RESEARCH PAPER

The changing nature and role of vocational education and training in Europe

Volume 3: the responsiveness of European VET systems to external change (1995-2015)

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Foreword

This research paper forms part of the Cedefop project *The changing nature and role of vocational education and training in Europe*.

The purpose of the project is to improve our understanding of how vocational education and training (VET) is changing in the countries belonging to the European Union (as well as Iceland and Norway). Over a three-year period (2016-18) the project will analyse how vocationally oriented education and training has changed in the past two decades (1995-2015); based on these results it will investigate the main challenges and opportunities facing the sector today and in the future. Work is divided into six separate but interlinked themes:

(a) the changing definition and conceptualisation of VET;
(b) the external drivers influencing VET developments;
(c) the role of traditional VET at upper secondary level;
(d) VET from a lifelong learning perspective;
(e) the role of VET at higher education levels;
(f) scenarios outlining alternative development paths for European VET in the 21st century.

The study takes as its starting point that vocationally oriented education and training is something more than the traditional VET delivered at upper secondary level (in the form of school-based education or training, apprenticeships, or combinations of these). The need for lifelong learning is driving diversification of VET, with new institutions and stakeholders involved. There is also expansion of VET to higher education areas, partly through reform of existing institutions, partly through the emergence of new institutions. This has been caused by factors internal to the education and training system as well as by external pressures linked to demographic, technological and economic changes.

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Executive summary

The challenges facing VET systems

There is a common set of challenges facing vocational education and training (VET) systems in all (or most) countries:

(a) developing the capacity of the VET system so that it is better able meet the needs of the labour market (to counter the tendency in some countries for vocational schools to teach what they have the means to teach rather than meet the labour market needs) and society;

(b) increasing the attractiveness of VET to both would-be vocational students and employers;

(c) securing a sufficient volume of students to teach in competition with the general stream, especially where the number of young people is in sometimes sharp decline;

(d) ensuring that the system can be responsive to the changes resulting from technological drivers, both in mitigating the impact of skills obsolescence and ensuring that the demand for new skills in new jobs is met;

(e) ensuring that those employed in vocational schools possess the technical knowledge and have access to the latest technologies, so that the teaching they deliver is relevant to the needs of industry;

(f) maintaining a balance between provision of broad-based education and the demand, from some quarters, for VET to be tightly focused on supplying the skills for a specific, narrowly defined occupation;

(g) being able to do more in those countries where pressure on public finances has reduced funding for VET.

The responses

Common responses – though not necessarily evident in every country – to the various challenges outlined above include:

(a) reconfiguring the ties of the labour market and wider society with the VET system in specifying competences and curricula. This is sometimes reflected in giving social partners more say over the content of VET and in the development of work-based learning;

(b) finding new sources of students/learners. The demographic challenge results in a need to find new sources of skills. Accreditation of existing skills

has assumed greater importance in many countries, as has accreditation of the skills of migrants;

(c) moving to an outcome/competence-based system of initial vocational education and training (IVET) (in some instances shortening the duration of training);

(d) attempting to increase participation in apprenticeship training and access to work-based learning, as these are seen as a particularly effective means of linking training to the needs of the labour market/employers;

(e) trying to increase the direct participation of social partners in VET so that, *inter alia*, students have access to the latest technologies (typically not available in vocational schools because of their cost) and teachers can better keep their industry knowledge up to date;

(f) making substantial investments in skill anticipation systems; increasingly extending VET so that it is available at the post-secondary level and/or ensuring that VET at upper secondary level potentially provides the means to continue education at higher levels (either in or outside the VET stream);

(g) developing and utilising qualifications frameworks to make the VET system more transparent.

Patterns of convergence and divergence

The above lists a number of responses to common factors over the past 20 years or so, but adaptation to change is influenced by the respective starting points of countries. For instance, the former Soviet bloc countries had to reinvent their VET systems in the 1990s, while change was more piecemeal or incremental in other countries, even if, over the longer term, the changes introduced have had the impact of substantially reforming the structure and content of VET provision.

