

THE FUTURE OF WORK AND SKILLS IN ETF PARTNER COUNTRIES

ETF ISSUES PAPER

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EXECUTIVE SUMMARY

The objective of this Issues Paper is to analyse the impact of global developments on skills demand in the ETF's partner countries and discuss implications for policy reforms to manage the transition of education, training and lifelong learning systems of the future. A team of international and national experts contributed to the paper by (i) collecting and analysing information, data and new ideas on the skills demands of the future in ETF partner countries; and (ii) exploring responses for the better management of the transition towards an inclusive future for the benefit of individuals and societies.

Chapter 1 develops an analytical framework for the study and investigates the context and the current and foreseeable global trends in economies, labour markets and skills. Globalisation is seen as a common denominator for many other global trends, with effects on the environment, culture, political systems, economic development and prosperity, and on human physical well-being in societies worldwide. The impacts of specific global trends vary by geographical, regional and socioeconomic contexts. Among future drivers impacting work and skills are digitalisation, automation and robotics, especially in routine occupations, although uncertainties about the magnitude of the impacts remain. Changes in work and skills culture require changes in human attitudes and behaviour.

Chapter 2 focuses on the specific challenges faced by the ETF's partner countries as a result of those global trends: digitalisation as a driver of diversification of economic structures; automation as a threat to foreign direct investments (FDIs) and offshoring; the challenges of labour markets, especially youth and female unemployment and inequality; demographic challenges together with migration flows and 'brain drain'; the impacts of climate change and diminishing natural resources; and increasing political instability.

Chapter 3 explores in more depth the type and extent of changes in labour markets within the ETF's regions. The chapter analyses the key factors that affect countries' abilities to cope with these changes. These include the relative size of the youth population, participation in tertiary education and public expenditure on education as a percentage of countries' gross domestic product (GDP), and employment by broad economic sectors.

Chapter 4 discusses the existing policy responses and strategic choices of the ETF's partner countries for effectively managing the transformation of work and skills, and provides a number of recommendations for these countries. The recommendations for further developing work and skills in these countries highlight the importance of creating a future-oriented culture, mindsets and corresponding foresight exercises. Improving the economy and mitigating socioeconomic issues, such as corruption and inequality, are considered key conditions for fostering sufficient investments and achieving progress in education, vocational training and lifelong learning system reforms.

INTRODUCTION

In 2016, the European Union (EU) adopted the new ‘Skills Agenda for Europe’ to ensure that people develop a broad set of skills from early on in life and to make the most of Europe’s human capital, which will ultimately boost employability, competitiveness and growth (European Commission, 2016). Three areas of action were designed in order to improve the quality and relevance of skills formation; make skills and qualifications more visible and comparable; and improve skills intelligence and information for better career choices. In 2018, two new initiatives were set up: the updated EU recommendation on Key Competences for Lifelong Learning (eight key competences to be instilled in pupils) and a Digital Education Action Plan for people and the education system to adapt to life and work in a digital age. Regardless of countries’ stage of development and their geographical locations, education plays a vital role in developing knowledge, skills, attitudes and values, enabling people to contribute to and benefit from an inclusive and sustainable future (OECD, 2018b). Corresponding strategic policy conclusions on the key importance of education and training for economic, societal and technological developments have been drawn by many international organisations and by a number of individual countries worldwide.

This ETF Issues Paper on the Future of Work and Skills is the first attempt to collect and analyse existing information and data on the skills demands of the future in ETF partner countries, and to explore responses for better managing the transition (transformation) towards an inclusive future for the benefit of individuals and societies. Thus, the paper analyses the impact of global developments on skills demands in ETF partner countries in order to support their discussions on the policy reforms required for managing the transition to the future. Rather than making a detailed analysis of each individual country, the paper reviews the general trends across the four regions of the ETF’s partner countries: South Eastern Europe and Turkey (SEET), Eastern Partnership (EaP), Southern and Eastern Mediterranean (SEMED) and Central Asia¹.

The key focus of the paper is to identify the impact of different trends and drivers in the ETF’s partner countries and the implications for people-centred policies. Rather than focusing solely on predicting the future, the paper reviews the risks and opportunities of the transition, the processes of change, and the preparations for an unknown future, in particular in the fields of education including vocational education and training (VET), skills and employment. Managing transition processes means not only mitigating risks, but also taking opportunities.

¹ The **SEET** region includes Albania, Bosnia and Herzegovina, Kosovo*, Montenegro, North Macedonia, Serbia and Turkey. The **EaP** region includes Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine. Although it is not part of the EaP region, the data for Russia is sometimes included under this group for practical reasons. The **SEMED** region includes Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine** and Tunisia. Although not systematically, the limited information on Libya and Syria are added when available in the SEMED region. The **Central Asia** region includes Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

*This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence, hereinafter ‘Kosovo’.

**This designation shall not be construed as recognition of a State of Palestine and is without prejudice to the individual position of the Member States on this issue, hereinafter ‘Palestine’.

The paper is structured as follows: Chapter 1 develops an analytical framework for the study and investigates the context and the current and foreseeable global trends for economies, labour markets and skills. Chapter 2 focuses on the specific challenges faced by the ETF's partner countries as a result of those global trends. Chapter 3 examines in more depth the type and extent of changes in labour markets and skills needs identified in the ETF's regions, with some highlights from case studies. Policy responses and strategic choices regarding future skills development to manage the transition is the focus of Chapter 4.

1. UNDERSTANDING THE IMPACTS OF GLOBAL TRENDS ON ECONOMIES, LABOUR MARKETS AND JOBS

The analytical framework of this study benefitted from the foresight approach developed by the VTT Technical Research Centre of Finland. Foresight is a systematic, participatory, prospective and policy-oriented process which, with the support of environmental/ horizon scanning approaches, is aimed to actively engage key stakeholders into a wide range of activities anticipating, recommending and transforming (ART) technological, economic, environmental, political, social and ethical (TEEPSE) futures. Existing experiments of horizon scanning have already identified 50 global trends shaping the future of work and skills, which can be classified broadly into five domains: economic trends; societal trends; science, technology and innovation trends; environmental trends; political/ethical trends (see Annex 1). Under science, technology and innovation trends, various types of platform technology can be identified, such as materials technologies, health/food technologies, bio/nano technologies, energy/climate technologies and information and communication technologies (ICTs)/digital technologies (see Annex 2).

Figure 1.1 presents the general framework of this study on the future of work and skills, and the logic of its key elements. The stepwise logic of the framework is as follows. The *first step* in the analysis is how selected global trends – at a general level – have an impact on economies, jobs and employment. The *second step* is an in-depth analysis of the impacts of global trends on job and employment structures, labour markets and the composition of skills and competences so that supply matches demand (The first and second steps of the framework are presented in Chapter 1). The *third step* in the analysis is to identify what kind of changes are needed in education, VET and lifelong learning systems and how these systems can be supported by new education and learning technologies. The *fourth step* is to explore what kind of strategies and policies are needed to manage the transition of work and skills to the future in order to achieve the set objectives, and what kind of system is needed to monitor the impacts of such work and skills strategies and policies (The third and fourth steps of the framework are presented in Chapter 4).

FIGURE 1.1 FORWARD-LOOKING ANALYSIS OF WORK, LABOUR MARKET AND SKILLS: ANALYTICAL FRAMEWORK



1.1 Impacts of global trends on economies, jobs and skills

It is vital to gain an understanding of existing and emerging trends and drivers underpinning multi-systemic transformations of economies, societies and the development of education, skills and learning systems. As highlighted by UNESCO (2014), as thinking about education and learning evolves, it is necessary to look beyond the confines of the education sector and examine wider societal development trends to understand their potential implications for the future of education and learning. The trends discussed below are globalisation (economic, industrial and ICT trends); demographic changes, migration and mobility (social trends); digitalisation, artificial intelligence (AI) and automation (technological trends); and climate change and diminishing natural resources (natural or environmental trends)².

Finally, we refer briefly to political instability, which the Global Economic Forum, for example, considers a key feature of the global risks landscape. In the challenging and complex global context, all these trends are intertwined both mutually and with other global and local trends, for example with the rise of the platform economy, robotics, urbanisation and population ageing. The global trend analysis here includes both developed, transition and developing countries³. Some global trends are

² Different versions of these global trends have been identified and analysed in many future-oriented studies and documents on jobs, labour markets, skills, and education and training (e.g. Beblavý et al., 2016; UNESCO, 2014; Redecker et al., 2011), and they were also among the trends prioritised by the regional experts of ETF partner countries in the ETF workshop 'The future of work and skills' held in Turin in April 2018.

³ While the term 'developed countries' always refers to high-income countries (or advanced economies), there is a confusion on the term 'developing countries' as this may cover low-income to lower-middle or upper-middle income countries. Due to a wide diversity, the ETF uses the term 'transition countries' to refer to lower-middle and upper-middle income countries, although the term was originally used for the ex-Soviet Union countries after the collapse. More recently the term 'emerging countries' is also used for lower-middle and upper-middle income countries, while the term 'developing countries' almost always refers to low-income countries.

more relevant in some transition and developing countries than others, and the impacts of trends also vary by geographical and regional contexts.

Globalisation – A common denominator for global trends

Globalisation drives socioeconomic developments in all nations, regardless of their phase of socioeconomic development. Globalisation can be defined as a process of interaction and integration among the people, companies and governments of different nations, a process driven by international trade and investment and aided by information technology (IT). In 2000 the International Monetary Fund identified four basic aspects of globalisation: trade and transactions; capital and investment movements manifested in, among other things, global value chains (GVCs); migration and movement of people; and the dissemination of knowledge. Further, environmental challenges such as global warming, cross-boundary water, air pollution, and overfishing of the ocean have been linked with globalisation⁴. Moreover, the internet and ICT are among the most important enablers of globalisation. Thus, globalisation can be seen as a common denominator for most of the global trends discussed below.

Today more than 50% of global trade in manufacturing goods consists of intermediate goods, and an increasing 70% of trade in services involves intermediate services (ESCWA, 2017). GVCs allow disadvantaged countries to become involved in production chains by specialising in specific components, parts or tasks⁵. Such countries benefit from economies of scale and other advantages gained from partnering with global conglomerates, notably greater interconnectedness among economies in a geographical region. International fragmentation of production has helped to shift participation in global markets from developed to developing countries, and between developing countries themselves. This has created a platform for countries to take part in the global economic operation through product specialisation. The result is a new production and trade paradigm that integrates low-wage labour from developing countries with technology provided by more advanced ones. After a modest start in the clothing and electronics industries in the late 1960s, the North–South exchange in international production networks has evolved and expanded to industries such as sports footwear, automobiles, television and radio receivers, sewing machines, office equipment, electrical machinery, cameras, watches, light-emitting diodes, solar panels, and surgical and medical devices.

The majority of developing countries, including the poorest, are increasingly participating in GVCs. The developing country share of global value-added trade increased from 20% in 1990 to 30% in 2000 and to over 47% in 2017 (ESCWA, 2017). An estimated 80% of the global trade associated with GVCs is conducted through transnational corporations. As a result, countries with high FDI inflows relative to their economies tend to exhibit higher participation in GVCs and generate higher domestic value added from trade, which is corroborated by the strong correlation between FDI stocks and country GVC participation. GVC links in developing countries play an important role in economic growth. Domestic value added created from GVC trade can be very significant relative to the size of local economies. In developing countries, for example, value-added trade contributes some 28% to countries' GDP on average, as compared with 18% in developed countries (De Backer and Miroudot,

⁴ Source: <https://en.wikipedia.org/wiki/Globalization>

⁵ The term 'value chain' refers to the processes involved in developing, designing, producing, marketing and distributing a product. It stretches from upstream activities (research and development, for example) to downstream ones (assembly, distribution, marketing and after-sales service). The distinct feature of a GVC is that these activities are spread across multiple countries, often in one geographical region but also in different parts of the world.

2013). The research shows that learning and innovation capacity, skilled workers and the acquisition of knowledge from other companies (often from more developed counterparts) are elements of success in GVCs.

Decisions on investments and locations by multinational and other enterprises are made in the global arena, logistics and value chains are globalised, and companies compete worldwide for an educated and skilled workforce. Hence, the worldwide competition is about the attractiveness of innovation systems, the availability of a skilled labour force, and affordable costs. The competition for talent and a skilled labour force is increasingly fierce, necessitating greater workforce diversity to secure competitive advantage (e.g. EY, 2015). This means that developing and emerging economies have no option but to invest in skills development and capacity building in education, training, VET and lifelong learning if they are to become attractive locations for foreign investment.

Demographic changes

According to forecasts, the world population will continue to increase rapidly. For example, the population of Africa is expected to triple to over 2.5 billion by 2050, and the current migration level is expected to rise to millions instead of hundreds of thousands. Many developing countries have seen a decline in their fertility rate only recently, with some of the poorest countries still experiencing persistently high fertility. As the global population continues to grow, migration, urbanisation and increasing social and cultural diversity are reshaping countries and communities (OECD, 2018b). According to the United Nations, 54% of the world's population lives in cities, and by 2050 this proportion will increase to 66%. An increase in urbanisation directly translates to an increase in two factors: (1) energy, which is fundamental not only to the construction of new materials, but also to the powering and maintenance of all settled populations; and (2) infrastructure, such as rail, roads, schools, hospitals and residential and non-residential buildings. These vital pieces of infrastructure support urban populations and ensure access to basic services. China and India had the fastest growing rate of urbanisation of major population bases from 1990 to 2015⁶.

Demographic change differs in developed and developing countries. The demographic shift has potential to create more jobs, particularly in the health and social care sectors as a result of the ageing population (Schultz and Geyer, 2013; ITUC, 2017). However, workers need to have the right set of skills to be employed in these positions. In countries with an ageing population, there are growing demands on the education system to provide opportunities for adult reskilling and upskilling (UNESCO, 2014).

Migration, mobility and brain drain

Migration has been increasing over recent years. In 2017 an estimated 258 million people were living in a country other than their country of birth, up from 220 million in 2010 and 173 million in 2000 – an increase of 49% since 2000 – according to statistics released by UN DESA (2017). This number of international migrants constituted 3.4% of the world's population, a modest increase from 2.8% in 2000. Over 60% of all international migrants live in Asia (80 million) or Europe (78 million). North America hosts the third largest number of international migrants (58 million), followed by Africa (25 million). Global displacement is also at a record high level, with the number of internally displaced people at over 43 million and the number of refugees 26 million as a result of persecution, conflict or

⁶ For example, it is estimated that by 2025, 46 of the 200 global cities will be in China (Dobbs et al., 2015). Here the term 'global city' refers to a city that is a primary node in the global economic network.

violence. Contrary to the general perception that most refugees are making their way to countries in the Global North, 85% of refugees are hosted in developing countries, many of which are desperately poor and receive little support to care for these populations (UNHCR, 2018).

Migration is associated with several socioeconomic and ethical challenges. Many studies suggest that the main reasons for emigration are economic and social inequality for the majority of people, followed by conditions of war and violence. Recent decades have been characterised by migration of highly qualified researchers from South to North and a related brain drain. As many as 20 million of the 59 million migrants living in OECD countries are highly skilled (UNESCO, 2010). Among the main challenges for developing economies is brain drain, which often benefits developed countries but hampers science, technology and innovation progress in less developed countries, for example by reducing total output, diminishing competence in domestic high-skill sectors, and eroding the tax base (Stiglitz and Charlton, 2005; Weinberg, 2011). Brain drain takes place not only externally but also internally. For example, in India internal migration and brain drain occur when domestic firms cannot compete with the attractive compensation packages offered to personnel by foreign firms based within the country (UNESCO, 2010).

In recent years there has been a spike in migration streams to both Europe and many neighbouring countries as a result of instability and insecurity in many surrounding regions in Africa and the Middle East. In these cases, for many people migration represents hope, an opportunity to escape from human disasters such as terrorism, severe food shortages and drought owing to climate change. A new trend that is increasingly witnessed is that of simultaneous emigration and immigration flows, in particular in many middle-income countries in the European neighbourhood. Thus, it is no longer clear whether countries are strictly sending or receiving countries, and the impact of flows very much depends on the specific country context.

Migration is a challenge not only in departure communities but also in receiving communities (UNESCO, 2014). It is also linked to diverse global challenges such as population growth, demographic changes and urbanisation. The impact of international migration is likely to increase considerably, leading to high levels of brain drain for some countries and ‘brain gain’ for others. Moreover, migration demonstrates that education must prepare learners to live and work abroad and that qualification systems will have to adapt to increasing demand for more transparency and for effective approaches to the recognition of qualifications. In conclusion, in numerous developing countries migration is and will continue to be a serious challenge.

Digitalisation, artificial intelligence and automation

The future will be shaped by digital disruptions (EY, 2015). Digitalisation and AI are general-purpose technologies that are gradually, and significantly, changing working life, labour markets and skills needs in developed and developing economies worldwide. Digitalisation increasingly affects the global marketplace and the dynamics of knowledge, innovation and education. Transnational enterprises and their business ecosystems and value chains are gaining from digital platforms and ecosystems. Brynjolfsson and McAfee (2014) call the current technological revolution a ‘Second Machine Age’ that is characterised by astonishing progress, with digital technologies that create opportunities for the rapid growth of productivity and for higher living standards. To harness the potential of these technologies, societies must invest in updating workers’ skills, facilitating the mobility of the workforce and generating innovations that complement human labour. The transformation to the ‘digital era’ requires reforms in education, VET and lifelong learning systems. Digitalisation is also linked to the

blurring of boundaries between industrial sectors, changes in the nature and conditions of work, Internet of Things-enabled connected devices, and the virtual world replacing travelling (EY, 2015).

The digital era is expected to bring many different positive opportunities. Digital ID systems are expected to provide better access to public and private services for the 2.4 billion people, mainly in developing countries, who lack formal identification records such as birth certificates. The Second Machine Age accelerates a shift from resource-based to knowledge-based economies in both the developed and developing worlds. Digital progress is expected to lower prices, improve quality and create a world where abundance becomes the norm (Brynjolfsson and McAfee, 2012).

Alongside its positive impacts, digitalisation is also associated with a number of threats. The digital divide is part of a broader trend of increasing inequality that has various aspects, from low levels of education to income inequality and from health issues to failings of education systems, etc. (NESTA, 2017). Among the challenges presented by digitalisation are unprecedented transparency, privacy concerns and cybersecurity threats (EY, 2015). Digital platform use may lead to uncontrolled use of social media, political influence, etc. Digital progress will not benefit everyone equally, and it could leave many workers behind. Digitalisation always leads to the debate on technological unemployment, as discussed in Section 1.2.

