UK and US is likely to change in the future, provide additional insights[27]:
- the number of occupations likely to need more workforce in the future are less than those likely to shrink
- Education, healthcare, and wider public sector occupations are likely to grow
- skills that are likely to be in greater demand in the future, include interpersonal skills, higher-order cognitive skills, and systems skills.
- the future workforce will need broad-based knowledge in addition to the more specialised skills that will are needed for specific occupations.

[26] IPPR (2017) Skills 2030: Why the adult skills system is failing to build an economy that works for everyone (link)
[27] Bakhshi, H., Downing, J., Osborne, M. and Schneider, P. (2017). The Future of Skills: Employment in 2030. London: Pearson and Nesta (link)

The World Economic Forum report in 2016 provides several forecasts on job changes[28]. The Figure 2 below presents the expected changes between 2015-2020 across job families, whose findings mirror the trends mentioned for the UK and US job market (See Figure 3).

Figure 3

In 2010, Cedefop's report on labour market trends and skills supply from 2010 to 2020 in the EU-27[29] concluded that a large majority of jobs created in that timeframe will be to replace retiring employees as the EU's population ages. Due to the shift towards a service economy, it is likely that new jobs will be primarily created in knowledge- and skill-intensive occupations, such as high-level managerial roles and professional or technical jobs, with a likely decline in 'routine' jobs, including skilled manuals and office jobs. Furthermore, the share of jobs held by the highly-qualified will increase from 29 to 35% at the expense of those held by low-qualified workers. According to the report, new and highly qualified young people entering the workforce will drive these changes, together with retirement of lower skilled workers. The report however points out that imbalances might occur and that it will be necessary to strengthen guidance and work in cooperation with employers to build skills strategies.

III.II General and consumers' trends

According to a 2015 article[30], the general trends likely to have an impact on the international consumer's landscape in the upcoming years could be divided into five overarching categories:

1. the changing face of the consumer (*e.g. aging population, millennials*)
2. evolving geopolitical dynamics *(e.g. climate change*)
3. new patterns of personal consumption (*e.g. well-being and focus on health*)
4. technological advancements (e.g. big data and Internet of Things (IoT))
5. structural industry shifts (e.g. talent shift/drought)

Each category contains several sub-categories to help better understand the concrete implications of each trend in the future. The authors further distinguish among what they have defined 'high" and "low" predictability. The former category includes older consumers, ubiquitous use of internet and companies to make better use of digitization, big data, and analytics. Trends in in the low predictability realm, requires much deeper understanding and conclusions hardly apply to cross-sectoral and international scenarios.

[28] World Economic Forum (2016). The Future of Jobs Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution (link)
[29] Cedefop (2010). Skills supply and demand in Europe Medium-term forecast up to 2020, Luxembourg: Publications Office of the European Union, 2010 (link)
[30] Benson-Armer, R.; Noble, S, Thiel, A (2015). *The consumer sector in 2030: Trends and questions to consider*, McKinsey & Company (link)

The OECD published report[31] where skills are linked to the rise of global value chain (GVC). Value chain includes all activities that companies and workers carry out to produce goods or services, from ideation to its end use and beyond[32]. Activities such as design, production, marketing, distribution and support to the final consumer are all considered to be part of the value chain. From the early 2000s onwards, global value chain has become widely used to better reflects the transformation due to globalisation and internationalisation of the markets. Activities can be carried out by the same company but in different locations. Therefore, GVC offer opportunities and challenges for workers: on the one hand, employees might be able to use their skills without moving to another country; on the other hand, jobs can be easily offshored to different countries, creating job loss in certain areas. According to the authors, investing in skills enable countries to be more competitive in the global arena because effective policy skills can enhance country's productivity, support the country in becoming an innovation hub and also protect workers against negative effects of GVS, among which job losses and expansion of low quality jobs.

III. III Trends in the skills demand

O*net, an American portal for job seekers, is a good example of how skills can be already used today to find the right job. Its machine learning allows to move from the Jobs in demand to the Skills, mapping skills and competencies needed to do roughly over a thousand jobs. O*net allows jobseekers to navigate vacancies and to identify jobs using a "skills" advanced search system[33].

O*net provide the opportunity to match current skills with jobs, but it says little about what skills are needed in the upcoming years. In this regard, *Skillsforecast* developed by Cedefop, offers online tools and searchable databases to help understand skill supply and demand forecasts, by providing comprehensive information on the future labour market trends in Europe. Currently the Skillsforecast include data and forecast on[34]:

- **Labour force**
  Including population aged 15+ who are economically active[35].