Several factors are evident:

(a) VET appears to go in and out of fashion over time. The 2010s has proved to be a period of increased public policy interest in VET. In part this is a response to increasing concerns about the degree of skill mismatch in the economy. But, at other junctures, there has been much less public policy interest in VET; especially so during the 1990s and 2000s when, for some countries, the concern was with boosting participation in higher education (general education);

(b) IVET today, in many countries, looks very different to how it looked at the beginning of the 1990s in several countries. Even if the esteem in which IVET is held is not as high as that for general/academic education, in many countries it has matured over time into a major constituent part of the formal

education system. This differs by country but in some countries VET was not as firmly established a part of the formal education system in the late 1980s and early 1990s as it is today. This partly reflects the elongation of the transition from school to work and increasingly flexible labour markets (and the effect this has upon employer willingness to fund VET);

(c) policy shifts are apparent in countries between centralisation and decentralisation with respect to which institutions are responsible for VET. In some countries – such as the Netherlands, Italy, and the UK – there have been shifts in the extent to which authority and autonomy is granted to regional and local levels (even to the level of the individual vocational school or college) and also to business sectors. This is not necessarily unidirectional: even if there pressures to grants parts of the VET system more autonomy, so that it is more responsive to the labour market, there appear to be forces that sometimes operate in the opposite direction (towards centralised authority over the VET system);

(d) evidence suggests a broadening of course content (and a reduction in the total number of qualifications available) reflecting pressures to equip people with broad skill sets to meet changing labour market demands. The broadening of courses – with respect to their occupational scope – has led to more transversal skills content in VET courses. At the same time, there is some flexibility, such that courses can be flexed so that they meet skill demand at the local level;

(e) the increased autonomy key institutions in the VET system have acquired over time – and the flexibility it potentially confers upon the VET system – may mean that it is better placed to respond to changes in the labour market and economy. In some countries this potentially allows change to be introduced in curricula relatively quickly; in others less so. There is a tension here between approaches. Being able speedily to adapt courses runs the risk that the skills they provide quickly become obsolete; courses with relatively broad foundations and, in consequence, some flexibility in accommodating change, may be inherently more difficult to reform and run the risk of becoming dated over the longer term. The comparison of UK-England with countries such as France and Germany is instructive here;

(f) the nature of recent technological changes (such as robots, artificial intelligence (AI)) has resulted in concerns of VET schools falling behind in their attempts to keep abreast of the rate of change. They are expected to equip people with skills that are in short supply in the labour market and have access to the latest technologies. Accordingly, they struggle recruiting staff with the required skills and having access to the latest technologies.

The economic climate of austerity and its impact on public finances also means that they have more limited financial resources with which to respond to change, especially technical change;

(g) demographic change, in combination with austerity, has led to some consolidation in VET provision. Increased pressures being placed on the VET system to deliver the skills a country needs clash with resource provision becoming tighter, which has consequences for the VET infrastructure. This is apparent in some countries more than others;

(h) there is an emphasis on the VET system becoming more responsive to the needs of the labour market and society more generally; VET providers also need to be increasingly responsive. Their continued survival is dependent on them being able to capture a sufficient market share to make the service they provide sustainable. This should not be overstated and the difference between, for example, the UK and Norway or Finland is substantial in this regard. But the notion of making the VET system more responsive to the rapidly changing labour market and society implicitly implies, in some countries, that the imperative for VET providers to adapt to changing market needs has intensified;

(i) a common thread is that of IVET being extended to higher levels, beyond its upper secondary level heartland; this is part of the process of ensuring that VET is attractive to young people (does not close off access to higher education), but also of meeting the need for vocational skills at higher levels. Where there is less clarity is with respect to whether the VET stream: it becomes embedded within existing higher education institutions and structures; it develops along its own parallel track; or it embodies a mixture of both. There is a degree of policy experimentation in some countries but not necessarily a common trend;

(j) continuing vocational education and training (CVET) has been largely a private investment decision for employers and individuals. Although this situation prevails, it is noticeable that the division between IVET and CVET has become less well defined over time. This is mainly a consequence of labour markets becoming more flexible and people being expected to spend longer in them before retiring. This creates a need for the skills of the workforce to be replenished over time; a need which is not necessarily met by in-company CVET (especially in more flexible labour markets) but which can fulfilled by various IVET programmes.

The authors of the country studies generally paint a relatively optimistic picture for the future of VET but, at the same time, suggest that a range of external factors could easily bring about a more pessimistic outcome (seen in

overall aggregate level of demand for labour and skills, funding levels for VET, and its capacity to meet labour market needs).

Concluding comments

There is a high degree of commonality in the direction of travel. What differs is the relative starting point (the extent to which the VET system was already established at the start of the 1990s) and the extent to which external shocks in the period between the early 1990s and 2016 have had an impact on the economy and labour market. The impacts are mediated through different institutional settings but the types of change introduced in response to external factors shows a degree of similarity. The resemblances, rather than the differences, are the interesting findings.