Digitalisation is also associated with trends in offshoring, deshoring and reshoring. Offshore countries are assessed to be better protected from job losses in the short term owing to the concentration of customer-service-type activities, which have less immediate automation potential. Although automation will eliminate a substantial number of jobs that are currently offshored, offshoring is expected to remain important in the future, as opportunities for outsourcing higher-level tasks that cannot be automated to lower-cost countries continue to be identified. In many cases, new jobs will be created in closer proximity to the businesses, thus creating a 'reshoring' effect in which automation eliminates jobs in one country and creates new jobs in automation management in an onshore country (A.T. Kearney, 2017). Higher-cost onshore countries such as the USA will, overall, lose a smaller proportion of jobs, as they will gain a higher percentage of jobs through reshoring.

In conclusion, for digital technologies to benefit everyone everywhere requires the closure of the remaining digital divide, especially in terms of internet access (World Bank, 2016). Access to digital technology brings both opportunities and threats in emerging and developing countries. Through inclusion, efficiency and innovation, access provides opportunities that were previously out of reach for those who are poor and disadvantaged. In Kenya, for example, the cost of sending remittances dropped by up to 90% after the introduction of a digital payment system M-Pesa (World Bank, 2016). In the short run, the digital prospects of developing countries can be improved by investing in infrastructure, reforming education at all levels and encouraging entrepreneurs to invent the new products, services and industries that will create jobs. Moreover, digitalisation and new technology support education, training and lifelong learning (this issue is discussed in more detail in Chapter 4). As UNESCO (2014) concludes, growth in open educational resources and free online courses by universities and technical and vocational education and training (TVET) institutions is dramatically changing education. Beyond its scope for improving learning in school settings, ICT can also enable informal and non-formal learning.

Climate change and diminishing natural resources

Climate change and the depletion of natural resources require urgent action and adaptation (OECD, 2018b). Global climate changes have already led to global responses, which culminated in the Paris

Agreement within the United Nations Framework Convention on Climate Change (UNFCCC), aimed at keeping global warming under control starting in 2020⁷. One of the three pillars of the Europe 2020 Strategy is sustainable economy, promoting the transformation towards an inclusive green economy that generates growth, creates jobs and helps reduce poverty through sustainable management of natural capital⁸. Managing the life cycle of natural resources, from extraction through the design and manufacture of products, to what is considered as waste is essential to green growth and part of developing a resource-efficient, circular economy where nothing is wasted. Energy comes from many sources, the most common being coal-fired power stations, renewables, and nuclear and gas-fired power stations. In China, for example, coal makes up 65% of the energy mix, followed by renewables, at 26% (OECD, 2018b). The shift from non-renewables to renewables in the production and consumption of energy leads to many changes and requirements in jobs, skills and education.

Colijn and Behrens (2015) examine the relationship between energy, employment and economic growth. While decarbonisation will lead to job losses in the primary sector, a higher number of jobs will be created in the power sector (owing to an increase in the number of jobs in construction, installation, manufacturing, and operation and maintenance). The estimated net employment impact is positive. The reason for the growing number of jobs in the power sector is the higher labour intensity of renewables. Furthermore, the renewable energy sector employs a higher share of skilled workers than most activities in primary fuels, according to Behrens et al. (2013). Thus, it can be inferred that the skill level of jobs is likely to go up, and that re-education and training will also be required.

Climate change has had drastic impacts, especially in developing countries, in the form of drought, desertification and land degradation. These impacts are leading to serious socioeconomic consequences, such as hunger and migration, especially in Africa, where hundreds of thousands of people have been displaced. It is estimated that over the next 10 years an estimated 60 million people will be at risk of being forced to move from degraded land, both within and outside the continent. In Somalia, for example, in November 2016 rains failed for the third year in a row, creating a devastating drought that by March 2017 had caused the displacement of over 600 000 people within the country.

Political instability and risks

For over a decade, the Global Risks Report of the World Economic Forum (WEF) has focused on the evolution of global risks and the connections between them⁹. The report highlights persistent, long-term trends such as inequality and deepening social and political polarisation, which exacerbate the risks associated with the weakness of the economic recovery and the speed of technological change. According to the report, these trends came into focus during 2016 with the rising political discontent and disaffection that was evident in countries across the world. Perhaps the most significant signs of disruption have come from Western countries, with the increased impact of populism in the UK Brexit voting and the US presidential election. Moreover, across the globe there is evidence of a growing backlash against elements of the domestic and international status quo.

⁷ The Paris Agreement entered into force in November 2016, with the signature of 195 UNFCCC members and the approval of 185 countries. The agreement is to keep the increase in global average temperature to well below 2°C above pre-industrial levels; and to limit the increase to 1.5°C, since this would substantially reduce the risks and effects of climate change. Under the Agreement, each country must determine, plan, and regularly report on the contribution that it undertakes to mitigate global warming through greenhouse-gas-emissions mitigation, adaptation, and finance.

⁸ http://ec.europa.eu/environment/green-growth/index_en.htm

⁹ <http://reports.weforum.org/global-risks-2017/executive-summary/>

1.2 Impacts of trends on the nature of work, employment and skills needs

According to the analytical framework presented in Figure 1.1, the second step is an in-depth analysis of the impacts of selected global trends on the nature of work, jobs, employment and labour market structures, and on future skills and occupational composition to ensure that the supply of skills and occupations will match demand. The first subsection below discusses the changes in the nature of work, i.e. the replacement of the 'job' by the 'task', enabled by new technologies, and opportunities for entirely new business models ('Uberisation', i.e. being hired and paid by the task). The second subsection considers the debate on the negative and positive impacts of automation and robotics on employment, while the third is on methodologies, dynamics and results of future-oriented studies of skills and occupations.

Impact of digitalisation on the nature of work and jobs

One of the most debated studies on the replacement of human work by technological progress is by Brynjolfsson and McAfee (2012, 2014). They explain such replacement in terms of the decoupling of labour productivity from employment¹⁰. Productivity grew until the late 1990s, after which productivity and employment became decoupled. Brynjolfsson and McAfee list several explanations for this, from tax and policy changes to the effects of globalisation and offshoring, but stress another driver of the decoupling, namely the changing nature of technological progress. As digital devices such as computers and robots become more capable, in line with Moore's Law¹¹, they can do more of the work that used to be done by people, and digital labour substitutes for human labour. This happens first with more routine tasks, which is a major part of the reason why less-educated workers have seen their wages fall the most as the computer age has progressed (Brynjolfsson and McAfee, 2012).

The decoupling of productivity from employment will accelerate for two reasons (Brynjolfsson and McAfee, 2012, 2014). First, computers will continue to become cheaper over time and digital labour will become cheaper than human labour. This is happening not only in the USA and other rich countries but also in places like China and India. Second, technologies are going to continue to become more powerful, and to acquire more advanced capabilities. They can already drive cars, understand and produce natural human speech, write clean prose, etc. 'Brawny computers'¹², brainy programmers and big data are a potent combination that has just started to develop. Brynjolfsson and McAfee (2012) quote Marc Andreessen on the implications of the work of brawny computers, brainy programmers and big data: 'The spread of computers and the internet will put jobs in two categories: People who tell computers what to do, and people who are told by computers what to do.' Only one of these two job categories will be well paid. 'Great decoupling' is not going to be reversed, because advances in digital technologies are not about to stop (Brynjolfsson and McAfee, 2012).

Davis's argument on threatened jobs is based on the dissemination of a new business model, 'Uberisation'. As automation and offshoring are widely recognised threats to existing jobs, Davis (2015) concludes that the advent of smartphones and new forms of 'platform capitalism' such as Uber create a new type of threat: the replacement of the 'job' with the 'task'. The basic model of labour on

¹⁰ The original idea of decoupling of labour productivity and employment was from Bernstein (2011).

¹¹ The number of transistors on a semiconductor can be inexpensively doubled about every two years.

¹² The term 'brawny computers' refers to more powerful and faster portable computers with strong operational processors, although they may be lightweight.

demand has come to be called the 'gig economy' because, unlike workers in jobs that imply an ongoing and perhaps indefinite connection between employer and employee, gig labourers perform a particular service for a fee. Personal services that were relatively immune to offshoring are now subject to 'Uberisation'. There are now 'Ubers' for almost any personal service, from package pickup and delivery, to housecleaning, to house-calls by physicians.

Heeks (2017) elaborates the concept of the digital gig economy. The primary term from a work and labour focus would be 'online labour', from a client-side focus 'online outsourcing', and as an overall domain '(digital) gig economy'. 'Online labour' is contingent (task- or project-based), intangible work delivered digitally and done for money, organised via online outsourcing platforms that are marketplaces bringing together buyers and sellers. Online labour, both from developed and developing countries, represents the digitisation of both work and work organisation. On the basis of various estimations, Heeks (2017) suggests that there were an estimated 36 million registered workers from low- and middle-income countries on Western-based online outsourcing platforms in 2015, and at least 6.1 million of them are active workers.

The actual size of the digital gig economy is, therefore, relatively limited, as has been its impact on the wider economy and labour market. Its demand for attention comes from, first, the fact that it represents a new model of employment, and, second, its high growth rates, which mean it will have an ever-increasing economic, social and political impact.

Employment effects of automation and robotics

The impact of technological change on employment is a recurring issue for debate. Frey and Osborne (2013) summarise this debate as follows: technological progress has been accompanied by substantial changes in the occupational structure throughout history, but it has not resulted in widespread technological unemployment. The reason is that technological progress has two opposing effects on employment: a *capitalisation* effect (employment grows in highly productive sectors) and a *destruction* effect (technology and labour are substitutes). In the 19th century, manufacturing technologies and skilled labour were substitutes. The 20th century was characterised by job polarisation caused by computerisation.

McKinsey (2017b), Arntz (2016), Frey and Osborne (2015) and A.T. Kearney (2017) are among a number of studies to report on the employment effects of automation and robotics. McKinsey assesses the types of jobs that might be created under different scenarios up to 2030 and compares this with jobs that could be displaced by automation. The report concludes that even as automation technologies, including AI and robotics, cause declines in some occupations, automation will change many more: in 60% of occupations, at least 30% of constituent work activities could be automated. Frey and Osborne (2015) conclude that 47% of jobs in the US economy are at risk of being automated by advances in AI-related fields. A.T. Kearney (2017) states that as technology continues to improve and its implementation expands, more than 1 million jobs are at risk in the next five years in four countries alone (USA, Poland, India and the Philippines). According to A.T. Kearney's report, automation is still in its infancy; it complements and augments existing human skills in business process outsourcing (BPO¹³) industries and allows workers to become more productive and efficient, and fewer in number, although accomplishing the same work.

¹³ BPO industries cover finance, accounting and customer service work, including procurement and predominantly non-voice work, as well as human resources and sales work.

In conclusion, studies on the employment effects of new technologies present scenarios that must be taken seriously. However, many such studies conclude that the impacts of automation and other new technologies remain uncertain and controversial. For example, Autor (2015) concludes that this debate often overstates the extent of machine substitution for human labour and ignores strong complementarities between automation and labour, increasing productivity, raising earnings, and augmenting the demand for labour. Studies have often minimised the potential effects of automation on job creation, and have tended to ignore other relevant trends, such as globalisation, population ageing, urbanisation, and the rise of the green economy. For example, the impacts of digitalisation on future jobs are far from certain, in spite of the fact that the composition of the workforce has shifted dramatically in recent decades (Berger and Fray, 2016). Moreover, among the issues to be considered are also occupations that do not yet exist but may emerge in the future in response to the identified drivers of change.

Assessments of future skill and occupation compositions

Foresight, forecasting and predicting future skills and occupations to ensure that supply matches demand has been an ongoing challenge in education and labour market strategies and policies. The reason for the difficulty in analysing new and emerging occupations is that first, they are not well reflected in existing data sources, and second, the coherent institutions and cognitive categories that would facilitate data collection are absent (Damarin, 2006). Along with new jobs, new skills are required that can be developed through formal education or on-the-job-training. According to Beblavý et al. (2016), the basic task is to identify these new jobs and skills and to discern the ways in which they impact the economy. Crosby (2002) states that in identifying new occupations, the majority of studies rely on surveys, employer interviews, trade publications and job postings (and corresponding job titles).

There are many organisations surveying new occupations, such as the US Bureau of Labour (the O*NET system), the Texas Career Development Resources office, Cedefop (Pan-European Forecasting Model)¹⁴, the European Commission (European Skills Panorama)¹⁵, and the Human Resource Development Canada (the Canadian Occupational Projection System). For example, the Danish national Labour Market Authority and the Swedish public employment service collect evidence on employers' demand and compile projections on skills and occupational demand in a multilevel perspective (local, regional and national) (ETF/Cedefop/ILO, 2015). Wilson and Zukersteinova (2011) and ETF/Cedefop/ILO (2016a, 2016b) present many methods used to forecast future skill needs: quantitative approaches; qualitative methods; focus groups, Delphi methods and scenario development; and sectoral studies, and regional and other observatories. The maintenance and continuous development of standardised international occupational classification is important for making international comparisons and for systematic management in the planning and implementation of education policies. Selected examples of occupational and employment projections are presented in Annex 3.

The dynamics of and changes in job composition vary in relation to many different issues, such as occupational stability and mobility, outsourcing, routine and/or non-routine work, educational and skills mismatch, and over-education (Beblavý et al., 2016; OECD, 2017). For example, results from the study by Hanson and Slaughter (2015) indicate that employment in science, technology, engineering

¹⁴ See Cedefop (2018).

¹⁵ See <http://skillspanorama.cedefop.europa.eu/en>

and mathematics (STEM) occupations follows the ‘boom-bust’ (or boom-destruction) cycle in the technology industry. Skill polarisation can occur at the occupational level: while workers in lower occupational classes face skill stagnation or depreciation, the opposite can occur for workers in higher occupational classes because their employers tend to invest in on-the-job training. Possible causes of job polarisation are technological change and globalisation, both of which mainly affect routine jobs (Autor et al., 2003; OECD, 2017).

As automation destroys many low-skilled jobs, the focus will shift to higher-skilled jobs (A.T. Kearney, 2017). Automation will create new occupations that do not currently exist, much as technologies of the past have done. The scenarios put forward by McKinsey (2017b) suggest that by 2030, 75 million to 375 million workers (3–14% of the global workforce) will need to switch occupational categories. Moreover, all workers will need to adapt as their occupations evolve alongside increasingly capable machines. The findings of McKinsey (2017b) suggest several trends that may serve as catalysts of future labour demand and could create demand for millions of jobs by 2030. These include caring for others in ageing societies (ITUC, 2017), raising energy efficiency and meeting climate challenges, producing goods and services for the expanding consuming class, especially in developing countries, and the investment in technology, infrastructure, and buildings that is needed in all countries (McKinsey, 2017b).

There are many examples of failures in education and training systems. For example, in the late 1990s, in the period of fast growth and diffusion of ICT and mobile phones, Finland, like many other countries, increasingly trained engineers for these occupations. When the ICT bubble burst in the early 2000s, these countries were faced with the problem that the vocational training and high-school education system had educated and trained an excessive number of engineers, and cuts had to be made in these education and training programmes. ICT and mobile phone engineering jobs were also at a high level when Nokia’s mobile phone business, which was sold to Microsoft in 2013, collapsed, and this led to high levels of unemployment. On this occasion, however, ICT and mobile ‘over-resources’ attracted many foreign companies in this industry to Finland to establish research and development (R&D) laboratories and other business units.

1.3 Conclusions

Section 1.1 describes the impacts of global trends on economies, labour markets and jobs, especially in developing countries. Globalisation is seen as a common denominator for many other global trends, with effects on the environment, on culture, on political systems, on economic development and prosperity, and on human physical well-being in societies worldwide. Some global trends are more relevant than others in developed and developing economies, and their impacts vary by geographical and regional contexts.

Section 1.2 analyses the impacts of global trends on employment and labour market structures, skills and occupation compositions in terms of matching skills supply to demand. Digital-based devices change the nature of work and skills. Automation and robotics will increasingly affect employment, especially in routine occupations, although uncertainties still remain regarding the magnitude of these effects. Substantial efforts are devoted to foresight, forecasting and projection of future trends of skills and occupations. Changes in existing work and skills culture require changes in human attitudes, mindsets and the behaviour of decision-makers.

2. IMPACTS OF GLOBAL TRENDS ON WORK AND SKILLS IN ETF PARTNER COUNTRIES

This chapter analyses how global trends affect ETF partner countries and how these countries react and respond to the effects of these trends. Based on these considerations, we present a future-oriented appraisal and outlook of how ETF partner countries will manage in global environments in the future. The trend analysis in this chapter broadly follows the logic of the previous chapter. As concluded in Chapter 1, globalisation can be seen as a common denominator in most global trends. The trends we discuss in this chapter are digitalisation as a driver of diversification in economic structures in ETF partner countries, automation as a threat to FDI and offshoring, the labour market, especially youth and female unemployment and inactivity, demographic challenges together with migration flows, the impacts of climate change and diminishing natural resources, and increasing political instability at national and international levels.

When making reference to the impact of global trends on ETF partner countries, we fully recognise that the current realities in these countries do not depend only on the impact of global trends and drivers. For example, some of the weaknesses identified can be seen as symptoms of countries' lack of progress in relation to global economic and technological developments, and during the past decade, global economic crises have aggravated economic problems in many ETF partner countries. A quick review of the GDP per capita (in purchasing power parity (PPP) international dollars) reveals big differences across the partner countries (see Annex 4). For example, Kyrgyzstan, Tajikistan, Syria, Palestine, Moldova and Uzbekistan have very low levels of GDP per capita. In contrast, Israel, Russia, Kazakhstan and Turkey have the highest levels of GDP per capita. These levels have implications for living standards and migration trends in the countries, as well as the design of future policies. Another reminder of this is that Palestine, Kyrgyzstan and Jordan are the countries with the highest net levels of official development aid as a percentage of GDP.

Overall, as with all economies, developments in ETF partner countries and regions have been 'path-dependent' and determined by diverse individual geographical, cultural, socioeconomic and historical idiosyncrasies. Although the following sections will make some regional generalisations regarding the key trends, it is important to keep in mind the specificity and diversity of every country. Nonetheless, this paper attempts to summarise the general trends across the four regions of the ETF's partner countries: South Eastern Europe and Turkey, Eastern Partnership, Southern and Eastern Mediterranean, and Central Asia.

2.1 Impacts of global trends on ETF partner countries

Digitalisation as a driver for diversification of economic structures

Global trade, ubiquitous ICT and digitalisation shift the economic structures of countries from tangible primary production towards intangible services and knowledge-dominated economies. An examination of the changes in employment shares of different sectors over the past decade indicates that in most ETF partner countries, the services sector is growing and primary production, manufacturing and construction are declining. For example, in 2017 the services sector represented over 60% of GDP in SEET region (except Albania) and was also the largest sector in the EaP region in terms of employment and contribution to GDP (except Georgia). Many partner countries have difficulty in modernising their economies, and many are locked into traditional industrial structures. For example,

in countries in Central Asia, although it is recognised that economies need to be restructured, little has been done in the past 15–20 years to diversify the economic structure of non-renewable oil and gas. Another challenge for all regions is the size of the informal economy and employment.