- **Employment trends**
  Employment trends present the development of the employed persons in different sector, occupations and qualification

- **Job opportunities**
  Job opportunities represent the sum of net employment change and replacement demand

In addition to online databases, several authors and organisations provide additional suggestions to what skills are likely to be most needed in the future.
Tony Wagner, Senior Fellow at the Learning Policy Institute, refers to seven critical mindsets young people must have for tomorrow's jobs[36]:

1. Critical Thinking and Problem Solving
2. Collaboration Across Networks and Leading by Influence

[31] OECD (2017), *OECD Skills Outlook 2017: Skills and Global Value Chains*, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264273351-en
[32] Stacey Frederick, Duke University. Durham, NC, USA. Date: August 16, 2016 (link)
[33] Visit o-net portal at https://www.onetonline.org/
[34] http://www.cedefop.europa.eu/en/events-and-projects/projects/forecasting-skill-demand-and-supply/data-visualisations
[35] People with disabilities are not included in this group.
[36] Bidshahri, R (2017). 7 Critical Skills for the Jobs of the Future, SingularityHub (link)

3. Agility and Adaptability
4. Initiative and Entrepreneurship
5. Effective Oral and Written Communication
6. Assessing and Analyzing Information
7. Curiosity and Imagination

In a comparison between the top 10 skills in 2015 and 2020 (see Figure 3 below[37]), the World Economic Forum forecasts that Complex problem solving will be still the most valued skills, followed by Critical thinking and Creativity, expected to be the skill acquiring most relevance among those mentioned, moving up from the 10th position in 2015 to the 3rd place in 2020. According to the author of the article, the rise of Creativity as one of the important skill in the upcoming years is connected to the demands on workers to be able to use and benefit from the technological innovation in the future (See Figure 4).

in 2020	in 2015
1. Complex Problem Solving	1. Complex Problem Solving
2. Critical Thinking	2. Coordinating with Others
3. Creativity	3. People Management
4. People Management	4. Critical Thinking
5. Coordinating with Others	5. Negotiation
6. Emotional Intelligence	6. Quality Control
7. Judgment and Decision Making	7. Service Orientation
8. Service Orientation	8. Judgment and Decision Making
9. Negotiation	9. Active Listening
10. Cognitive Flexibility	10. Creativity

Figure 4

In the Partnership for 21st century learning (P21)'s framework, Creativity is included in among the Learning and Innovation Skills, recognized as the skills that separate students who are prepared for increasingly complex life and work environments in the 21st century, and those who are not[38]. When further elaborating on the characteristics of Creativity, P21 refers to two dimensions[39]:

Think Creatively:
- Use a wide range of idea creation techniques (such as brainstorming)
- Create new and worthwhile ideas (both incremental and radical concepts)
- Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts

Work Creatively with Others
- Develop, implement and communicate new ideas to others effectively
- Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work
- Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas
- View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes

Creative Thinking can also be presented as a set of different abilities and according to a team of teachers, designers and writers, include: Brainstorming, Creating, Designing, Entertaining, Imagining, Improvising, Innovating, Overturning and Active Questioning[40].

[37] Alex Gray (2016). *The 10 skills you need to thrive in the Fourth Industrial Revolution*, World Economic Forum (link)
[38] www.p21.org/our-work/p21-framework
[39] http://www.p21.org/about-us/p21-framework/262
[40] https://k12.thoughtfullearning.com/FAQ/what-are-learning-skills

III.**IV Education and skills**

In an effort to make sense of the interplay, transformation and changes the different driving forces will bring on different across economies, industries and global issues, the World Economic Forum launched the *Mapping Global Transformations* platform[41]. This is a dynamic knowledge tool aimed at supporting more informed decision-making, based on inputs from experts from leading global universities, think tanks, international organizations and other research institutions. The *Mapping Global Transformations* platform allows users to visualize and understand 120+ topics and the interconnections and interdependencies between them. When focusing on *Education and Skills*, the findings of the platform point out that:

> *technological innovation is fundamentally transforming education, and updating the skills required for the contemporary workplace. Building future-ready education systems requires designing curricula fit for the 21st century, coupled with the consistent delivery of a basic education for everyone that builds a solid foundation for a lifetime of adapting and developing new skills. Specialized education should provide in-demand skills, and address the disconnect between employer needs and existing instruction. This could help to improve labour market productivity, and optimize global talent.*

According to Raya Bidshahri[42], there is gap between today's education and skills of the future. She calls for a system where instead of teaching students to answer questions, the goal should be teaching them to ask questions. Education should prepare learners for life not just for college or university. Education systems will create not just better employees, but most important leaders and innovators. This radical change will transform the future of education and the workforce, but also the world and society.