CHAPTER 1.

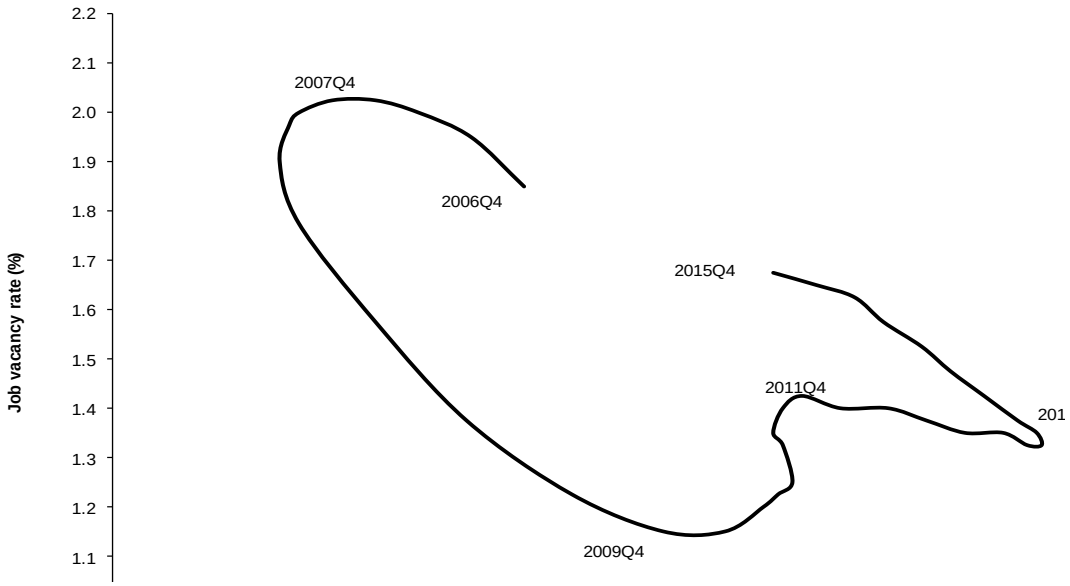
Introduction

1.1. The economic and social context

Europe faces a number of medium- and long-term challenges. Recovery from the financial and sovereign debt crisis in 2007-09 has proved slow; output growth is gradually improving but unemployment continues to be at historically high levels especially for young people (European Commission, 2015). The economic situation is uneven across the EU. Meanwhile long-term structural changes continue in the global economy, with technical change continuing apace, affecting both the nature of skill demand and its location (McIntosh, 2013). Consequently weak employment growth has intensified competition for jobs in Europe which, for some groups of jobseekers, is further heightened by global shifts in the centres of production and increased automation (Brynjolfsson and McAfee, 2012; Frey and Osborne, 2013). There is also some indication that technical change – via various digital platforms – may be increasing non-dependent employment levels, which may well have implications for VET (Huws et al., 2016). The challenges these changes pose for vocational education and training systems across the EU are potentially formidable: weak employment growth tends to result in skill/labour surpluses and rapid technical change; if VET systems are not sufficiently responsive to that change, skill shortages may arise.

The evidence to date points to a potential matching problem. Over time there is some evidence that the Beveridge Curve – that captures the ratio between job vacancy and unemployment rates – is being pushed outwards (Figure 1). This means that relatively high levels of job vacancies can coexist with relatively high levels of unemployment. It can be seen in Figure 1 that over time the curve has shifted outwards from a situation in 2006 where a relatively high vacancy rate was accompanied by a relatively low unemployment rate, to 2015 where both unemployment and vacancy rates are relatively high. The factors that underlie movements in the Beveridge Curve are multifarious and are typically explained with reference to the operation of passive and active labour market policies (Elsby et al., 2011). VET systems in themselves are unlikely to be able to bring about significant movement in the Beveridge Curve but they will, at the margins, have a bearing on the extent and speed with which vacancies are filled.