In the future, digital labour will become cheaper than human labour. The Global Innovation Index 2018 shows that Israel is by far the most innovative of the ETF's partner countries¹⁶. Other countries, such as Ukraine, Russia, Moldova and Turkey, have promising positions in the rankings, while Algeria, Tajikistan, Kyrgyzstan, Lebanon, Egypt, Belarus and North Macedonia are lagging behind. For most sectors of expertise, this indicates that automation poses a risk in the long run. For example, in Turkey, automotive and electronics production are affected by automation. Many ETF partner countries are not performing well by most measures of digital transformation¹⁷. The Digital Readiness Index developed by Cisco (2018) shows Israel and Kazakhstan at a high level; Georgia, Russia, Serbia and Azerbaijan at a medium level; and Egypt, Morocco, Turkmenistan and Uzbekistan following behind¹⁸. However, Tajikistan and Algeria are still at the very beginning of their digital journey. The WEF's Networked Readiness Index (2016) distinguishes Israel, Kazakhstan, Russia and Turkey as better-performing countries, while Algeria, Tajikistan, Kyrgyzstan, Egypt, Bosnia and Herzegovina, Lebanon, Tunisia and Albania remain significantly behind¹⁹. Finally, the share of internet users among the population as a whole is very low in Turkmenistan, Tajikistan and Kyrgyzstan, followed by Algeria and Uzbekistan. In contrast, more than three quarters of the population in Israel, Kazakhstan, Russia, Azerbaijan, Lebanon, Moldova, Belarus and North Macedonia uses the internet.

The Networked Readiness Index confirms that in South Eastern Europe, infrastructure, regulatory and political environment are among the weakest points of digital transformation. In Turkey, meanwhile, the interest of the young and increasingly educated population in digital skills is accompanied by easy access to the internet and digital platforms, providing a promising outlook for the future²⁰. Unfortunately, according to the *Global Information Technology Report* (WEF, 2016), the regulatory and business environment in Turkey is deteriorating. This might negatively affect the digital absorption capacity in the future. In Central Asia, countries increasingly recognise the changing global environment in terms of disruptive digital technologies, the industrial internet, more advanced manufacturing and changing demands for skills.

In conclusion, new technologies might result in the movement of large numbers of people from agriculture to urban-based services and knowledge occupations in ETF partner countries. Digital prospects can be improved by investing in infrastructure, reforming education and encouraging entrepreneurs to invent the new products, services and industries that can create jobs. In ETF partner countries, the transition to the digital era requires reforms in education, VET and lifelong learning. Moreover, growth in open educational resources, free online training such as that provided by massive online open courses (MOOCs), and TVET will offer new educational opportunities, accelerate skills

¹⁶ The Global Innovation Index 2018 provides detailed metrics about the innovation performance of 126 countries. This annual ranking is published annually by Cornell University, INSEAD and the World Intellectual Property Organisation.

¹⁷ Digital transformation measures use of the internet and broadband technology, the share of the economy using digital technology, and the digital readiness of public administrations and governments.

¹⁸ The Digital Readiness Index ranks 118 countries, see: www.cisco.com/c/dam/assets/csr/pdf/Country-Digital-Readiness-White-Paper-US.pdf

¹⁹ The Networked Readiness Index ranks 139 countries, see WEF (2016): www3.weforum.org/docs/GITR2016/WEF_GITR_Full_Report.pdf

²⁰ Goldin and Katz (2008) conclude that, in general, younger and more educated individuals will grasp new technologies more quickly and therefore will be in high demand.

development and provide retraining. Remaining locked in a traditional industrial structure may become a serious barrier to transformation in the long run. For example, in countries in Central Asia, the production structure is dominated by fossil energy sources, while the global pressure is to replace non-renewable energy sources with sustainable renewables.

Foreign direct investments and offshoring threatened by automation in the long run

Total trade (exports and imports) as a percentage of GDP is a basic indicator of openness to foreign trade and economic integration, and indicates the dependence of domestic producers on foreign demand (export) and of domestic consumers and producers on foreign supply (import), relative to the country's economic size. Countries such as Belarus, Georgia, North Macedonia, Serbia, Montenegro, Kyrgyzstan, Turkmenistan and Ukraine are highly dependent on foreign trade. Many ETF partner countries have enjoyed the economic benefits of FDI and offshoring, of a growing presence in GVCs, and of a rise in foreign trade. Turkey is an interesting example. FDI flows have increased to nearly USD 14 billion, up to 1.3% of GDP in 2017 (0.4% in 2000). Turkey was ranked 50th in the Global FDI Attractiveness Index in 2017. Offshoring reached USD 2.6 billion in 2017 and the presence of Turkey in GVCs quadrupled over two decades to USD 66 million in 2017 (UNCTAD, 2018). Nevertheless, the country's involvement in GVCs is still considered to be below its potential.

Following the global recession, FDI recovered in many ETF partner countries. The share of FDI as a percentage of GDP is quite high in Albania, Azerbaijan, Georgia, Montenegro, Serbia and Turkmenistan, relative to their size. For example, inward FDI to SEET countries grew as a result of robust GDP growth, support for private sector job creation, and growing cooperation with the EU. FDI recovered in these countries by 20% to USD 5.5 billion after the decline in 2016 (UNCTAD, 2018). However, FDI flows to EaP and Central Asia regions declined by 27% between 2016 and 2018. Most of this decline was due to sluggish FDI flows to four major recipient economies (Russia, Kazakhstan, Azerbaijan and Ukraine). Political uncertainty in the regions has remained high and is linked to geopolitical concerns. The WEF's Global Competitiveness Index (2017–18) shows that Bosnia and Herzegovina, Lebanon, Kyrgyzstan, Egypt, Tunisia, Moldova and Algeria are the ETF's partner countries that are lagging behind. Meanwhile, Israel, Azerbaijan and Russia stand out as more competitive countries²¹.

In conclusion, ETF partner countries must be aware that the benefits from FDI and offshoring are assessed to be in danger as new technologies increasingly take over BPO and automation in manufacturing (A.T. Kearney, 2017; UNCTAD, 2018). More easily automated finance and accounting jobs have the highest potential for automation. A.T. Kearney (2017) concludes that offshore countries are more protected from job losses, at least in the short run, owing to the concentration of customer-service-type activity, which has less immediate automation potential. But according to the McKinsey Global Institute (2017b), the percentage of work activities that could be automated by adapting current technology is 50.5% in Morocco, 50.4% in Turkey, 50.3% in Russia and 48.7% in Egypt. Onshore countries in which workers are most expensive will lose the smallest proportion of their BPO jobs to automation. However, a prerequisite for this is that they need to upskill their workers to a higher level than lower-cost countries. Political instability may have increasingly negative impacts on FDI and offshoring in the future, as UNCTAD (2018) assesses in the case of Turkey.

The majority of ETF partner countries are also increasingly participating in GVCs. Among them, Russia, Turkey, Israel, Egypt, Morocco and Tunisia show higher levels of participation in GVC than

²¹ The WEF's Global Competitiveness Index 4.0 2018 ranks some 140 economies, see: www.weforum.org/reports/the-global-competitiveness-report-2018

others. GVC activity is organised around large manufacturing hubs. The greater the distance to the main manufacturing hubs in Europe, North America and Asia, the lower the engagement, suggesting that there is an advantage to locating close to large ‘headquarter’ economies. For most ETF partner countries, Europe is the main hub for manufacturing. Sectors in which high GVC participation is common are agriculture; processed food products; plastics and rubber; textiles; metal products; electrical and electronic equipment; and motor vehicles. For example, owing to its proximity to Europe and Asia, Turkey is in the GVC for textiles, automotive manufacturing (Fiat, Renault, Toyota, Mercedes), electronics (Bosch, Siemens) and chemicals. Similarly, Tunisia is in the GVC for textiles, electrical machinery, transport equipment and motor vehicles, aeronautics, home appliances, food products and chemicals. Foreign investments include those by Alcatel and Siemens in telecommunications, Sanofi Aventis and Pfizer in pharmaceuticals, Nestlé in food processing, Toyota and Pirelli in automotive manufacturing and Zodiac Aerospace in the aircraft industry in Tunisia.

Youth and female unemployment characterises labour markets

ETF partner countries reveal diverse patterns of labour market participation, but it is reasonable to say that not all human resources are used efficiently in most labour markets. As Table 2.1 shows, well below the half of the working-age population is in the labour market (employed + unemployed) in Algeria, Egypt, Jordan, Bosnia and Herzegovina, Kosovo, Lebanon, Moldova, Morocco, Palestine and Tunisia. Consequently, the employment rate in many of these countries is lower than 40%. In cases where the unemployment rate is very high (Bosnia and Herzegovina, Kosovo, Palestine, Jordan), the employment rates are even lower, at around 30%. Unemployment in general, and youth and female unemployment in particular, are among most serious socioeconomic problems of most ETF partner countries. Other countries with relatively high unemployment rates are North Macedonia, Armenia and Tunisia. Youth unemployment is more responsive than adult unemployment to business cycles because young people are more concentrated in certain economic sectors. During a global recession, they are among the first to lose their jobs. At the same time, young people are exposed to lengthy transitions from school to work in the majority of ETF partner countries.

In contrast, Albania, Azerbaijan, Belarus, Kazakhstan, Georgia, Montenegro, Turkmenistan and Uzbekistan have higher activity rates. In countries with high agricultural employment, activity and employment rates seem to be higher, though this does not necessarily involve decent full-time jobs. In general, it can be said that high rates of inactivity among the working-age population are a serious problem, particularly among women, in Algeria, Egypt, Jordan, Kosovo, Palestine, Tunisia and Turkey. Underutilising a significant portion of the working-age population is a strong impediment to the development of these countries. For example, in Turkey the employment rate of 47% is low mainly as a result of the low female employment rate (27%). Turkey ranks towards the bottom of the WEF’s Gender Gap Index. However, increased digitalisation and the platform economy, together with new and more flexible forms of work, are expected to improve the employment of women and young people. In some ETF partner countries, employment rates are expected to grow; for example, in the SEET region the predicted increase is from 51.3% in 2015 to 54.9% by 2020 (Petreski, 2017).

TABLE 2.1 ACTIVITY, EMPLOYMENT AND UNEMPLOYMENT RATES (AGED 15+), 2017 (%)

Country	Activity rate	Employment rate	Unemployment rate
Albania	66.8	57.4	13.7
Algeria	41.8	36.9	11.7
Armenia*	61.0	50.0	18.0
Azerbaijan	66.2	62.9	5.0
Belarus	71.3	67.2	5.6
Bosnia and Herzegovina	42.6	33.9	20.5
Egypt*	46.7	40.9	12.4
Georgia	65.8	56.7	13.9
Israel	64.0	61.3	4.2
Jordan	39.2	32.0	18.3
Kazakhstan	69.7	66.3	4.9
Kosovo	42.8	29.8	30.5
Kyrgyzstan*	61.5	57.1	7.2
Lebanon**	38.7	44.9	9.7
Moldova	42.2	40.5	4.1
Montenegro	54.7	45.9	13.3
Morocco*	46.4	42.0	9.4
North Macedonia	55.1	42.8	22.4
Palestine	45.3	32.7	22.5
Russia	62.8	59.5	5.2
Serbia	54.0	46.7	13.5
Syria	NA	NA	NA
Tajikistan	59.3	53.2	10.3
Tunisia*	47.2	39.8	15.3
Turkey	52.8	47.1	10.9
Turkmenistan	65.5	63.2	3.4
Ukraine	62.0	56.1	9.5
Uzbekistan	65.7	60.9	7.2

Notes: *2016, **2012. Construction sector is included under industry. For Albania and Kosovo: age group 15–64; for Armenia: age group 15–75; for Belarus: age group 15–74; for Algeria: unemployment is the age group 16–59; for Ukraine: age group 15–70 for all indicators.

Sources: ETF KIESE database. Turkey: Turkstat.

The high informal employment in many ETF partner countries is often associated with widespread poverty and large rural economies. It is always difficult to obtain recent data on informal employment, but Table 2.2 uses data from the recent edition of the International Labour Organisation (ILO) report on the informal economy, with different reference years for different countries. Where more recent alternative sources are available, they are also included in the table. The first point to note is the large share of informal employment in almost all countries. The degree of informality still varies from a quarter/third of

employment (Serbia, Ukraine, North Macedonia, Moldova, Bosnia and Herzegovina, Kazakhstan, Russia and Turkey) to a half/three quarters of employment (Armenia, Azerbaijan, Albania, Egypt, Morocco, Palestine, Syria, Tajikistan and Tunisia). We can also see that around half, or more, of employment is vulnerable in Albania, Azerbaijan, Georgia, Morocco and Tajikistan, with Armenia not far behind. These numbers show the high degree of vulnerability in the labour markets of partner countries. Thus, having a job is no guarantee of being able to escape poor working conditions and/or poverty in these countries.

TABLE 2.2 SHARE OF INFORMAL EMPLOYMENT (LATEST AVAILABLE YEAR) AND INCIDENCE OF VULNERABLE EMPLOYMENT, 2017 (%)

Country	Informal employment	Vulnerable employment
Albania	61.0 (2013)	52.9
Algeria	NA	31.7
Armenia	52.1 (2015) 45.2 (2016, ETF)	40.9
Azerbaijan	68 (2016, ETF)	55.2
Belarus	NA	3.4
Bosnia and Herzegovina	30.1 (2005)	19.4
Egypt	63.3 (2013)	20.4
Georgia	NA	49.6
Israel	NA	8.6
Jordan	44.9 (2010)	10.2
Kazakhstan	30 (2013)	23.0
Kosovo	NA	23.1
Kyrgyzstan	48.6 (ILO, 2013)	34.7
Lebanon	NA	NA
Moldova	28.9 (2010) 36.4 (2016, ETF)	34.5
Montenegro	NA	24.6
Morocco	79.9 (2010)	48.1
North Macedonia	20 (2015)	19.2
Palestine	64.3 (2014)	23.1
Russia	35.9 (2014)	5.3
Serbia	22.1 (2016)	27.2
Syria	70.1 (2003)	NA
Tajikistan	74.8 (2009)	47.1
Tunisia	58.8 (2014)	20.8
Turkey	34.8 (2017)	28.0
Turkmenistan	NA	21.1
Ukraine	22.7 (2015)	14.8
Uzbekistan	NA	24.7

Sources: Data on informal employment is the share of total employment including agriculture and is derived from ILO (2018), Women and men in the informal economy: a statistical picture (third edition), www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_626831.pdf. When more recent alternative sources are available, they are also added. For the incidence of vulnerable employment, which represents own-account workers and contributing family workers as a proportion of the total employed, the data is from ETF KIESE database.

In conclusion, inactivity, unemployment and informal employment, especially for women and young people, are significant challenges that need to be tackled seriously in the future. It is important that ETF partner countries provide encouraging evidence of the positive correlation between higher levels of education and improved job prospects. In nearly all ETF partner countries, activity and employment rates are the highest for tertiary education graduates. Then, the graduates of upper secondary and post-secondary non-tertiary education come better, in particular post-secondary vocational education, compared to those with lower education below secondary level. In general, the higher the educational level, the higher the rate of labour market participation. As skills needs become increasingly knowledge-based, workers are forced to adapt to the requirements of a rapidly changing global knowledge economy. Overall, in most ETF partner countries, the trend is towards higher educational levels among the workforce.

Diverse demographic dynamics and migratory movements bring challenges

Demographic dynamics and migration flows in the ETF's partner countries vary widely. Demographic ageing is relevant in the SEET (to a lesser extent in Kosovo and Turkey) and EaP regions, but not in SEMED and Central Asia. For example, in the SEET region, demographic trends are driven by decreasing population, as a result of declining fertility and emigration flows. Turkey has a large young population, although the ageing trend is also arriving. Nevertheless, its workforce is still growing owing to the young population as well as the gradual integration of Syrian refugees into the Turkish labour market. In the SEMED region, the 'youth bulge' caused by a rapid demographic transition is likely to be maintained for the next two decades at least. In many of these countries, more than 40% of the population is under the age of 30.

Migration has become a persistent challenge in many ETF partner countries, not only as outflows but also as inflows. The influx of Syrian refugees has exacerbated an already difficult situation, especially in Lebanon (1.2 million), Jordan (1.4 million) and Turkey (3.5 million). Emigration rates are high in the six countries of SEET (except Turkey): within two decades almost one quarter of the population has left the region (Oruč and Bartlet, 2018). Emigration contributes to population ageing, since most emigrants are young and of working age. In EaP countries, Russia is the main destination, absorbing most of the migrants from the neighbouring countries, while Armenia, Belarus, Georgia, Moldova and Ukraine have a negative balance in net migration. Countries in Central Asia have high numbers of their working population abroad, as migrants in Russia and Kazakhstan, and this situation is expected to continue in the future.

For the SEMED region, migration brings many challenges. According to the International Organisation for Migration²², in Tunisia the gap between strong migration pressure and limited legal migration channels brings permanent tension. Tunisia has become both an immigration and a transit country: some 40 000 irregular migrants reside in the country. Emigration from the SEET is driven by the deterioration in economic conditions and a lack of appropriate jobs, especially for medium- and high-skilled workers. In Turkey, following the failed coup attempt in July 2016, there has been a surge in the number of Turkish asylum seekers and high-skilled emigrants in Western Europe. Turkey has been host to more than 3.5 million refugees from Syria and nearly 400 000 refugees from other nations (UNHCR, 2018), and is the country that hosts the highest number of refugees in the world.

²² www.iom.int/countries/

TABLE 2.3 EMIGRANT AND IMMIGRANT STOCKS, 2017

Country	Population	Emigrant stocks abroad	Immigrant stocks	
			Total	Refugees
Albania	2 930 000	1 148 144	52 484	1 387
Algeria	41 318 000	1 792 712	248 624	99 827
Armenia	2 930 000	951 023	190 719	18 905
Azerbaijan	9 828 000	1 155 381	259 241	1 492
Belarus	9 468 000	1 484 875	1 078 652	4 408
Bosnia and Herzegovina	3 507 000	1 659 852	37 100	5 324
Egypt	97 553 000	3 412 957	478 310	263 407
Georgia	3 912 000	838 082	78 218	2 692
Israel	8 322 000	350 484	1 962 123	44 623
Jordan	9 702 000	744 582	3 233 553	2 928 724
Kazakhstan	18 204 000	4 074 446	3 635 168	1 566
Kyrgyzstan	6 045 000	760 134	200 294	464
Lebanon	6 082 000	822 300	1 939 212	1 558 615
Moldova	4 051 000	973 618	140 045	557
Montenegro	629 000	137 589	70 984	1 056
Morocco	35 740 000	2 898 721	95 835	6 398
North Macedonia	2 083 000	534 720	130 972	771
Palestine	4 921 000	3 803 893	253 735	2 155 274
Russia	143 990 000	10 635 994	11 651 509	316 595
Serbia	8 851 000	956 455	801 903	31 314
Tajikistan	8 921 000	578 529	273 259	2 894
Tunisia	11 532 000	767 155	57 663	729
Turkey	80 745 000	3 418 932	4 881 966	3 115 317
Turkmenistan	5 758 000	243 202	195 061	26
Ukraine	44 223 000	5 941 653	4 964 293	9 665
Uzbekistan	31 911 000	1 991 941	1 159 190	29

Source: UN Department of Economic and Social Affairs, Trends in International Migrant Stock: Revised data for 2017 based on the country of birth statistics, www.un.org/en/development/desa/population/migration/data/estimates2/estimates15.shtml

Although brain drain is often said to hamper progress in ETF partner countries by reducing output, diminishing the competence of national high-skill sectors and eroding the tax base, the positive impacts of migration should also be acknowledged, especially remittances, with their socioeconomic impacts.