In 2016, Think Global and Oxford Cambridge and RSA have investigated to what extend UK employers are prepared to the likely challenges of the future[43]. Based on the findings, the authors concluded that: the skills gap persists; more needs to be done to prepare for future skills requirements in a global world; employers themselves are out of touch. Furthermore, the study provides recommendations, calling for joint and coordinated efforts among including government, trainers and employers to better prepare young people from the reality of work and life in turbulent, global times.

> ***For Employers:*** *Employers needs to understand the multiple purposes of the education system, and take their own share of responsibility for improving the work-preparedness of young people. They need to be more connected with young people, and work should be done to better understand mismatches between employer and young peoples' expectation of work purpose and requirements. Employer bodies and associations should work actively to make employers aware of important global trends and developments.*
>
> ***For the Skills System:*** *Core skills remain vital; but curricula and careers advice must also include employability/soft skills. Schools should be more responsive to employers' demands; and regulatory and qualifications bodies should highlight the importance of global skills and competencies in standards frameworks.*
>
> ***For Government:*** *Government should be the facilitator for ensuring all stakeholders are engaged in the education and skills system rather than the determiner of requirements. The focus of activity should be on how to ensure efficient and effective partnership working is developed and maintained. To future-proof the education and training system, global and long-term perspectives must be adopted into curricula; and official projections for employment and skills in the UK (for example, from the ONS) should include specific consideration of global trends over the same periods studied in each projection.*

[41] https://www.weforum.org/about/transformation-maps
[42] Bidshahri, R (2017). 7 Critical Skills for the Jobs of the Future, SingularityHub (link)
[43] Think Global and Oxford Cambridge and RSA (2016). Turbulent Times: Skills for a Global World (link)

Since 2013, the European Skills Index created by Cedefop measures the comparative performance of the skills formation and matching system of each EU country. The purpose of a skills formation and matching system is to continually develop the skills of the population and utilise these skills by matching individuals' skills to the needs of employers[44]. The European Skills Index is based on 22 indicators clustered in three pillars, each of which measures a different aspect of a country's skills formation and matching system.

> **Pillar 1 'Development'** measures training and education activities
> Skills Development represents the training and education activities of the country and the immediate outputs of that system in terms of the skills developed and attained. Sub-pillars are included to distinguish compulsory education and post-compulsory education and training (lifelong learning activities).
>
> **Pillar 2 'Activation'** measures the transition of people into work, and participation in the labour market.
> Skills Activation includes indicators of the transition from education to employment, together with labour market activity rates for different groups of the population, to identify those which have a greater or lesser representation in the labour market.
>
> **Pillar 3 'Matching'** measures the degree of successful matching of skills, that is the extent to which skills are effectively matched in the labour market.
> Skills Matching represents the degree of successful utilisation of skills, the extent to which skills are effectively matched in the labour market. This can be observed in the form of jobs and mismatches which include unemployment, shortages, surpluses or underutilisation of skills in the labour market. Sub-pillars are included to distinguish unemployment and vacancies, and skills mismatches.

III. V Challenges

The ET 2020, the New Skills Agenda, Youth Guarantees, the Digital and Jobs Coalition, among others, coupled with allocation of financial resources through different programmes (EaSI, Erasmus+ to mention but a few), demonstrate the strong commitment from the EU to actively invest in the upskilling and re-skilling of EU citizens. In addition to increased productivity, the society as a whole is likely to benefit from joint efforts to create more flexible education systems, better suited to respond to fast changing needs in a globally interconnected societies. When shifting the focus from the benefits to the challenges connected to skills, some broad categories can be identified, including EU initiatives addressing them:

Recognition: considering the high mobility across EU Members states border, recognition of qualifications obtained abroad should be simplified and transparent. The European Qualifications Framework (EQF) helps to compare national qualifications systems, frameworks and their levels to make qualifications more readable and understandable across different countries and systems in Europe. The EQF is one of the 10 actions of the News Skills Agenda and in the recent Council Recommendations[45] invite all Members States to use EQF to reference national qualifications frameworks or systems and to compare all types and levels of qualifications in the Union that are part of national qualifications frameworks or systems.