Figure 1. **Beveridge curve, 2006q4 to 2015q4 (four-quarter average rates)**



Source: Eurostat (a). Unemployment rates by sex, age and citizenship [database: lfsq_urgan].
Eurostat (b). Job vacancy statistics by NACE Rev. 2 activity - quarterly data (from 2001 onwards) [database: jvs_q_nace2].
Figure from http://ec.europa.eu/eurostat/statistics-explained/index.php/Job_vacancy_and_unemployment_rates_-_Beveridge_curve

Evidence suggests that mismatches between the levels of qualification held and the jobs undertaken have increased but there is also evidence that skill shortages persist. This is especially so in key sectors, such as ICT/digital, but can also be found in more traditional sectors such as manufacturing and construction ([2]). It seems likely that, even with relatively weak overall skill demands, and despite the increase in levels of educational attainment, skill shortages persist (European Commission, 2015; Cedefop, 2015a, 2015b 2015c)). This is not simply a cyclical issue. The *New skills agenda* places great

([2]) It is acknowledged that the concept of skills mismatches is complex. Vertical mismatches occur where people's skills are at a level inappropriate for the jobs available resulting in, for example, people being over- or underqualified for the jobs available. Horizontal mismatches occur where the type of skills the individuals hold, irrespective of their level, are not suited to the jobs available. There is also skills obsolescence to consider where individuals' skills lose their relevance as a consequence of various changes both in the external labour market and within the workplace. Skill mismatches might reflect short supply in the external labour market, but also where employees within a workplace do not possess the level of competence required to fulfil the tasks in their current job. For further information see: Cedefop (2010). *The skill matching challenge: analysing skill mismatch and policy implications.* Luxembourg: Publications Office.

emphasis on better intelligence to inform choices about investments in skills and also on making 'VET a first choice' in looking for a better match between skills supply and skills demand (European Commission, 2016a). It will be the way in which countries are able to flex their VET systems to meet current skill demand and, at the same time, sufficiently anticipate future demand, which is critical in this regard ([3]). But it is not only the way in which VET systems are designed to anticipate skill demand arising from a range of external factors that is of interest. It is also the way in which they are able – or are configured – to respond effectively to the occasional shocks to which the European economy is subject. This is important given the different events with which Europe has had to contend over the past 10 years. The external environment has resulted in the State being increasingly interested and influential in the provision of VET (Goodson, 2001). It is these issues which form the core of the current study.

1.2. The external environment and VET systems

There a number of external factors that will have implications for any VET system. These include:

(a) demographic change (including migration);
(b) the business cycle;
(c) globalisation/offshoring;
(d) technical change/digitisation/robotics;
(e) organisational change within workplaces and within sectors (including sectoral restructuring);
(f) public policy (e.g. systems of social protection that use VET as part of their efforts to combat social exclusion, macroeconomic policy).

Figure **2** outlines how the external environment can affect a VET system. Signals from the external environment will be mediated by the policy and societal norms extant within a country. There are several elements to consider here, including the prevailing approaches to economic and social policy, the historical development of education and training systems, and the value attached to VET. For instance, in UK-England there has been, and continues to be a market-based orientation to developing almost all public policy including the provision of VET, which is more marked than in other parts of the UK ([4]). This has allowed many

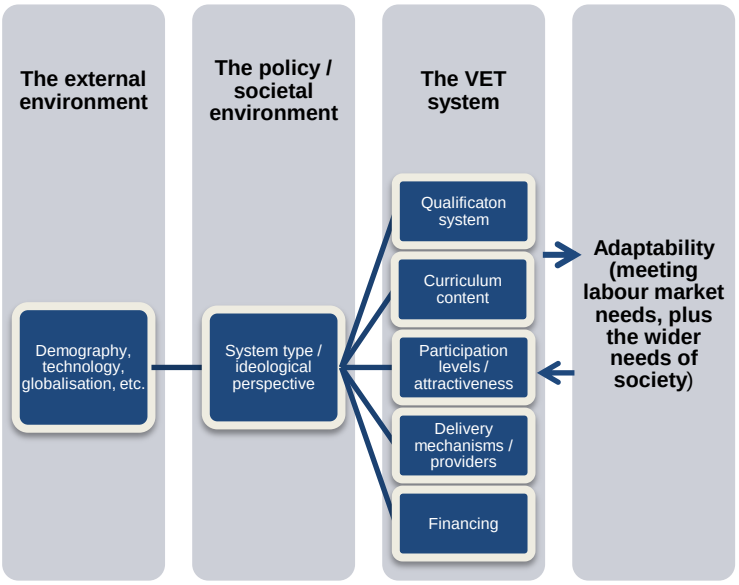
([3]) The way organisations adapt their patterns of work organisation is also important.