The increased inflow of remittances from emigrants to their families has clear positive effects, reducing both poverty and the need for state support. World Bank data shows that the remittances as a share of GDP worldwide in 2017 were highest in Kyrgyzstan and third highest in Tajikistan,

where they represented a third of GDP. In Moldova, remittances represent 20% of GDP, in Lebanon 15%, and in Albania, Armenia, Bosnia and Herzegovina, Egypt, Jordan, Montenegro and Turkmenistan over 10%.

In conclusion, processes of demographic change and migratory movements, although they differ widely, must be among the key issues considered in the future strategies and policies of ETF partner countries. For example, in the SEET and EaP regions, as in most parts of the EU, the ageing population may have potential to create demand for jobs and skills in the health and social care sectors. Whether this will result with new jobs depends on the availability of public and private budgets and proactive policies as currently health and social care are heavily underdeveloped and underfunded in ETF partner countries. In some ETF partner countries, migratory movements appear to be an insoluble challenge and requires active cooperation among the countries involved and a global policy agenda. Remittances are often praised for its positive impact in poverty reduction and educational investment, but they often trigger inactivity among the recipients by increasing their reservation wage. Moreover, the negative impact of losing a talented portion of the population abroad is a serious threat to the future development of economies in the ETF's partner countries.

Impact of climate change and diminishing natural resources

Over the coming decades, billions of people will face shortages of water and food and greater risks to health and life as a result of climate change. Many ETF partner countries are greatly affected by climate change, especially because many people depend heavily on the natural environment and have scarce resources to cope with the changing climate. For example, the Mediterranean area is becoming drier, making it even more vulnerable to drought and wildfires. Particularly affected will be the economic sectors of ETF partner countries that rely strongly on certain temperatures and precipitation levels, for example agriculture, forestry, energy and tourism (e.g. in the SEET, SEMED and Central Asia regions). Among other examples of serious environmental problems is the long-term irradiation (soil, water, air) in the area of the Chernobyl accident in Ukraine and at the Semipalatinsk Test Site (STS or Semipalatinsk-21), south of the valley of the [Irtys River](#) in Kazakhstan.

In Central Asia, the growing importance of introducing green economy principles, as well as investing in the development of alternative energy sources, requires more decisive actions. This is especially obvious, for example, in relation to the depletion of major oil reserves that is forecasted for Kazakhstan and Azerbaijan in the 2030s and the current growing demand for energy in Kyrgyzstan and Tajikistan. In conclusion, a shift is required in skills development and education towards ETF partner countries' own capabilities to analyse and draw strategy and policy conclusions for more sustainable development and technologies for the future.

Nevertheless, climate change can create new job opportunities as new markets emerge in specific sectors or regions and as investments are made in order to cope with the changing environment. So far, only a limited number of studies have investigated the quantitative impacts of adaptation to climate change on output and employment, but the scale of labour market adaptation should not be underestimated. The areas that are expected to undergo the most significant adjustments in employment, in terms of both level and composition, include agriculture and fisheries, beach and skiing tourism, infrastructure building, energy supply, construction, and finance and insurance.

The need to use natural resources more responsibly and the need for renewable energy sources, recycling and the green economy are widely recognised, and will lead to so-called green jobs. Green jobs are defined as work in industry, services and administration that contributes to preserving or

restoring the quality of the environment²³. Environmental and climate change policies bring enormous employment opportunities, but also the risks associated with structural change. According to the United Nations Environment Programme's green economy report (UNEP, 2011), investments in improved energy efficiency in buildings could generate an additional 3.5 million green jobs in Europe and the USA, and when developing countries are included, the potential is much greater.

Growing inequality and political instability at national and international levels

Alongside other global trends, increasing inequality and polarisation of societies is observed both between countries (recipients vs influencers) and within countries (regional, rural/urban). According to the World Bank, the headcount ratio for national poverty lines (percentage of population) is gradually decreasing in all countries, but is still significant (see Table 2.4). In 2016 (or the latest available year), around a third of the population was living below the national poverty line in Syria, Tajikistan, Armenia and Egypt. A quarter of the population was below the poverty line in Lebanon, Palestine, Kyrgyzstan, Serbia and Georgia, while the figure was around 15% in Kosovo, Bosnia and Herzegovina, Tunisia, Albania, Jordan, Uzbekistan and Russia. If the Gini coefficient is taken as the measure of inequality, countries such as Turkey, Israel, Russia, Georgia, North Macedonia, Tajikistan, Armenia and Bosnia and Herzegovina show a very high and increasing level of inequality in their societies (Table 2.4). Certain groups are over exposed to risks of poverty and social exclusion, such as people living in rural areas, persons with low education attainment, people with disabilities, and members of ethnic minorities.

Increasing inequality is a key factor in increasing social unrest and political instability. Political instability is growing in ETF partner countries, with socioeconomic and international consequences. For example, since July 2016 political instability in Turkey has had a negative impact on the economy and FDI flows. Leading rating agencies have downgraded Turkey's sovereign credit rating, which has acted as a deterrent both to international borrowing and to foreign investment in the country. The economic structure of many ETF partner countries is largely dominated by the primary sector, and they are not in an open global market situation. Some global trends are more relevant in some developing countries than in others, and interaction between trends varies by geographical and regional contexts. For example, political uncertainty in the EaP and SEMED remains high, partly as a result of geopolitical concerns.

²³ The United Nations Environment Programme defines green jobs as 'work in agricultural, manufacturing, research and development (R&D), administrative, and service activities that contribute substantially to preserving or restoring environmental quality. Specifically, but not exclusively, this includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high-efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution' (greening industries and creating jobs) (UNEP, 2011).

TABLE 2.4 SHARE OF POVERTY 2016 AND GINI COEFFICIENT, 2017 (OR LATEST AVAILABLE YEAR) (%)

Country	Poverty headcount*	Gini coefficient
Albania	14.3	29.0
Algeria	5.5	NA
Armenia	29.4	32.5
Azerbaijan	6.0	NA
Belarus	5.7	27.0
Bosnia and Herzegovina	16.9	32.7
Egypt	27.8	31.8
Georgia	21.3	36.5
Israel	NA	41.4
Jordan	14.4	NA
Kazakhstan	2.7	26.9
Kosovo	17.6	26.4
Kyrgyzstan	25.4	26.8
Lebanon	27.4	NA
Moldova	9.6	26.3
Montenegro	8.6	31.9
Morocco	8.9	NA
North Macedonia	21.5	35.6
Palestine	25.8	NA
Russia	13.3	37.7
Serbia	25.5	28.5
Syria	35.2	NA
Tajikistan	31.3	34.0
Tunisia	15.2	NA
Turkey	1.6	41.9
Turkmenistan	NA	NA
Ukraine	3.8	25.0
Uzbekistan	14.1	NA

Notes: *Poverty headcount ratio at national poverty lines (percentage of population).

Source: World Bank database, latest available year between 2017 and 2011.

Summary of the prospects for global trends

Table 2.5 is an attempt to summarise the future impacts of global trends in the four regions of the ETF's partner countries. We recognise that generalisations on the future impacts of global trends is not necessarily fair because all countries in these regions have their specific, diverse and history-dependent characteristics.

TABLE 2.5 FUTURE PROSPECTS OF IMPACTS OF GLOBAL TRENDS BY REGION

Global trends	SEET	EaP	SEMED	Central Asia
Globalisation	+++	+++	+++	++
Digitalisation as driver of economic structures	+++	+++	++	++
FDIs and offshoring threatened by automation	++	++	+++	+++
Youth and female unemployment and inactivity	+++	+	+++	+
Migration, mobility and brain drain	+++	++	+++	++
Demography: population boom or ageing	+++	+++	+++	+++
Climate change and diminishing natural resources	++	++	+++	++
Growing inequality and political instability	+	+	+++	+

Note: + = low, ++ = medium, +++ = high

Various forms of globalisation, such as trade, value chains and digital platforms, will have a significant impact on future developments in most ETF partner countries. The foreseeable impacts of automation are expected to threaten FDIs and offshoring as new technologies and automation grow in these countries. Preparation for the digital era and the impact of automation require proactive reforms in education, VET and lifelong learning systems as well as in labour and employment policies (e.g. addressing the issue of job quality and attractiveness) in all ETF partner countries. The positive correlation between education and job prospects provides encouraging perspectives that could help to mitigate unemployment and brain drain in the long run. The mitigation of climate change and sustainable use of natural resources are preconditions for welfare in all ETF partner countries, and they can be significantly supported by corresponding education, training and skills development activities.

2.2 Implications for future development of skills and education systems

On the basis of the analysis in the previous section, we suggest that at least two actions are required to develop skills, education and learning systems. The first is to make a future-oriented projection of the key economic and technological sectors and their related skills needs in the future; the second is to make a future-oriented projection of the required education, VET and lifelong learning systems.

Analysis of the future importance of techno-economic sectors and required skills needs

ETF partner countries need to analyse the future importance of their economic sectors and consider how they can renew and transform current economic and technology sectors to make them relevant for the future. The future-oriented analysis of economic sectors and related skills needs should reveal any mismatches between the current skills structure and the skills structure required in the future.

For example Störmer et al. (2014) explore the implications of selected sectors for jobs and skills in the UK. They analyse the significance of economic sectors in the future, the expected role of sectors in driving future economic growth, and the importance of sectors in meeting societal demand. The focus is on implications that are plausible and consistent with the impacts of key trends and disruptions. According to the study, a key issue in analysing trends in skills demand and formation systems is whether countries carry out forward-looking analyses of economic sectors, the economic growth of

these sectors and their importance in meeting societal demand. Among the issues to be examined in future-oriented analyses of matching skills are the phase and structure of industrial development (primary-agriculture, industry and construction, services); the areas of market failure in the public sector (social and health care, infrastructure, defence, education); technological levels; firm size; the need for FDIs and the ability to attract them; the needs of export and import firms; and entrepreneurship and start-ups.

Another example is Sweden which has developed and implemented a labour market forecasting methodology since the 1960s. The methodology combines a national forecast of macro-economic trends, a description of employment and labour at regional (provincial, county) level and information gathered from employers at local level. Forecasting of labour demand is based on systematic and regular interviews with employers. Results from questionnaires or interview surveys are assessed, running a plausibility check and taking national and global economic trends into account. A longer time series is needed to test whether results from the employer survey agree with historical experience of labour market statistics and economic trends in general (see ETF/Cedefop/ILO, 2015).

Some examples of occupational and employment projections are presented in Annex 3. So far this type of analysis in ETF partner countries is rare or done on ad-hoc basis, despite the existence of traditional basic statistics. However, the reliability and comparability of these statistics over longer time series is problematic, and weak governance and social partnership in human capital development (HCD) impede such quantitative projections and associate qualitative research (European Commission, 2014; ETF, 2016). It is recommendable for ETF partner countries is to build up capacities and carry out anticipatory analyses of the future development of economic sectors, their role in driving future economic growth, their importance in meeting societal demand, and their implications for jobs and skills demand in economic sectors of relevance in the future.

Analysis of the future requirements for education, VET and lifelong learning systems

The future-oriented projection of economic sectors and their related skills needs will reveal any mismatches between the current skills composition and the required composition in the future. The second task is to carry out a future-oriented projection of how education, VET and lifelong learning systems can produce the skills that match the future needs in ETF partner countries. The matching challenge needs to consider two aspects.

The first is the substance aspect; this focuses on the content of education and on the substance-related competences that the workforce will need for the occupations of the future (for example, in engineering education, competences in digitalisation, automation, and clean technology)²⁴.

The second aspect of matching skills supply and demand relates to the general dynamics of the education and learning system, i.e. its ability to continuously renew cognitive capabilities to enable individuals to absorb the new skills needed to meet the changing requirements of occupations.

These issues are discussed more extensively in the context of conclusions and recommendations in Chapter 4.

²⁴ Annex 2 lists relevant platform technology areas of the future.

3. TYPE AND DEGREE OF CHANGES IDENTIFIED IN ETF PARTNER COUNTRIES

This chapter provides a brief overview of the basic trends observed in ETF partner countries that are relevant to understanding the future demand for jobs and skills. This overview is necessarily broad and general owing to limited availability of data.

At a fundamental level, the broad range of changes affecting the ETF's partner countries require societies that are more flexible. Age structures are an important determinant of flexibility, including in terms of learning/reskilling opportunities and relocation. Thus, a fundamental factor in countries' ability to cope with changes is the relative size of their youth population, as it provides scope for making changes. We can see from Table 3.1 that in all regions, in line with the global trend towards ageing societies, the youth population is declining as a share of the total population. The shares of the 0–24 age group in 2015 varied widely between countries. In Palestine, Syria, Jordan, Tajikistan, Egypt, Kyrgyzstan and Turkmenistan, around 50–62% of the total population was in the 0–24 age group; in Uzbekistan, Algeria, Morocco, Libya, Lebanon, Israel, Turkey, Azerbaijan and Kazakhstan, the share was 40–47%; meanwhile, in Ukraine, Russia, Belarus, Bosnia and Herzegovina, Serbia, Moldova, North Macedonia and Georgia, the share was as low as 25–30%.

The estimated demographic changes in partner countries between 2005 and 2020 indicate that the 0–24 age group as a share of the total population has decreased in all countries without exception. Table 3.1 shows a decrease of an average of 10 percentage points in the 0–24 age group in 2005, 2010, 2015 and 2020 in every country. This indicates that regardless of the current structure of the population, whether young or old, all countries have experienced increases in life expectancy and ageing, and decreases in fertility. As an example, in Palestine, which has the highest proportion of its population in the 0–24 age group, this share has decreased from 66% in 2005 to a predicted 59% in 2020. Some countries have experienced an even sharper fall in their youth population: for example, in Albania the 0–24 age group as a share of the population has decreased from 45% in 2005 to a predicted 32% in 2020.

Although changes in the population age distribution bring a number of challenges (e.g. the impact on social security systems, the scarcity of labour), the demographic transition also has positive implications. Two broad macroeconomic benefits are highlighted in the UN DESA (2017) report. The first growth potential resulting from population changes occurs following a drop in fertility, when the share of the youth population is low while the share of the elderly population is not yet too high; this provides a window of opportunity to increase ratios of economic support. During this period, governments are advised to increase investments in young people's (expanded to lifelong learning) health and education in order to improve both labour force productivity and the overall long-term well-being of the population. Following effective investments in human capital, countries could take advantage of a second demographic dividend, as an ageing population enables capital accumulation at the macroeconomic level. These ambitions would require the implementation of national policies to support productive employment and personal saving among young people and adults (UN DESA, 2017).

TABLE 3.1 SHARE OF THE 0–24 AGE GROUP IN THE POPULATION, 2005, 2010, 2015 AND 2020 (%)

Country	2005	2010	2015	2020
Albania	44.8	40.7	34.3	31.7
Algeria	52.1	47.9	45.2	43.3
Armenia	40.6	37.6	34.2	31.9
Azerbaijan	46.7	43.2	39.7	36.8
Belarus	31.5	29.4	27.5	27.0
Bosnia and Herzegovina	32.7	30.0	27.8	25.9
Egypt	54.9	52.4	50.6	49.5
Georgia	36.2	34.1	31.7	31.0
Israel	44.1	42.4	42.7	42.5
Jordan	58.5	56.5	55.2	53.2
Kazakhstan	44.1	43.3	41.7	40.9
Kyrgyzstan	52.3	52.3	49.5	47.7
Lebanon	47.5	43.7	43.5	38.7
Libya	52.1	48.4	45.9	43.5
Moldova	38.1	34.7	29.9	26.7
Montenegro	35.8	33.7	32.0	30.4
Morocco	51.1	47.7	45.0	42.5
North Macedonia	36.4	33.4	30.6	28.5
Palestine	65.7	64.0	61.9	59.0
Russia	32.2	29.8	27.4	27.6
Serbia	32.9	30.9	29.3	28.2
Syria	61.4	57.3	57.9	56.8
Tajikistan	60.3	58.0	55.2	53.1
Tunisia	46.2	42.1	39.2	37.7
Turkey	47.2	44.2	42.2	40.0
Turkmenistan	53.9	51.2	48.8	46.5
Ukraine – North	30.0	28.0	25.9	25.4
Uzbekistan	54.3	51.2	47.4	43.9

Note: No data is available for Kosovo.

Source: UN Population Division, World Population Prospects, 2017 revision,
<https://population.un.org/wpp/DataQuery/>

As a result of the increasing demands for knowledge and skills associated with ongoing globalisation and digitalisation, but also linked to countries' abilities to cope with other changes such as ageing (health care) and climate change (agricultural renewal), it is equally important to spot trends in education. As a first indicator, we examine the patterns of public expenditure on education as a percentage of countries' GDP and public budget. The mean years of schooling and the gross enrolment rates in tertiary education are then examined and compared.

Educational expenditure as a share of GDP (Table 3.2) normally includes both public and private expenditure; thus, the numbers represent all expenditure from the state budget as well as from individuals' own pockets. The results show that some countries, such as Israel, Kyrgyzstan, Moldova, Tunisia, Uzbekistan, Ukraine and Tajikistan, spend a considerable amount of GDP (around 6% or above) on education, though this does not show the different proportions of public and private expenditure. Given the education markets in these countries, it is possible to say that part of this expenditure must come from individuals in Israel, Moldova and Ukraine. However, the majority of ETF partner countries spend very little on education – mostly below the OECD average of 5%.