[44] http://skillspanorama.cedefop.europa.eu/en/indicators/making-skills-work-index3
[45] https://ec.europa.eu/ploteus/sites/eac-eqf/files/en.pdf

Accreditation: A central tool of the Bologna process, whose general aim is to make national education systems more compatible, is the ECTS[46]. ECTS is a credit system designed to make it easier mobility of students across different countries. The amount of credits is assigned based on the learning achievements and workload of a course. Therefore, ECTS enable students to transfer credits from one university to another. The European Credit system for Vocational Education and Training (ECVET), by making it easier for people to get validation and recognition of work-related skills and knowledge acquired in different systems and countries, promotes mobility and compatibility between vocational education and training (VET) systems across Europe.

Validation of non-formal education: especially in today's societies and due to the possibilities offered by technology, the opportunities of learning by experience and within informal settings grows exponentially. People who acquire competencies in these alternative settings have a value and individual should be able to use them when seeking job opportunities. The 2012 Council Recommendations acknowledge the importance of these competencies[47], which are also highlighted in the New Skills Agenda for Europe (2016).

Quality: when learners acquire competences attending VET in a given country and then move abroad, there is always the possibility the institutions in the new country may have doubts about the quality of the other system. The European Quality Assurance Reference Framework (EQAVET) is a voluntary reference instrument designed to help EU countries promote and monitor the continuous improvement of their vocational education and training systems on the basis of commonly agreed references. Additionally, the framework should build mutual trust between the VET systems and therefore make it easier for a country to accept and recognise the skills and competencies acquired by learners in different countries and learning environments[48].

Return of investments: Policies focusing on skills bring about short and long term results. The economic benefits of investing in skills rather than addressing the consequences generated by widespread low and/or old skills, are being monitored and investigated. In 2017, Cedefop's study on low-skilled adults in the EU provides positive evidence about the economic and social benefits linked to investment in skills[49].

[46] http://ec.europa.eu/education/resources/european-credit-transfer-accumulation-system_en
[47] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2012:398:0001:0005:EN:PDF
[48] http://ec.europa.eu/education/policy/vocational-policy/eqavet_en
[49] Cedefop (2017). Investing in skills pays off: the economic and social cost of low-skilled adults in the EU. Luxembourg: Publications Office. Cedefop research paper; No 60. http://dx.doi.org/10.2801/23250

IV. **Conclusions**

Given the rate and interconnectedness of radical changes, predicting future trends seems difficult. Technology will bring about profound changes in our daily life, the way work and the way the world is connected. In ever demanding environments where robots, AIs and machine learning are likely to perform part of traditional tasks, it is likely that skills and competencies people will need to master in order to thrive are those, such as creativity, that are more difficult to transfer or outsource to machines.

The right skillset is crucial to ensure people can find quality jobs, by which they can realise personal goals but also act as engaged citizens. Individuals' competences do play a role in the jobs people are able to find, hence a great importance should be placed on how skills are acquired, maintained and updated over time. However, what competencies are needed changes faster and faster and some struggle more than others to adapt to ever demanding requests, creating skills gaps and mismatches. Improving communication across labour market, education and training and policies is crucial. The challenges of the future call for a transformation in the education system too, including a full acknowledgement of alternative learning process, including non-formal education and VET that can better equip learners to quickly adapt to new settings and demands.

In the Chapter on Equal opportunities and access to the labour market, the European Pillar of Social Rights points out that the right to quality and inclusive education should be enjoyed by all, adding that this right is linked to the acquisition and retention of skills that enable people to participate fully in society[50]. However, the MEP Helga Stevents noted that:

> *The EU is effectively one of the most advanced and richest regions on the planet, yet it is not inclusive enough. We still manage to regularly exclude 80 million disabled EU citizens. This way we are missing out on valuable skills and potential labour force in the process (…)"* [51]

The lack of a fully inclusive society may leave behind part of its citizens, whilst close to 70 million Europeans struggle with basic reading and writing, calculation and using digital tools[52]. People are in greater need of skills to better adjust to changes, thrive in today's fast-changing social and economic landscapes and contribute to society, through innovation and growth. More work must be done to ensure equal opportunities to access education and training, and promote an inclusive society Opportunities to upskilling and re-skilling during the life time should be made available to all members of the society. New systems and tools that can better reflect everyone's talents should also consider the human ability to adapt to changing contexts and competencies acquired on the job.

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[50] https://ec.europa.eu/commission/priorities/deeper-and-fairer-economic-and-monetary-union/european-pillar-social-rights/european-pillar-social-rights-20-principles_en
[51] http://www.europarl.europa.eu/news/en/press-room/20171127IPR88945/helping-people-with-disabilities-meps-advocate-positive-discrimination
[52] http://ec.europa.eu/social/main.jsp?catId=1224&langId=en