TABLE 3.2 EDUCATION EXPENDITURE AS A PROPORTION OF GDP AND OF THE PUBLIC BUDGET, LATEST AVAILABLE YEAR (%)

Country	GDP	Public budget
Albania	3.1 (2017)	10.4 (2017)
Algeria	4.3 (2012)	NA
Armenia	2.8 (2016)	10.2 (2016)
Azerbaijan	2.5 (2017)	9.9 (2017)
Belarus	5.0 (2016)	17.2 (2016)
Bosnia and Herzegovina	5.0 (2013)*	NA
Egypt	3.8 (2012)	11.4 (2015)
Georgia	3.8 (2016)	12.2 (2016)
Israel	8.1 (2017)	16.7 (2017)
Jordan	4.9 (1999)	NA
Kazakhstan	3.0 (2016)	16.6 (2015)
Kosovo	4.4 (2014)	16.5 (2014)
Kyrgyzstan	6.0 (2015)	16.3 (2015)
Lebanon	2.6 (2013)	8.6 (2013)
Moldova	6.4 (2017)	17.8 (2017)
Montenegro	4.5 (2016)	9.7 (2016)
Morocco	4.7 (2016)	23.6 (2016)
North Macedonia	4.0 (2016)	12.0 (2016)
Palestine	5.7 (2016)	NA
Russia	3.8 (2014)	11.2 (2014)
Serbia	3.9 (2016)	9.6 (2015)
Syria	5.1 (2012)	NA
Tajikistan	5.8 (2016)	17.0 (2016)
Tunisia	6.6 (2015)	22.9 (2015)
Turkey	5.7 (2017)	13 (2016)
Turkmenistan	3.1 (2012)	20.8 (2012)
Ukraine	5.9 (2014)	13.1 (2014)
Uzbekistan	7.1 (2015)	33.5 (2015)

Source: ETF KIESE database based on UIS database. *United Nations Development Programme (UNDP).

The table also shows state investment in education. Here again we see a higher share of public budgets allocated to education (16–33%) in Israel, Tunisia, Morocco, Moldova, Uzbekistan, Turkmenistan, Tajikistan, Kazakhstan, Kyrgyzstan, Kosovo and Belarus. Some other countries have much lower budget allocations in education, particularly Lebanon, Serbia, Montenegro, Azerbaijan, Albania and Armenia. This is a contradictory situation in countries where education is considered a top priority on the policy agenda. It is also important to keep in mind the level of education systems when considering resources. In countries where literacy rates of the population aged 15+ are still relatively low (Algeria, Egypt, Morocco, Tunisia, Syria) and the mean years of schooling are also low (Syria, Morocco, Tunisia, Algeria, Turkey and Lebanon), the need for higher investment in education is obvious if these countries are to catch up with other countries.

The performance of education systems could also help us to gain a picture of individuals' prospects. Table 3.3 shows the mean years of schooling received by people aged 25+ and the gross enrolment ratio in higher education. The mean duration of schooling is as low as 5.5 years in Morocco, 7.2 years in Tunisia, 8 years in Algeria and Turkey, and 8.7 years in Lebanon. These numbers confirm the low level of investment made in HCD in these countries. In contrast, countries such as Israel, Belarus, Georgia, Russia, Ukraine and Kazakhstan achieved (almost) 12 years of schooling. Enrolment rates in higher education also confirm higher levels of investment in human capital in Belarus, Israel, Russia, Serbia and Ukraine. The data on education presented here shows that countries in the EaP region have the highest tertiary educational attainment, but little positive impact can be observed in employment trends by broad economic sectors (i.e. agriculture and industry), irrespective of the growing trend in tertiary education attainment.

TABLE 3.3 MEAN YEARS OF SCHOOLING, 2018, AND GROSS ENROLMENT RATIO IN HIGHER EDUCATION, 2017

Country	Mean years of schooling	Gross enrolment in higher education (%)
Albania	10.0	56.9
Algeria	8.0	47.7
Armenia	11.7	52.2
Azerbaijan	10.7	27.1
Belarus	12.3	86.7
Bosnia and Herzegovina	9.7	NA
Egypt	7.2	34.4 (2016)
Georgia	12.8	57.5
Israel	13.0	64.1 (2016)
Jordan	10.4	31.7
Kazakhstan	11.8	49.5
Kosovo	NA	NA
Kyrgyzstan	10.9	43.6
Lebanon	8.7	38.1
Moldova	11.6	41.1
Montenegro	11.3	58.2

Morocco	5.5	33.7
North Macedonia	9.6	41.1 (2015)
Palestine	9.1	42.5
Russia	12.0	81.8 (2016)
Serbia	11.1	66.5
Syria	5.1	39.1 (2016)
Tajikistan	10.4	30.9
Tunisia	7.2	32.0
Turkey	8.0	NA
Turkmenistan	9.8	8.0
Ukraine	11.3	83.5
Uzbekistan	11.5	9.1

Source: UIS and UNDP (2018), Human Development Indices and Indicators: 2018 Statistical Update, www.hdr.undp.org/sites/default/files/2018_human_development_statistical_update.pdf

Discussions on the shifts in economic structure and sectors point to general trends regarding a decreasing agricultural economy, an increase in services, and a decrease in manufacturing. There are even signs of ‘premature de-industrialisation’ in emerging economies, or, in some cases, countries skipping the industrialisation phase altogether. Jobs in agriculture are shifting towards (mainly low-end) services, without increasing, even with the decreasing shares of manufacturing in many developing countries. In the services sector, the majority of jobs are created in low-end/low-value-added subsectors such as personal services and hospitality, with fewer in high-end/high-value-added subsectors such as financial intermediation and business services.

In all ETF partner countries, the services sector is the largest in the economy in terms of employment, except in Tajikistan, where agricultural employment is the highest (65%) (see Table 3.4). The size of the services sector ranges from the highest in Israel, Jordan and Palestine (81–82% of employment) to the lowest in Tajikistan (28%). Moreover, since 2010 the services sector has gradually grown in many countries by an average of 5 percentage points, and in some countries by more than 10 percentage points (Georgia, Kazakhstan, Palestine), although in Azerbaijan, Bosnia and Herzegovina, Jordan, Kosovo, Moldova, Montenegro and North Macedonia there has been much lower growth. Meanwhile, agricultural employment is still relatively high in Georgia, Albania, Morocco, Azerbaijan, Armenia, Moldova, Egypt, Kyrgyzstan and Uzbekistan. Overall, the share of employment in agriculture has decreased in all countries since 2010 – with the decrease particularly high in Kazakhstan – except in Tajikistan and Moldova, where there has been an increase.

While the broad services sector will be heavily affected by digitalisation, this is also the most dynamic sector. Meanwhile, agricultural employment is directly tied to climate change and the global commodities trade, while industry is much more capital-intensive and inert than services, thus posing the biggest challenge in terms of adapting to changes in global trade, labour force requirements and the digitalisation of industry (e.g. the industrial internet). Industry is also more contingent than services on changes in global trade flows.

TABLE 3.4 SHARE OF EMPLOYMENT BY BROAD ECONOMIC SECTOR, 2017 (OR LATEST AVAILABLE YEAR) (%)

Country	Agriculture	Industry	Services
Albania	38.2	19.4	42.4
Algeria	10.1	30.8	59.1
Armenia**	35.3	15.9	48.8
Azerbaijan*	36.3	14.3	49.3
Belarus	9.6	30.1	60.3
Bosnia and Herzegovina*	18	31.3	50.7
Egypt*	25.5	25.5	48.8
Georgia	43.2	8.1	48.8
Israel	1.0	17.5	81.5
Jordan*	1.9	17.6	80.5
Kazakhstan*	16.2	20.7	63.2
Kosovo*	4.2	29.4	66.3
Kyrgyzstan*	26.8	22.1	51.1
Lebanon***	4.5	19.3	76.3
Libya***	12.4	26.7	60.9
Moldova	32.3	16.6	51
Montenegro	7.7	17.1	74.3
Morocco*	38	21.1	40.8
North Macedonia	16.2	30.6	53.2
Palestine	7.7	11.6	80.7
Russia	5.9	27	67.1
Serbia	17.2	25.3	57.5
Tajikistan*	64.9	6.7	28.4
Tunisia*	14.7	33.2	51.7
Turkey	19.4	26.5	54.1
Turkmenistan	8.2	44.9	46.8
Ukraine*	15.6	24.3	60.2
Uzbekistan*	27.7	23.0	49.3

Notes: *2016, **2015, ***2012. Construction is included within industry.

Source: ETF KIESE database.

It is immediately clear that regional characterisations of sectoral employment situations and trends are not particularly useful because of the high level of within-region variation between countries. The same can be said for the detection of longer-term trends, which, if present, tend to be noticeable only on a country level. The SEET region, however, appears to have the highest common levels of industrial employment, and thus will presumably be most affected by changes in manufacturing technologies and the digitalisation of industry. Belarus and Turkmenistan as individual countries will also be significantly affected by these changes.

Another factor is the distribution of educational levels within the active population. Table 3.5 shows the educational attainment of the active population (employed + unemployed), which tends to be higher than that of the inactive population.

TABLE 3.5 EDUCATIONAL ATTAINMENT OF THE ACTIVE POPULATION, 2017 (OR LATEST AVAILABLE YEAR) (%)

Country	Low	Medium	High
Albania	44.7	36.3	19.0
Algeria**	68.2	19.3	12.5
Armenia**	5.2	66	28.8
Azerbaijan*	6.5	76.8	16.8
Belarus	1.5	44.8	53.7
Bosnia and Herzegovina*	16.5	66.8	16.7
Egypt*	42.0	38.1	19.8
Georgia	4.9	57.5	37.6
Israel	9.1	34.4	56.5
Jordan*	61.5	23.3	15.2
Kazakhstan*	1.6	61.2	37.2
Kosovo*	19.8	57.5	22.8
Kyrgyzstan*	4.7	70.9	24.5
Lebanon***	66.5	15.3	17.9
Moldova	19.9	55.6	24.5
Montenegro	10.1	61.4	28.6
Morocco**	81.7	10.5	7.9
North Macedonia	19.4	55.7	24.9
Palestine	59.3	16.3	24.4
Russia	3.9	62.6	33.5
Serbia	17.4	57.6	25
Syria	NA	NA	NA
Tajikistan (2009)	17.9	66.9	15.2
Tunisia**	56.4	20.8	22.8
Turkey	55.9	20.8	23.3
Turkmenistan	NA	NA	NA
Ukraine*	2	45.5	52.6
Uzbekistan*	NA	NA	NA

Notes: *2016, **2015, ***2012. Low: ISCED 0–2, Medium: ISCED 3–4, High: ISCED 5–6.

Source: ETF KIESE database.

As can be seen, the share of low-educated individuals among the active population is very high in Morocco (82%), Algeria (68%), Lebanon (67%), Jordan (62%), Palestine (59%), Tunisia (56%) and Turkey (56%). Considering the very low share of medium-skilled individuals (even lower than high-

skilled), these countries show high inequality in education and the polarisation of skills, leading to a widening in the income gap. In contrast, the share of high-skilled individuals is very high in Israel (57%), Belarus (54%) and Ukraine (53%), followed by Georgia, Kazakhstan and Russia. These countries also have very small shares of low-educated and larger shares of medium-educated populations, which indicates a more equal distribution of education services.

One potentially important area is the proportion of the youth population taking part in VET, and their insertion into the labour market. Having such data by broad economic sectors would help us to compare the relative effectiveness of tertiary education and VET programmes in contributing to employment in each region and to match labour demand, in general. Table 3.6 shows the number of students in vocational programmes as a percentage of total upper secondary students (ISCED 3). Some countries, such as Palestine, Tajikistan, Georgia, Tunisia, Algeria, Morocco, Jordan and Azerbaijan, have a very low share of students in the VET stream compared to the general education stream. In contrast, 93% of students in Uzbekistan are in the VET stream, as are more than half of students in Serbia, Montenegro, North Macedonia, Kosovo and Russia. However, when we look at the gender share of VET students, more boys than girls attend these programmes in all countries. In some countries, the proportion of girls is very small, indicating difficulties of access for girls (Palestine, Tajikistan, Albania, Jordan and Tunisia).

TABLE 3.6 STUDENTS IN VOCATIONAL PROGRAMMES AS A SHARE OF TOTAL UPPER SECONDARY STUDENTS (ISCED 3), 2017 (OR LATEST AVAILABLE YEAR) (%)

Country	VET	Male	Female
Albania	19.8	80	20
Algeria	9.7 (2011)	46	54
Armenia	26.2 (2016)	59	41
Azerbaijan	14.2	76	24
Belarus	42.4 (2016)	63	37
Bosnia and Herzegovina	75.9	54	46
Egypt	46.0 (2016)	57	43
Georgia	8.8 (2016)	58	42
Israel	40.3 (2016)	51	49
Jordan	13.1 (2014)	65	35
Kazakhstan	39.7	57	43
Kosovo	52.6	60	40
Kyrgyzstan	35.2 (2016)	58	42
Lebanon	24.2 (2016)	58	42
Moldova	48.7	61	39
Montenegro	67.9	56	44
Morocco	11.6 (2012)	62	38
North Macedonia	59.6	55	45
Palestine	2.2 (2016)	84	16
Russia	54.4 (2016)	61	39

Serbia	74.6 (2016)	54	46
Tajikistan	6.4 (2013)	91	9
Tunisia	9.6 (2016)	65	35
Turkey	46.4	55	45
Turkmenistan	21.7 (2014)	62	38
Ukraine	30.1 (2016)	62	38
Uzbekistan	93.1	51	49

Source: ETF KIESE database based on UIS database.

Finally, two other indicators can tell us about the performance of an education system: the share of early school leavers among those in the 18–24 age group, and young people who are not in education, employment or training (NEETs).

Table 3.7 shows that there are high shares of early school leavers in Tunisia (52%), Turkey (33%), Palestine (30%) and Egypt (28%), followed by relatively high shares in Russia, Moldova and Albania. This means that the highest level of education or training attained by those shares of young people is at most lower secondary education. In contrast, Belarus, Montenegro, Serbia, Bosnia and Herzegovina, North Macedonia, Israel and Georgia seem to be successful in keeping their young people in school.

TABLE 3.7 SHARE OF EARLY SCHOOL LEAVERS (% AGED 18–24) AND SHARE OF NEETS (% AGED 15–24), 2017

Country	Early school leavers	NEETs
Albania	19.6	25.9 (32.8*)
Algeria	NA	33.1
Armenia	NA	28.5 (2016) 36.6*
Azerbaijan	NA	NA
Belarus	1.3	7.3
Bosnia and Herzegovina	5.1	24.3 (26.4*)
Egypt	27.8 (2012)	27.6 (2016)
Georgia	8.9	24.8
Israel	7.2	14.9
Jordan	NA	24.6 (2012)
Kazakhstan	NA	8.7 (9.5*)
Kosovo	NA	27.4
Kyrgyzstan	NA	20.4 (2016)
Lebanon	NA	21.3 (2007)
Moldova	19.4	20.2 (27.8*)
Montenegro	5.4	16.7
Morocco	NA	27.5 (2016)
North Macedonia	8.5	24.9
Palestine	29.9	33.2
Russia	24.3 (2015)	12.4 (2016)

Serbia	6.2	17.2
Syria	NA	NA
Tajikistan	NA	NA
Tunisia	51.6 (2015)	29.1 (2015)
Turkey	32.5	24.2
Turkmenistan	NA	NA
Ukraine	NA	16.5 (18.3*)
Uzbekistan	NA	NA

Sources: ETF KIESE database. *Data from UNDP 2018, Human Development Indices and Indicators: 2018 Statistical Update, www.hdr.undp.org/sites/default/files/2018_human_development_statistical_update.pdf

Most ETF partner countries face high NEET rates. The share of NEETs in the 15–24 age group indicates problems with both the education system and the labour market, especially in Tunisia, Morocco, Armenia, Egypt, Jordan, Albania, Bosnia and Herzegovina, Algeria, Palestine and North Macedonia, where the NEET rates are between a quarter and a third. In some ETF partner countries the proportion of young girls who are NEETs is almost 40%. Especially in the SEMED region, this pattern is linked to sociocultural norms, less favourable working environments, and family duties. In other countries, such as Belarus, Israel, Kazakhstan, Russia and Ukraine, the systems seem to be relatively more efficient for young people.

4. STRATEGIES AND POLICIES TO MANAGE WORK AND SKILLS TRANSFORMATION

The development of labour markets, occupational compositions, and education, VET and lifelong learning systems requires a well-planned and proactive long-term strategy, policy action plan and evidence-based monitoring system. The contextual socioeconomic and technological factors of work and skills strategies in the ETF's partner countries are of crucial importance. Section 4.1 gives an overview of the and skills strategies in these countries, and Section 4.2 draws conclusions arising from previous chapters of this report and presents recommendations for work and skills development in the future.

4.1 Overview of employment and skills strategies

The tables below give a region-by-region overview on employment and skills strategies and policies in the ETF's partner countries. The table includes as well a list of economic and innovation related strategies to showcase countries' future orientations and possible impact on skills demand. The information is based mainly on the inputs provided by national experts as well as the ETF country fiches drafted in 2017, ETF Torino process regional reports and other national or EU sources. Rather than giving a complete picture of work and skills strategies and policies, the tables give examples of the diversity of economic, employment and skills strategies and policies in these countries and regions.

South Eastern Europe and Turkey

The six SEET countries have created a regional strategy on growth, competitiveness, job creation and human capital development, namely the South East Europe 2020 Strategy. This strategy mirrors the Europe 2020 Strategy and was adopted in 2013. The countries have committed, among others, to reap the ICT potential in their efforts to innovate economies, modernise public administration and improve citizens' ability to use Internet/electronic-based services, although they lag behind when it comes to the actual use of digital technologies in business. The SEET countries and the Regional Cooperation Council are involved in an annual progress monitoring focused on the interlinked implementation of various socioeconomic policies, including stimulus towards increased innovation, skills and trade integration.

Since 2014, the regional cooperation has been given a new impetus in the context of the EU-Western Balkans six flagship initiatives and the Berlin Process as a forum to discuss regional cooperation between policy leaders/prime ministers. In 2017, the SEE 2020 Strategy was reinforced through the adoption of the Multi-Annual Plan for the creation of a regional economic area focused on trade integration, enabling investments and regional mobility, and promoting a digital integration agenda. These priorities are linked to regional economic integration (e.g. enabling the flow of goods, services, capital and labour resources) and making the region more attractive for investments and trade, and it is expected to impact the skills supply and demand.

Turkey is also part of the EU enlargement area, having intense economic relations with the EU and the South Eastern European countries. All SEET countries have strategies and operational/action plans for increasing the quality of skills development processes (i.e. initial and continuing education and training), for strengthening the link between education and employment and ensuring a human capital base fit to answer the future economic demand and social context.

Since 2016, all SEET countries have also worked with the EU Joint Research Centre to develop and implement ‘smart specialisation’ strategies as part of their strive for growth and competitiveness. In the region, Turkey is the only economy which has adopted a sub-national (regional) approach to smart specialisation, with all the other countries taking a national approach. The other countries are at various stages of developing and adopting smart specialisation strategies, taking into account priority economic sectors and the potential for research and innovation.

TABLE 4.1 OVERVIEW OF EMPLOYMENT AND SKILLS STRATEGIES IN SEET

Albania	Economic Reform Programme, National Strategy for Development and Integration 2015–20, National Energy Strategy 2018–30, Transport Sector Strategy and Action Plan 2016–20, National Strategy for Science, Technology and Innovation 2017–22, Albania Digital Agenda 2015–20, Albania is developing a Smart Specialisation Strategy to be adopted by 2020. National Employment and Skills Strategy 2014–20, National Strategy for VET and Lifelong Learning (2013–20), National Strategy on Pre-University Education 2015–20, National Gender Equality Strategy and Action Plan 2016–20 and Plan for Women Entrepreneurship
Bosnia and Herzegovina	Economic Reform Programme, Framework Energy Strategy of Bosnia and Herzegovina, Framework Transport Strategy of Bosnia and Herzegovina for the period 2016–30, Strategy for the Development of Science in Bosnia and Herzegovina 2017–22, Electronic Communications Sector Policy in Bosnia and Herzegovina 2017–21 (also two digital communication related strategies will be developed: Broadband Access Strategy and the Strategy for information society development). Bosnia and Herzegovina will develop a strategy on quality infrastructure. Strategic Platform for Adult Education in the Context of Lifelong Learning 2014–20. Bosnia and Herzegovina is working on a Smart Specialisation Strategy. Further economic, education and employment strategies or operational plans are adopted at the level of the three entities of Bosnia and Herzegovina.
Kosovo	Economic Reform Programme, National Development Strategy 2016–20, Strategy and Action Plan 2019–22 to fight the informal economy, European Reform Agenda, Multimodal Transport Strategy, Energy Sector Strategy 2017–26, National Energy Efficiency Action Plan, Kosovo Digital Agenda 2013–20, Strategy for Development of Private Sector 2017–21. Kosovo will develop a Strategy on Innovation and Entrepreneurship and a Smart Specialisation Strategy. Sectoral Strategy of the Ministry of Labour and Social Welfare 2018–22, Kosovo Education Strategic Plan 2017–21, Action Plan for Youth Employment Promotion.
Montenegro	Economic Reform Programme, Montenegro Industrial Policy Strategy by 2020, Energy Development Strategy of Montenegro to 2030, 2017–27 Railway Development Strategy, 2018–22 Trade Facilitation Strategy, Montenegro Development Directions 2018–21, Regional Development Strategy to 2020, Strategy for Development of Agriculture and Rural Areas 2015–20, National Sustainable Development Strategy, 2018–22 Strategy of Development of Micro, Small and Medium-Sized Enterprises, Strategy of Development of Women’s Entrepreneurship, Strategy of Innovation Activity 2016–20, Information Society Development Strategy 2016–20, Strategy of Scientific and Research Activity 2017–21. Montenegro is developing a Strategy for Smart Specialisation for which the Entrepreneurial Discovery Process has been completed. Vocational Education Development Strategy to 2020, Strategy for the Development of Higher Education (2016–20), Inclusive Education Strategy (2019–25), Strategy for Adult Education 2015–25, National Strategy for Employment and Human Resources Development 2016–20. Lifelong Learning Entrepreneurial Learning Strategy (2014–19). Youth Strategy is under finalisation.

North Macedonia	Economic Reform Programme, Competitiveness Strategy 2016–20, Industrial strategy 2018–27, Strategy for formalisation of the informal economy 2018–22, Innovation Strategy 2012–20, 2009–19 Strategy for Equal Regional Development, National Transport Strategy (2018–30), Renewable Energy Sources Strategy for 2020 (North Macedonia will develop a new Strategy for Energy Development for 2040), National Strategy for Agriculture and Rural Development 2014–20, National Strategy for Development of SMEs, Woman Entrepreneurship Strategy (2018–23), National Cyber Security Strategy 2018–22. The country is developing a Strategy for Smart Specialisation for which the Entrepreneurial Discovery Process is in progress. Education Strategy 2018–25, VET strategy in the context of lifelong learning 2013–20, Adult Education Strategy, Employment Strategy 2016–20, National Youth Strategy and the National Action Plan for employment of young people
Serbia	Economic Reform Programme, Industrial Development Strategy and Policy of the Republic of Serbia 2011–20, Energy Sector Development Strategy of the Republic of Serbia until 2025 with projections until 2030, Transport Strategy 2016–25, Agriculture and Rural Development Strategy 2014–24, Strategy for Support for the Development of Small and Medium-sized Enterprises, Entrepreneurship and Competitiveness for the 2015–20, Strategy for Scientific and Technological Development 2016–2020, National Programme for Combating the Informal Economy, E-government Strategy 2015–18, Strategy for Information Society Development until 2020, Electronic Communications Development Strategy 2010–20, Next Generation Networks Strategy until 2023. A new Industrial Strategy and Smart Specialisation Strategy are under preparation. Strategy for Education Development until 2020, National Employment Strategy 2011–20, Employment and Social Reform Programme, National Youth Strategy 2015–25. A strategy for the development and implementation of entrepreneurial education at all levels of education is under preparation.
Turkey	Economic Reform Programme, Turkey's Vision 2023, the 10 th and forthcoming 11 th National Development Plans of Turkey and the Priority Transformation Programmes (covering innovation, research, transport, infrastructure, competitiveness, etc.), Medium Term Programme 2019–21, KOSGEB Strategic Plan (2019–23), Science and technology human resources strategy plan. In Turkey the specialisation framework was adapted into 'results-oriented programmes' which all regions must develop from 2019 onwards. There exist also 2023 Education Vision, National Employment Strategy 2014–23, Action plan (IMEIGEP) to strengthen the link between education and employment.

Eastern Partnership region

Launched in 2009 as a joint policy initiative, the EaP aimed to deepen and strengthen relations between the EU, its Member States and its six Eastern neighbours. Within this framework, all partners have committed to deliver tangible benefits to the daily lives of citizens across the region on four priority areas: strengthening institutions and good governance; economic development and market opportunities; connectivity, energy efficiency, environment and climate change; and mobility and people-to-people contacts. For each of the priority areas, an EaP platform has been created to bring together all countries for exchanges of policies and identifying cooperation opportunities. Under four priority areas, the EaP countries agreed to reach 20 targets by 2020, as specified in the European Commission's document *20 Deliverables for 2020*.

Developing stronger, diversified and vibrant economies in the region is at the heart of the cooperation with the EU. This means helping small and medium-sized enterprises (SMEs), attracting investments and creating jobs in new sectors, increasing trade opportunities by supporting access to new markets. Similarly, the EaP countries also demonstrated a strong political will to reap the benefits of ICT and address the challenges of digital markets (e.g. cyber-security, electronic identification, eCommerce, digital skills) by the agreement of harmonisation of the Digital Markets in the Eastern Partnership.

The six countries in the EaP region have several general development strategies and visions, including on reforms of education, VET and lifelong learning systems and, in some cases, improving the coordination of labour supply and demand. The timeline for most national development strategies is 2020, but sometimes extends to 2025 or 2030. Since 2016, Ukraine and Moldova has started to develop their smart specialisation strategies. The two countries developed a pilot project that supports the early preparatory phases of the development of research and innovation strategies for smart specialisation. Ukraine is leading implementation of smart specialisation at regional level, which is part of the State Strategy of Regional Development 2020 and new law on regionalisation. Georgia and Belarus are at the start of the process.

TABLE 4.2 OVERVIEW OF EMPLOYMENT AND SKILLS STRATEGIES IN THE EAP REGION

Armenia	The Armenia Development Strategy for 2014–25 pursues four priorities, two of which are employment and education. The strategy recognises the particular challenges of youth in the labour market and underlines the need for better-targeted and better-informed policy measures. In line with the strategy, the Programme of the Government of the Republic of Armenia 2017–22 was adopted in June 2017. Other documents include the Programme of Preliminary and Middle Professional Education and Training Development 2017–21, the National Employment Strategy and Action Plan 2013–2018, and the Supplementary and Continuing Education Strategy 2013–17. The new EU–Armenia Sector Reform Contract for 2017–20 has a strong focus on rural development programmes. The Centre for Strategic Initiatives was established in January 2017 to foster public–private partnership, attract FDI and align developmental goals, and to focus on education policies.
Azerbaijan	The development concept Azerbaijan – 2020: the Vision of the Future (adopted in 2013), among other things, aims to modernise the country’s education system. The Strategy for Development of Education in Azerbaijan by 2025 determines the purpose, objectives/goals, directions, instruments and mechanisms for the development of the education system by 2025. Strategic roadmaps for the national economy and main economic sectors were approved in December 2016. The Draft Employment Strategy for 2017–30 outlines future actions and emphasises the need to diversify the stock of knowledge and skills available to a modern, knowledge-based economy, placing an emphasis on education in line with labour market requirements. The Strategic Roadmap for the VET Sector (December 2016) supports lifelong learning, the updating of infrastructure and financing mechanisms, the development of new curricula, and the training of teachers and trainers. The Roadmap for the Implementation of a Dual Education System has been developed.
Belarus	The National Strategy for Sustainable Social and Economic Development of the Republic of Belarus up to 2030 (Strategy 2030) envisages the use of smart strategies, the implementation of IT solutions, the creation of ‘smart cities’, etc. The Programme for Social and Economic Development of the Republic of Belarus 2016–20 has been adopted. According to the ‘Intellectual Belarus’ strategy, which needs to be created before 2040, three key elements are to be achieved: comprehensive digitalisation, production on the basis of nano, bio, IT and additive technologies; and a highly educated workforce. The development of R&D is envisaged in the Science and Technology Strategy 2018–40. The National Review of the Implementation of the 2030 Agenda for Sustainable Development has been adopted. Belarus also has the Education and Youth Policy for 2016–20 State Programme.
Georgia	The Socioeconomic Development Strategy of Georgia (Georgia 2020) was adopted in 2014. The 4-Point Government Programme 2016–20 sets out measures in the areas of economy, education, public management and spatial arrangements. The new Government Programme 2018–20, Freedom, Rapid Development and Welfare, adopted in July 2018, confirms the continuity of the same priorities: the importance of economic growth, employment and education policies for the country. In 2014 two new institutions for competitiveness and innovation were created: Enterprise Georgia and the Georgian Innovation and Technology Agency. In the field of education and employment, there are the State Strategy for the Formation of the Georgian Labour Market 2015–18, the Strategy for VET Reform (2013–20), the 2005 Law on General Education, and a new VET Law adopted in 2018.

Moldova	Moldova's National Development Strategy ('Moldova 2020') promotes the development of a knowledge-based society by strengthening R&D activities and focusing on increased efficiency and competitiveness in the economy. One of the seven priorities set for radical change is educational reforms. The Education Code (2014) and the Strategy for Development of Education (2014–20) ('Education 2020') aim to link the education system to labour market needs. The Vocational Education and Training Development Strategy (2013–20) has the same aims for modernising and optimising TVET for labour market needs. One of the four policy priorities of the National Strategy for Employment (2017–21) is developing human capital, which is also a policy of the SME Development Strategy (2012–20) in promoting entrepreneurial skills and culture in Moldova.
Ukraine	The Medium-Term Priority Action Plan of the Government to 2020 ('Ukraine 2020'), approved by the Cabinet of Ministers in April 2017, focuses, among other things, on HCD (e.g. high-quality and affordable secondary education, VET and higher education). The Roadmap for Education Reform, adopted for the Ukrainian education system for the period 2015–25, aims inclusive education principles, better access to quality education, and compulsory basic secondary education. An occupational and skills forecasting exercise for 2015–25 has been conducted. Other initiatives are the Higher Education Law (2014), the Law on Professional Development of Employees (2012), the Law on Vocational Education (approved in 2016), and the Law on Education (approved in September 2017), which emphasises the importance of lifelong learning, competence-based education and key competences. Other initiatives include Sector Competitiveness Strategy for Ukraine 2015 (Agribusiness), and the creation of Ukraine's first innovation park UNIT.City, a location with all-inclusive infrastructure for high technology, innovative and creative businesses.

Southern and Eastern Mediterranean

Since 1995, the Euro-Mediterranean cooperation between SEMED and the EU has aimed to establish a common area of peace, stability, and shared prosperity; and focused on supporting economic and social transition and reform in the SEMED region. Later, the Union for the Mediterranean (UfM) was created for regular political dialogue on several issues of political importance from economy to trade, migration, women rights and employment, with various sectorial ministerial meetings held. For example, the Euro-Mediterranean employment policy dialogue has started in 2008 with the first ministerial conference in Morocco, and continued with the second ministerial conference in Belgium in 2010, the third in Jordan in 2016, and the fourth held in Portugal in April 2019. Key framework of cooperation has focused on job creation, employability of human capital and decent employment. Another Ministerial Declaration on Strengthening the Role of Women in Society was adopted in Paris in 2013 for promoting equal participation of women in political, economic, civil and social life and increasing their participation in economic and policy decision-making processes.

The countries in the SEMED region have plans and strategies to develop their economies in general, and employment and education in particular. According to the ETF Torino Process assessments from the region, the national reports illustrate progress in the attempts made by these countries to place TVET and skills visions in the wider perspective of HCD (ETF, 2017). This is demonstrated by the growing links between TVET strategies and those for employment and economic growth, all within the perspective of lifelong learning. For example, in some countries (Morocco, Jordan, Israel, Tunisia), VET strategies are intended to be developed as part of the HCD vision. In other cases, VET strategies exist, but are not directly linked to an overarching HCD vision or reforms are taking place independently of a formalised VET strategy. Tunisia is the only country which has started to develop a smart specialisation strategy so far.

One thing to mention is the difficulties experienced regarding the implementation of their policies and strategies, due to external factors (socioeconomic and political instability as well as frequent turn overs) and internal factors (poor inter sectoral cooperation, limited efficiency of governance mechanisms in place as well as issues linked to poor quality and performance of education and training systems).

TABLE 4.3 OVERVIEW OF EMPLOYMENT AND SKILLS STRATEGIES IN SEMED

Algeria	The five-year government plan (2014–18) underlines the importance of fighting unemployment, privatising and diversifying industry and promoting social dialogue. The new model for economic growth up to 2030 defines three stages from 2016 to 2030: (1) take-off (2016–19); transition (2020–25); and stabilisation (2026–30). An important pillar of the government plan has been, for many years, the economic diversification. The National Export Strategy 2019–23 promotes Algerian exports outside of the hydrocarbon sector. There exists specific action plan for the economic sectors (such as tourism, handicrafts, construction). The education policy in Algeria follows the strategic framework of the model for economic growth up to 2030.
Egypt	The overall Vision 2030, developed by the Ministry of Planning, includes a chapter on education and acts as the overall policy reference for the new TVET strategy, which has been developed as part of the reform under the TVET II Programme. In 2017, the National Strategy for the Empowerment of Egyptian Women 2030 has been adopted, including a pillar on economic development. Egypt is also building the world's largest solar park (Benban Solar Park), which will change the energy sector, with many implications on the new jobs and new skills requirements.
Israel	The National Economic Council has prepared a long-term strategy to address challenges in education, socioeconomic inequality and inefficient regulations (October 2017). The strategic document focuses on support for economic and social policy (primarily growth, employment and reducing social gaps), although some challenges remain in its implementation. Israel has produced a few foresight and forecasting studies on automation, on at-risk occupations, and 'Israel's World of Work 2040' conducted in 2017 with four possible scenarios. It also adopted National Strategy for Technological Education 2018–22, while discussions continue on how education can react to upcoming needs (e.g. the paper 'Preparing and adapting Israel's education system for the challenges of the 21 st century').
Jordan	Jordan developed a National Human Resources Strategy in 2016 (2016–25). The new strategy brings fundamental changes to the governance of the TVET system in the country. In 2017, the National Employment and Empowerment Programme (2017–21) was launched, aiming at increasing participation of Jordanians in the labour market, creating jobs, supporting entrepreneurship and fostering female participation. The Jordan Response Plan 2017–19 and the Jordan Compact outline specific strategies to improve access to employment and education for Syrian refugees, and to encourage investment and economic growth in Jordan.
Lebanon	The National Strategic Framework for TVET 2018–22 was launched in 2018 and an action plan is being developed. The framework confirms the government's commitment to TVET and is a step towards better collaboration between government institutions and stronger partnership with the private sector. This is part of the Strategy on Youth which is closely aligned with the needs of the private sector and targets 500 000 young people at risk (October 2017). The government plans to restart job-rich growth by 2020, estimated at USD 11 billion, has not been accompanied by international commitments.

Morocco	Strategic Vision 2015–30 for a fair, quality and open school system; the National Strategy 2015–30 for Education Reform referred to as Education Vision 2015–30: national integrated system for innovation (with three time intervals: 2015–20; 2020–25; 2025–30). The Plan for Industrial Acceleration sets the key economic sectors for economic growth and competitiveness; there are other action plan that are sector specific such as Green Morocco plan and the Solar Morocco plan. As part of the process of decentralization, the country also develops regional development plan that include specific actions for the socioeconomic development of the regions. The National Strategy for Vocational Training 2016–2021, prepared in close cooperation with the social partners and implemented under the coordination of the VET State Secretariat has not shown progress, mainly due to several political turnovers since 2017. The King entrusted the Prime Minister to prepare an action plan for VET reforms in beginning of 2019. The National Employment Strategy of 2015 was developed with the support of the ILO. An Action Plan for the strategy implementation called The Plan for Employment Promotion 2021 was launched in 2017, it is developed around 4 pillars of intervention that include also the local dimension, in line with the country decentralization process.
Palestine	The National Policy Agenda (2017–22) recognises the importance of education to economic growth and sustainable development and identifies quality education for all as a priority. It specifies national priorities of achieving economic independence by creating jobs, improving the business environment and promoting Palestinian industry to build a future economy. National Strategic Comprehensive Programme for Employment in Palestine (2015–20), the National Strategy for Adult Learning (2016). The National Policy Agenda 2017–22 specifies national priorities of achieving economic independence by creating jobs, improving the business environment and promoting Palestinian industry to build a future economy. National Youth Strategy 2017–22.
Tunisia	The National Development Plan 2016–20 sets out a number of objectives; not all of them have been followed by strategies or action plans for implementation. National Strategic Plan: Digital Tunisia 2018 aims to achieve a sophisticated technological infrastructure and modern economy. The National Observatory on Employment and Skills conducts studies on the labour market and skills, including on skills forecasting future jobs, and skills mismatch. Also studies on 'Evaluation of skills gap in the ITC sector in Tunisia' (www.digitaltalent.tn) and 'Upgrading VET In Tunisia MANFORM' exist. There are separate strategies on general education and higher education. The Ministry of Employment and VET recently adopted a VET reform strategy organised around 14 projects and entrepreneurship strategy. The National Strategy for Employment is currently under preparation.

Central Asia

The work and skills strategies in countries in Central Asia are often part of the general economic and technological development strategies, including, in some cases, digitalisation. In terms of policy responses, none of the countries in the region have long-term strategies and they still prefer to solve short-term challenges. However, in the area of VET, these countries have made significant progress since 2010 in formulating their medium- to long-term vision, as well as in translating this vision into policies (ETF, 2017).

Countries have made efforts to improve the coordination of public institutions responsible for HCD at national, sectoral and subnational levels. Most VET policy documents and strategies are integrated into wider education policy documents and strategies, but rarely consider the links between VET and other parts of the education system. Countries in Central Asia have started to pay more attention to the implementation of policies and are developing monitoring systems to assist in tracking progress. For example, Kazakhstan publishes an extensive report on the implementation of its education strategy (including VET) on an annual basis.

TABLE 4.4 OVERVIEW OF EMPLOYMENT AND SKILLS STRATEGIES IN CENTRAL ASIA

Kazakhstan	Among the key strategic documents are the National Education Development Programme 2011–20, the Digital Kazakhstan Programme, the visionary Kazakhstan 2050 Strategy, and the State Programme of Industrial-Innovative Development of Kazakhstan for 2015–19. The Kazakhstan 2050 Strategy has the building of a modern education system as priority number 4, including the target of having 100% of children in preschool education, developing the engineering education system, and modernising teaching methods. An internet-based National Education Database has been operational since 2014. The National Education Development Programme aims to provide quality education that meets international standards and to improve early education in kindergartens and school education, with the aim of preparing pupils for new occupations and lifelong learning in the future. The Development Strategy 2012–21 of Kasipkor Holding (under the Ministry of Education) is responsible for VET.
Kyrgyzstan	The National Strategy for Sustainable Development for 2018–40 is being drafted. The Programme for Digital Transformation of the Kyrgyz Republic ‘Taza Koom’ 2018–20 (a key component of the National Strategy for Sustainable Development) aims to promote the digital transformation of Kyrgyzstan. The country’s Education Development Strategy 2012–20 and corresponding medium-term action plans (2012–15, 2016–17) aimed at modernising the education system. The VET strategy is part of the overall education strategy. Although the strategy does not use the term ‘lifelong learning’, it often refers to this using the term ‘continuous education’.
Tajikistan	Among the key strategic documents are the National Development Strategy 2016–2030, the National Strategy for the Development of Education of the Republic of Tajikistan to 2020 (2012), and the National Strategy for the Development of Intellectual Property 2014–20. The coordination of VET-related issues is organised via inter-ministerial working groups. In the National Development Strategy 2016–30, it is envisaged that ICT will be a catalyst for sustainable development.
Turkmenistan	The key strategic document is the National (short-term) Strategy for Economic, Political and Cultural Development 2003–2020, the aim of which is to shift the economy to a growth model, based on innovation and sustainable development.
Uzbekistan	The key strategic document was the Uzbekistan Education Sector Plan 2013–17 (2013) and corresponding action plans. The Development Strategy 2017–20 (2017) and the Diversification Strategy in Agriculture aimed to shift the economy away from cotton production towards higher-value products. In January 2017 the new draft of a five-year development strategy was uploaded to the portal for public discussion. This was the first ever instance of public engagement, and was not typical of state leaders. The Action Strategy for Further Development of the Republic of Uzbekistan for the period 2017–21 did not have a particular emphasis on work and skills development.

Conclusions on work and skills strategies and policies

Tables 4.1–4.4 indicate that many ETF partner countries have already introduced various strategies and policies in developing their economies, labour markets, and education, VET and lifelong learning systems. In several countries, employment and skills strategies have been integrated into general economic, industrial and technological development strategies. Although the strategies and policies already exist, many expert reports used in compiling the tables stress that the challenge may not be a shortage of strategies and policies but a lack of progress in their implementation. For example, strategies are not always accompanied by action plans, proper funding and implementation is not monitored or evaluated.

4.2 Conclusions and recommendations

The conclusions and recommendations here largely follow the logic of the analytical framework of the forward-looking analysis of work, labour markets and skills presented in Chapter 1: how global trends impact on work and skills and how these impacts should be anticipated and analysed; what kind of

changes are needed and should be made in education, VET and lifelong learning systems; and what the strategies and policies should be to achieve set objectives. Conclusions are drawn and recommendations made on the basis of both the literature review and the current conditions in the ETF's partner countries as described in Chapters 2 and 3. Strategy and policy processes should encompass all phases of the policy-making cycle, starting from the creation of strategy and setting the policy agenda, followed by policy formulation, decision-making and policy implementation, and the monitoring, evaluation and impact assessment of set strategies and policies (e.g. Jann and Wegrich, 2007).

Towards anticipating the impacts of global trends on the economy, work and skills

1. Systematically develop a foresight and forecasting culture, mindset, expertise and methodologies using existing guiding materials (e.g. InGRID project reports) and acknowledged international experts.

Various guidebooks exist on future-oriented exercises, sometimes referred to as foresight, forecasting, anticipation, roadmapping, etc. (e.g. UNIDO, 2005; ETF/Cedefop/ILO, 2016a). What is common to most of them is the future-oriented thinking and mindset of participating experts and individuals. As argued in the guide of ETF/Cedefop/ILO (2016a), foresight and forecasting support decisions in areas that involve long lead times, such as education and training, and long-term labour market planning. Hence, anticipation in these areas offers early warning of evolving skill mismatches, allowing sufficient time for action to counteract them. Firms and education and training providers, who have to make decisions about the kinds of education and training required for the future workforce, need to assess future prospects carefully, seek to fill information deficits and avoid future imbalances and mismatches. This report, analysing the impact of global developments on skills demand in the ETF's partner countries, is by nature future-oriented, and accentuates the importance of developing future-oriented mindsets and practices in these countries.

2. Develop an anticipatory analysis of the economic development and structural change of the economy, containing an analysis of the impact of global trends and drivers; among the elements of such an analysis are the attractiveness in relation to FDIs, the participation of the economy in GVCs, trends in migration, and extent of the informal economy.

As McKinsey (2017b) concludes, ensuring robust demand growth and economic dynamism is a priority because history shows that economies that do not expand do not generate job growth. As discussed in Chapter 2, many ETF partner countries have very low levels of GDP per capita, are locked into existing industrial structures, and have extensive informal economic sectors, low FDI rates, etc. Many of these conditions are affected by globalisation and ultimately lead to low investments in education and skills development systems.

Impacts on jobs, labour markets and occupational composition

3. Develop anticipatory analyses of new occupations and associated skills needs.

According to NESTA (2017), among the key issues of importance is the anticipation of new occupations. Investments in skills must be at the centre of any long-term strategy for adjusting to structural change. A precondition for this is access to good information on skills needs, without which policymakers risk flying blind. The anticipation of new occupations is not possible without systematic foresight and a forecasting culture, including quantitative approaches; qualitative methods; focus groups, Delphi methods and scenario development; and sectoral studies, and regional and other observatories. Both skills anticipation and the development of skills measurement tools should be high on the agenda of ETF partner countries (European

Commission, 2014; ETF, 2016). The work of Beblavý et al. (2016) is one example of such methods and data sources in traditional labour market analysis and of innovative methodology and new data sources for the analysis of new occupations and skills. Alongside analyses of occupations, jobs and skills, the concept of a task also appears, and is used in a number of reports describing how and why new occupations have emerged (Beblavý et al., 2016).

In the anticipatory analysis of new occupations and skills, the ETF's partner countries can benefit from the guide published by the ETF/Cedefop/ILO (2016a). The analysis of barriers and carriers of change is an important element of anticipatory SWOT (strengths, weaknesses, opportunities and threats) analysis of new occupations and future skills needs in the ETF's partner countries. A key issue in matching supply to the demand for skills is how easily workers can switch jobs, i.e. whether they have the right set of skills and whether they are able to acquire these skills relatively quickly through formal education, on-the-job-training or lifelong learning (Beblavý et al., 2016). Among the key barriers to switching skills composition are inflexibility and inertia to make this change, but also an issue of insufficient opportunities and affordability of lifelong learning for individuals.

4. Keep regular labour market needs surveys and comprehensive labour market information systems: they support the supply of skilled workers to match the corresponding skills needs of the future.

The strategic approach will require timely interventions based on the identification of milestones. According to Autor (2015), the most effective policies for raising productivity, mitigating widening inequality, and expanding economic opportunity are those that ensure broad access to high-quality education for the vast majority of workers.

5. Start reforms of education, VET and lifelong learning systems as soon as possible to avoid inertia and in such a way that skills do not become a bottleneck as countries advance, especially in their digital transformation.

The World Development Report concludes that changes in education and training take a generation to have an effect (World Bank, 2016). Moreover, reforms need to start early so that skills do not become a bottleneck as countries advance in their digital transformation (World Bank, 2016). Technological change forms a continuous dynamic challenge to skills development. As Brynjolfsson and McAfee (2014) emphasise, the related challenge is the ability or inability of skills, organisations and institutions to keep pace with technical change – ‘the race between education and technology’. This relates especially to new technologies such as digitalisation and automation. In order to achieve positive outcomes, policymakers and business leaders will need to embrace automation's benefits and, at the same time, address the worker transitions brought about by these technologies (McKinsey, 2017b).

6. Develop functional labour market reforms and policies to better match jobs and workers/skills, particularly by giving appropriate incentives for the efficient allocation and use of human capital in the productive sectors. Active labour market policies (ALMPs) can bring more efficiency and flexibility into the system.

The functioning of the labour market is increasingly important in the ETF's partner countries. The transition to the use of new technology accentuates the importance of a well-functioning labour market. Consequently, effective measures are required to promote a safe transition for the current workforce to more productive jobs. Moreover, the basic skills required as a result of digitalisation should be accessible for all. Digitalisation and automation will change occupational content and

jobs, increasing the risk that less-educated people or individuals with obsolete skills will be marginalised and structural unemployment will grow. Consequently, it is important to ensure that further studies and lifelong learning are available for all education levels. To mitigate high structural unemployment and inactivity, competence programmes are needed to ensure a minimum level of upper secondary education and up to date skillsets.

As discussed in Chapter 2, automation can also be seen as a threat in ETF partner countries (for example, in Turkey the jobs in automotive and electronics production are assessed to be at risk because of automation). The employment impacts of automation call for innovative and radical societal solutions and policies. Digitalisation and the expanding scope of automation put pressure on countries' public finances, which is expected to lead to substantial job losses among certain skill groups. More radical policy proposals aimed at reducing administrative costs and public transfers should therefore be examined, like a basic income, which involves citizens receiving an unconditional income transfer that replaces other forms of public transfers (Berger and Frey, 2016). For example, Finland has conducted a large-scale experiment to evaluate the effects of the introduction of basic income guarantee, although first results were discouraging in terms of employment outcomes. What would work might be a proper social support (e.g. unemployment benefits) during jobless periods that is missing or insufficient in many ETF partner countries.

Impacts on education, VET and lifelong learning systems

7. Develop sufficient investments in education, VET and lifelong learning systems: they are necessary (though not sufficient) preconditions for successful economic development.

As concluded in Chapter 1, the ETF's partner countries and other developing economies have no option but to invest in skills development and capacity building in education, training, VET and lifelong learning if they are to enhance their competitiveness in global markets and become attractive locations for foreign investments. While great steps have been achieved in initial education with rising education attainment levels in the majority of ETF partner countries, access and participation in lifelong learning remain largely modest.

8. Develop generic and transversal skills in education, training and lifelong learning: they have become increasingly important owing to rapid technological and structural changes to labour markets and to ageing and demographic changes, immigration and globalisation.

According to the World Bank (2016), in the modern economy we need three types of skills: cognitive, social and behavioural, and technical. Generic and transversal skills have become increasingly important as a result of rapid advances in technology and structural changes to labour markets, and also as a result of ageing and demographic changes, immigration and globalisation (Redecker et al., 2011). Lifelong learning is considered the central learning paradigm for the future (e.g. Redecker et al., 2011). Education and learning systems should help citizens to become lifelong learners who flexibly respond to change, are able to proactively develop their competences, and thrive in collaborative learning and working environments. As the learning of new skills is seen as important in today's turbulent working life, learning based on new ideas may also require the effective de-learning of old skills and knowledge (Argyris and Schön, 1996).

- 9. Guarantee high-quality education for teachers: it has the strongest influence on learner achievement. The quality of teachers' education plays a vital role in advanced education and skill development.**

High-quality teachers are the strongest influence on learner achievement, and the education of teachers plays a vital role in advanced education and skill development.

- 10. Guarantee access to basic and secondary education for all, ensure equal opportunities for all in tertiary education, and develop quality systems for education, VET and lifelong learning.**

High-level basic and secondary education should be guaranteed for all and assured by sufficient quality systems. Every citizen should have equal opportunities to access to tertiary education. Good quality education is the most important investment a state can make for their citizens.

- 11. Develop access to education and training in the skills required for new technologies such as digitalisation (digital literacy, basic digital skills) and AI for all.**

In the era of digital transformation and with the advent of big data, digital literacy and data literacy are increasingly becoming essential (OECD, 2018a). Digitalisation will have profound impacts on professions, and the quality of vocational education must also be developed to meet new demands. As discussed in Chapter 2, some ETF partner countries are only at the very beginning in their digitalisation journey. The link between working life and vocational training is strengthened by enabling the overlap of vocational education and work, including through apprenticeship agreements.

- 12. Develop digital and other new-technology-based learning technologies, such as open educational resources, and free online courses such as MOOCs.**

The digitalisation of education enables effective mutual feedback and communication between teachers and students. ICT and digitalisation enable the use of new methods of education, VET and lifelong learning; for example, MOOCs allow low-cost replication of the best teachers, content and methods.

- 13. Develop entrepreneurial attitudes and innovation-oriented mindsets at all levels of education, training and lifelong learning.**

As discussed in Chapter 2, digital prospects in developing economies can be improved by, among other things, encouraging entrepreneurs to invent new products, services and industries that will create jobs. The development of entrepreneurship is already on the agenda in several ETF partner countries (Azerbaijan, Montenegro, Turkey).

- 14. Develop skills at all educational levels to understand and contribute to sustainable solutions to the challenges of climate change and the extraction of natural resources.**

As discussed in Chapter 1, climate change and diminishing natural resources have significant impacts, especially on many developing countries, in the form of drought, desertification and land degradation. These impacts lead to serious socioeconomic consequences, including hunger and migration, especially in Africa, resulting in the displacement of hundreds of thousands of people. However, solutions to mitigate the impacts of climate change offer job opportunities, for example in the area of new renewable energy technologies.

Introduction of well-coordinated employment and skills strategies and policies

15. Develop well-coordinated employment and skills policies that encompass all levels of education (preschool, basic education, VET, higher education, and lifelong learning).

Coordination is among the key issues in advanced work and skills strategies and policies. In many policy documents, skills development has been integrated into national and sectoral development strategies (e.g. EU Skills Agenda). One of the conclusions of the International Labour Conference of the International Labour Office in 2008 was to build seamless pathways in education that connect basic education, vocational training, labour market entry and lifelong learning (ILO, 2008). The result of many ETF studies also indicate the need for a holistic approach and well-coordinated policies in the ETF's partner countries (ETF, 2015; ETF, 2017; ETF, 2019). Brynjolfsson and McAfee (2012, 2014) also emphasise the importance of a coordinated strategy for all levels of education, namely preschool, basic education, VET, higher education and lifelong learning. According to Redecker et al. (2011), the central learning paradigm is characterised by processes that foster both lifelong and life-wide learning, and is shaped by the ubiquity of ICT.

16. Develop a well-coordinated work and skills strategy that connects skills development with the growth, employment and development strategies of the country. Pursue commitment to close cooperation of key stakeholder groups, such as ministries of education, industries, employers, the business sector and professional and civil society organisations. Public–private partnerships and common IT platforms can support citizens' career development.

Connecting skills development to growth, employment and development strategies requires that governments build policy coherence in linking education and skills development to labour markets and to the technology, investment, trade and macroeconomic policies that generate employment growth (ILO, 2008). The development of education and skills requires horizontal integration and coordination throughout policy administrations as well as vertical coordination, which refers to different administrative levels (national, regional/provincial, local/municipal) and responsibilities in maintaining and developing the education and skills system. Singapore provides one example of the well-coordinated national organisation of education and skills system. The growth and transformation for the future is driven and implemented by the Future Economy Council and the recommendations of the Committee on the Future Economy. The Council is chaired by Minister of Finance and comprises members from government, industry, unions, and educational and training institutions.

17. Develop ETF regionally coordinated strategies benefiting from benchmarking to current regional ETF examples (SEET, EaP, and SEMED).

Coordination is also important at supranational level. Beblavý et al. (2016) give an overview of the discourse on new jobs and skills taking place within international organisations and supranational bodies as well as at the national level of government. Multilevel actions may also relate to supranational and cross-border activities, for example by the EU or, among ETF partner countries, collaboration programmes initiated and coordinated by the ETF. The required labour supply policies must be differentiated, implying, for example, at EU level, the formulation of future strategies and effective coordination mechanisms rather than top-down guidelines, targets and

recommendations²⁵. Examples of coordination between the ETF's partner countries are efforts to improve the regional cooperation in education, employment and other fields.

Monitoring impacts of strategies and policies to achieve set objectives

18. Develop a future-oriented transformative strategy based on sequential phases of future economic development²⁶.

The smart work and skills strategy should be based on a stepwise transformative approach. For example, Sach's (2008) model of 'climbing the ladder of development' encompasses the gradual sequential steps of the development ladder from bottom to top, from subsistence economy to commercial economy, and then from emerging-market economy to innovation economy (Annex 5). For each sequential phase of development, the model identifies intertwined challenges for the public and private sectors and geographical challenges, as well as the corresponding creation and tasks of education, science and technological systems. The 'climbing the ladder' model is based on path-dependency and step-by-step development rather than moving forward in big leaps.

19. Develop an evidence-based monitoring and impact assessment for education, VET and lifelong learning strategies and policies to achieve the set objectives.

The existence of a robust monitoring, evaluation and impact assessment culture in education, VET and lifelong learning is an important condition for proactive evidence-based strategies and policies. As one example, the ETF's Torino Process can be considered an important follow-up analysis of VET strategies in the partner countries. Countries can benefit from recurring, wide-ranging impact studies, as such studies can offer a picture of dynamic changes in education, VET and lifelong learning systems. Better evidence-based data and the use of multiple evaluation methods will be needed for this. As UNESCO (2014) stresses, policy decisions must be evidence-based and reflect a long-term strategic and holistic approach towards the promotion of inclusive and sustainable development. The results of evaluation and of impact assessment generate sound evidence-based material for making decisions on the directions of education, VET and lifelong learning structures and compositions.

Targeting to eliminate societal inequality and guaranteeing inclusion for all

20. Pay attention in the anticipatory analysis to any opportunities to reduce the unemployment rates of women and young people, the number of NEETs, and the incidence of poverty.

Data on the mobility and circulation of labour force between various organisations, occupations, technologies and industries is of key importance in successful education, VET and lifelong learning policies, both at national and at international level, and such labour movements and their impacts should be studied in more detail.

²⁵ See 'NeuJobs: Employment 2025: How will multiple transitions affect the European labour market', at: https://ec.europa.eu/knowledge4policy/projects-activities/neujobs-employment-2025-how-will-multiple-transitions-affect-european-labour_en

²⁶ For example, Sachs (2008) separates the phases 'subsistence', 'commercial', 'emerging-market', and 'innovation' economy. The foreseeable challenges posed by the shift towards the 'digital age' require special considerations in the creation of a proactive work and skills strategy (Annex 5).

21. Search for socioeconomic and political ways to reduce political instabilities and work within a transparent climate would enhance investment intentions. Government initiatives and mechanisms need to be transparent and accessible, and should be properly followed up.

The elimination of social inequality and corruption remain among the key problems in many ETF partner countries, as does, in some of them, political instability. They are in a way linked to each other. The latter may have more negative impacts on FDI and offshoring in the future, as UNCTAD (2018) assesses in the case of Turkey.

ANNEXES

Annex 1. Global trends shaping the future of work and skills

Economic trends	1	App economy
	2	Circular economy
	3	Customer focus
	4	Disruption of work
	5	Gig economy
	6	Globalisation
	7	Industrial renewal
	8	Modular solutions
	9	Personnel costs
	10	Platform economy
	11	Price competition
	12	Productivity boost
	13	Public costs efforts
	14	Real-time economy
	15	Service economy
	16	Sharing economy
	17	Smart logistics
	18	Smart manufacture
	19	Smart materials
	20	Trade wars
Societal trends	21	Ageing
	22	Consumerism
	23	Good life and health
	24	Lifelong learning
	25	Mental health
	26	Physical health
	27	Safety and security
	28	Social cohesion
	29	Population growth
	30	Urbanisation

Science, technology and innovation trends*	31	AI and smart systems
	32	Automation
	33	Data services
	34	Digitalisation
	35	Robotics
	36	ICT infrastructure
	37	Smart mobility
Environmental trends	38	Air and water quality
	39	Biodiversity control
	40	Climate action
	41	Food security
	42	Resource efficiency
	43	Smart energy
	44	Waste control
Political/ethical trends	45	Food politics
	46	Migration control
	47	Security policy
	48	Smart specialisation
	49	Privacy and e-security
	50	Responsible research& innovation

Note: *See also Platform Technology Areas in Annex 2.

Source: VTT.

Annex 2. Platform technology areas

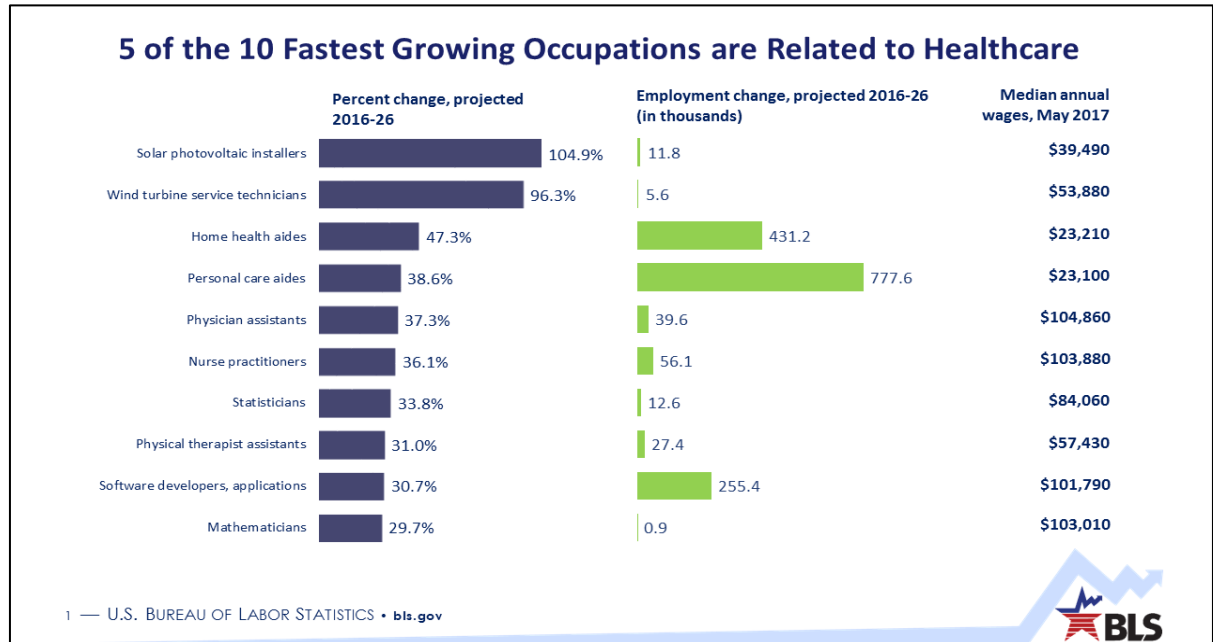
Materials technologies	1	Materials simulation and analysis
	2	3D printing
	3	Coating technologies
	4	Smart materials
	5	Composites and lightweight structures
	6	Sustainable materials
Health/food technologies	7	Advanced diagnostics
	8	In-body chips
	9	Engineered implants
	10	Next-generation therapeutics
	11	E-health and assisted living
	12	Personalised medicine
	13	Food safety and advanced traceability
	14	Sustainable food production
	15	Novel inputs and alternative food processing
	16	Personalised nutrition
Bio/nano technologies	17	Biotechnology for industrial processes
	18	Advanced genomics and gene editing
	19	Nano-enabled devices and displays
	20	Tailored nano-materials and nano-photonics
	21	Nano-manufacturing and nano-analytics
	22	Quantum technologies
Energy/climate technologies	23	Carbon modification technologies
	24	Energy storage
	25	Regenerative fuel cells
	26	Advanced hydrogen production
	27	Sustainable liquid biofuels
	28	Photovoltaic technology
	29	Marine renewable energy
	30	Wind power solutions
	31	Water treatment
	32	Air purification
	33	Micro energy harvesting solutions
	34	Advanced building fabrics

ICT/digital technologies	35	Low-powered wireless networks
	36	Advanced computing and storage
	37	Context-aware sensors
	38	Smart sensors
	39	Ultra-resilient electronics
	40	Self-organising/reconfigurable architectures
	41	Quantum-based IT
	42	AI
	43	Advanced robotics
	44	Data retrieval and analysis
	45	Data visualisation technologies
	46	IT and data security

Source: VTT.

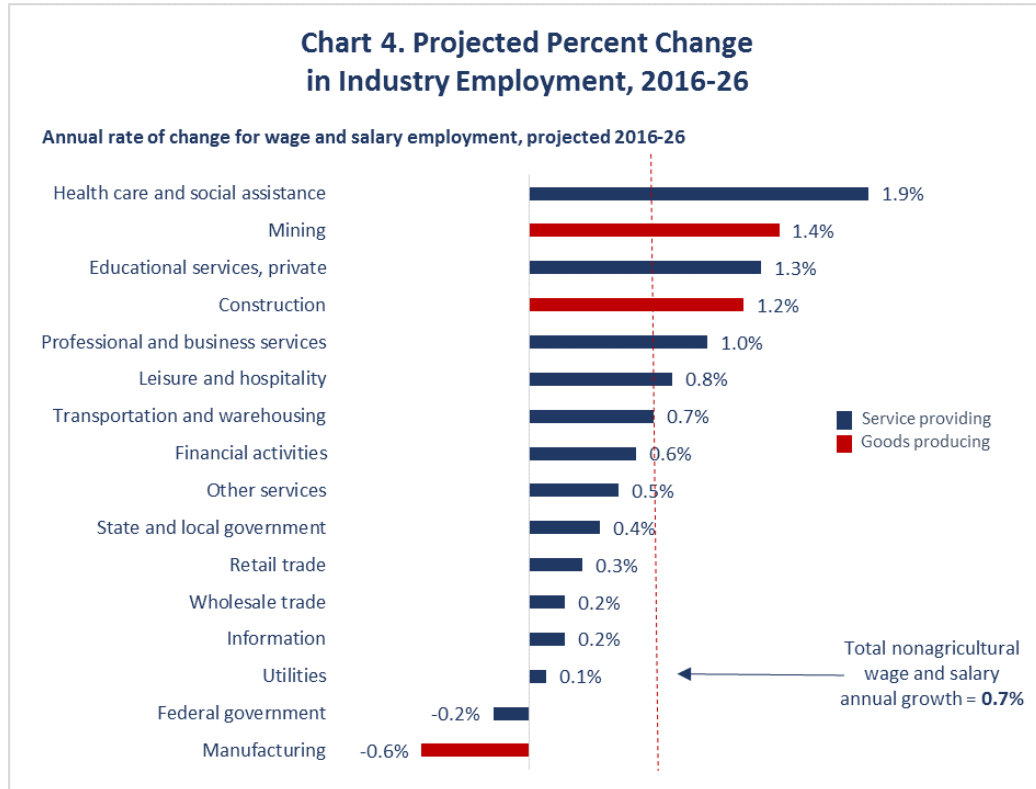
Annex 3. Examples of occupation and employment projections

TEN FASTEST GROWING OCCUPATIONS, PROJECTED 2016–26



Source: US Bureau of Labour Statistics, www.bls.gov/emp/

PROJECTED PERCENT CHANGE IN INDUSTRY EMPLOYMENT, 2016–26



Source: US Bureau of Labour Statistics, www.bls.gov/emp/

PROJECTED CHANGE BY BROAD OCCUPATIONAL GROUP IN THE EU, 2011–30 (TOTAL FOR EU-28 MEMBER STATES + ICELAND, NORWAY AND SWITZERLAND)

Shares (%)	2011	2016	2021	2026	2030	Net change 2016–30
Legislators, senior officials and managers	6.2	6.4	6.5	6.7	6.8	13.6
Professionals	17.0	17.8	18.1	18.4	18.7	11.7
Technicians and associate professionals	15.8	16.4	16.9	17.3	17.8	14.9
Clerks	10.7	10.3	10.0	9.7	9.4	–2.8
Service workers and shop and market sales workers	17.0	17.1	17.1	17.0	16.8	4.1
Skilled agricultural and fishery workers	4.3	3.8	3.5	3.4	3.2	–8.6
Craft and related trades workers	12.3	11.4	10.9	10.5	10.2	–5.0
Plant and machine operators and assemblers	7.3	7.0	6.9	6.8	6.8	2.6
Elementary occupations	9.5	9.8	10.0	10.2	10.4	12.4
All occupations	100.0	100.0	100.0	100.0	100.0	6.3

Growth (% per annum)	2011–16	2016–21	2021–26	2026–30	2016–30	Net change 2016–30
Legislators, senior officials and managers	1.0	0.9	1.0	0.8	0.9	0.9
Professionals	1.3	0.8	0.9	0.7	0.8	0.8
Technicians and associate professionals	1.2	1.0	1.1	0.9	1.0	1.0
Clerks	–0.4	–0.1	–0.1	–0.4	–0.2	–0.2
Service workers and shop and market sales workers	0.6	0.5	0.3	0.0	0.3	0.3
Skilled agricultural and fishery workers	–2.1	–0.7	–0.5	–0.7	–0.6	–0.6
Craft and related trades workers	–1.2	–0.5	–0.2	–0.4	–0.4	–0.4
Plant and machine operators and assemblers	–0.3	0.2	0.3	0.1	0.2	0.2
Elementary occupations	1.1	0.9	0.9	0.6	0.8	0.8
All occupations	0.4	0.5	0.5	0.3	0.4	0.4

Source: Cedefop (2018), Skills forecast: trends and challenges to 2030, pp. 46–48, www.cedefop.europa.eu/en/publications-and-resources/publications/3077

Annex 4. Real GDP growth rate in ETF partner countries

REAL GDP GROWTH RATE, 2013–17, AND GDP (PPP) PER CAPITA, 2017

Country	GDP growth rate (%)					GDP (PPP) per capita (international. dollars)
	2013	2014	2015	2016	2017	
Albania	1.00	1.77	2.22	3.35	3.84	12,472
Algeria	2.77	3.79	3.76	3.30	1.70	15,150
Armenia	3.30	3.60	3.20	0.20	7.50	9,098
Azerbaijan	5.80	2.00	1.10	–3.10	0.10	17,433
Belarus	1.02	1.72	–3.83	–2.53	2.42	18,616
Bosnia and Herzegovina	2.35	1.15	3.08	3.14	3.03	11,404
Egypt	2.19	2.92	4.37	4.35	4.18	12,994
Georgia	3.39	4.62	2.88	2.85	4.99	10,644
Israel	4.11	3.41	3.04	4.09	3.33	36,250
Jordan	2.83	3.10	2.39	2.00	1.96	12,487
Kazakhstan	6.00	4.20	1.20	1.10	4.00	26,071
Kosovo	3.43	1.20	4.09	4.07	4.47	12,003
Kyrgyzstan	10.92	4.02	3.88	4.34	4.58	3,652
Lebanon	2.64	2.00	0.82	2.00	2.02	19,486
Moldova	9.40	4.80	–0.40	4.50	4.50	5,657
Montenegro	3.55	1.78	3.39	2.95	4.30	17,439
Morocco	4.54	2.67	4.55	1.22	4.10	8,612
North Macedonia	2.93	3.63	3.84	2.92	0.02	15,203
Palestine	2.22	–0.18	3.43	4.71	3.14	4,300
Russia	1.79	0.74	–2.83	–0.23	1.55	27,890
Serbia	2.57	–1.83	0.76	2.80	1.87	15,164
Tajikistan	7.40	6.70	6.00	6.90	7.10	3,131
Tunisia	2.88	2.82	1.15	1.11	1.96	11,987
Turkey	8.49	5.17	6.09	3.18	7.42	26,453
Turkmenistan	10.20	10.30	6.50	6.20	6.50	18,680
Ukraine	–0.02	–6.55	–9.77	2.31	2.50	8,656
Uzbekistan	8.00	7.79	8.00	7.80	5.30	6,990

Note: PPP – purchasing power parity.

Sources: Data on real GDP growth rate 2013–17: World Bank GDP growth (annual %) data. Data on GDP (PPP) per capita in international dollars: International Monetary Fund, 2017.

Annex 5. Climbing the ladder of development

	Rungs of the development ladder	Public sector challenges	Private sector challenges	Notable geographical challenges
Climbing the ladder	Innovation economy	Excellence of universities, public funding for science	Management of knowledge workers, quality of life for employees	Establishment of high quality of life in 'creative' urban zones, with top-flight universities, entertainment, access to global travel and markets
	Emerging-market economy	Deepening of financial market, commercial law, public sector pensions, juridical systems, universities and technical schools	Creation of research capabilities, logistic systems, quality control, worker training	Need for competitive transport and communication services, linking national economies with international supplies and customers
	Commercial economy	Establishment of well-functioning industrial parks and zones; promotion of ports, airports, telecoms, internet and power; universal secondary education; completion of the demographic transition; labour codes	Export financing in industrial zones, contractual relations, including joint ventures with international buyers and supplies, adoption of labour standards	Transport and communications conditions, reliability of electricity, promotion of urban infrastructure and policy support to accommodate rapid urbanisation
	Subsistence economy	Creation of basic network of roads, power, health, primary schools, teachers' colleges; universal primary education; training of skilled workers for education, health, agriculture and infrastructure	Promotion of cash-earning agriculture, small-scale rural enterprises, microfinance	Vulnerability to drought, epidemics, agricultural pests, and other hazards

Source: Sachs (2008).

LIST OF ACRONYMS

AI	Artificial intelligence
BPO	Business process outsourcing
EaP	Eastern Partnership
ETF	European Training Foundation
FDI	Foreign direct investment
GDP	Gross domestic product
GVC	Global value chain
HCD	Human capital development
ICTs	Information and communication technologies
ILO	International Labour Organisation
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
IT	Information technology
MOOCs	Massive online open courses
NEET	(Young people) not in education, employment or training
OECD	Organisation for Economic Cooperation and Development
R&D	Research and development
SEET	South Eastern Europe and Turkey
SEMED	Southern and Eastern Mediterranean
SME	Small and medium-sized enterprise
TVET	Technical and vocational education and training
UNDP	United Nations Development Programme
VET	Vocational education training
VTT	Technical Research Centre of Finland
WEF	World Economic Forum

GLOSSARY

Artificial intelligence	‘Science and engineering of making intelligent machines’ (McCarthy, 1956). Field of computer science specialising in developing systems that exhibit ‘intelligence’ (McKinsey, 2017a). Software technologies that make a computer or robot perform equal to or better than normal human computational ability in accuracy, capacity and speed (www.businessdictionary.com/).
Barrier	Any kind of existing limitation or obstacle – whether technological, economic, environmental, political, social, ethical or spatial – that hinders a given sustainable innovation initiative.
Digitalisation	The use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business (Gartner IT Glossary, www.gartner.com/it-glossary/digitalization/).
Driver	Any kind of existing force, trend or enabler – whether technological, economic, environmental, political, social, ethical or spatial – that fosters a given sustainable innovation initiative. Factors causing change, affecting or shaping the future (A Glossary of Terms commonly used in Futures Studies, Full Version, Forward Thinking Platform, 2014).
Foresight	A systematic, participatory, prospective and policy-oriented process which, with the support of environmental/horizon scanning approaches, is aimed at actively engaging key stakeholders in a wide range of activities anticipating, recommending and transforming technological, economic, environmental, political, social and ethical futures (https://rafaelpopper.wordpress.com/futures/).
Job	Is bound to a specific work context and executed by one person (ESCO, 2015). A set of tasks and duties performed, or meant to be performed, by one person, including for an employer or in self-employment (ISCO, 2008).
Megatrend	Large, transformative global forces that define the future by having a far-reaching impact on business, economies, industries, societies and individuals (EY, 2016).
Occupation	A grouping of jobs involving similar tasks, which require a similar skills set (ESCO, 2015). A set of jobs whose main tasks and duties are characterised by a high degree of similarity (ISCO, 2008).
Opportunity	Any future possibility for a given sustainable innovation initiative to achieve something desirable, such as a technological, economic, environmental, political, social, ethical or spatial goal.
Skill	The ability to carry out the tasks and duties of a given job (ISCO, 2008).
Task	A unit of work activity that produces output (goods and services) (Acemoglu and Autor, 2011).
Threat	Any future possibility for a given sustainable innovation initiative to be affected by something undesirable, such as a technological, economic, environmental, political, social, ethical or spatial risk.
Trend	A general tendency or direction evident from past events increasing or decreasing in strength or frequency of observation; it usually suggests a pattern (Foresight Glossary, www.foresightguide.com/foresight-glossary/).
Vision	Foresight is a tool for developing ‘visions’, understood as possible future states of affairs that actions today can help bring about (or avoid) (http://forlearn.jrc.ec.europa.eu/guide/1_why-foresight/index.htm).

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