([4]) A case study of the external factors affecting the provision of VET in UK-England was undertaken as part of the study.

players to enter the market – in the provision of training, the development of programmes or the provision of qualifications – because this increases competition. By turning students into consumers, and providing them with information about the value of investing in different types of VET, it is assumed that the system will be oriented towards developing economically valuable skills (Gambin and Hogarth, 2016a, 2016b, 2017; Hogarth and Gambin, 2016). But the policy context or lens is not the only one of interest: there are societal norms to consider as well. Perhaps the most pertinent is the relative esteem in which VET is held by employers, individuals, and policy-makers. This might affect the policy priority attached to ensuring that the VET system is responsive to the external environment compared with, for example, other sectors of the education system. Funding levels can be an indication of policy prioritisation within a country.

There is then a question of what constitutes the VET system within a country. What are the constituent parts of the system that are expected to respond in some way to the external environment? There are several elements to consider – as indicated in Figure 2 – from the perspective of understanding how they are configured to respond to developments in the external environment, and how have they behaved in practice. This will be strongly related to the policy context as described above, as it is likely to have had an influence over the configuration of the system and the way in which actors behave within it. The policy context is also likely to determine which actors are influential within the system and the actions they take. From here it is possible to gauge the extent to which the VET system responds in a way which brings about effective labour market outcomes: the production of economically valuable skills that will serve individuals, employers, and the State as a whole, over the short and long term (providing employment, combatting skill mismatches, promoting career adaptability, stimulating productivity and competitiveness). Feedback mechanisms are important to ensure that VET systems are responsive to labour market needs (Cedefop, 2013).

Figure 2. **How the external environment affects the VET system**



Source: Cedefop.

1.3. Main objectives and research questions

The key questions the study addresses are set out below.

(a) To what extent are demographic developments influencing the need for and provision of VET?

In the context of an ageing EU labour force there is a need to consider how Member States are addressing this issue, particularly the role of CVET in allowing people to reskill in later years to avoid their skills becoming obsolete. However, migration into the EU and between Member States may reduce the scale of the problem facing certain countries. At the other end of the age spectrum many countries are faced with declining youth cohorts, which increases the competition between the general and VET streams for available students;

(b) To what extent are changes in the labour market, notably occupational profiles, influencing VET?

There are multiple changes affecting the occupational structure of employment. Existing jobs are changing and new jobs are emerging, the skill content of which is only just becoming apparent. There are a number of differing perspectives on what is driving both changes in the occupational structure (for example, task-based technological change) and the changing skill content of existing jobs (technical, organisational, and environmental change) (Ford, 2016; Autor et al., 2003; Goos et al., 2011);

(c) To what extent are changes in VET based on targeted labour market intelligence, for example, on skill needs analysis at national/regional, sectoral or local level)?
The role of information advice and guidance/labour market intelligence (LMI) is important in providing those in the labour market with data, including on the returns from taking various courses (IVET, CVET and non-VET). LMI extends labour market information (descriptive data such as statistics or survey results) by adding a layer of analysis, interpretation, conclusions and, in some cases, policy recommendations. The extent to which LMI systems are up and running in the EU varies by Member State: while countries such as the Netherlands have developed sophisticated systems supported by data at a detailed level of disaggregation over time, other countries are still in the early stages of developing LMI systems. This provides a natural experiment of sorts to look at the way LMI can change VET provision and how institutional arrangements have developed to ensure that the supply of skills is better matched to demand;

(d) To what extent is the role and nature of VET influenced by changing policy priorities at national level?
Considerable emphasis has been placed on understanding the institutional and policy context in which national debates on adapting VET systems – both CVET and IVET – to meet better the needs of the population and economy. This is seen as crucial in being able to understand how VET responds – and how it could respond better – to the exigencies of the economy and labour market.

1.4. Structure of the report

The report is structured as follows. Chapter 2 outlines the conceptual framework for the study. This is followed in Chapter 3 by an exploration of the quantitative data on the relationship between VET and the variety of external factors. In Chapter 4 an indication is provided of the way in which VET systems have responded to external factors. Chapter 3 and 4 provide the context for the analysis in Chapter 5, which shows how various countries have modified their VET systems over time. Chapter 7 looks more specifically at how national systems have responded to demographic and technical change and the vagaries of the economic cycle. Chapter 7 provides a conclusion.

CHAPTER 2.

Understanding change in VET systems

2.1. Developing a general approach

Countries are, more or less, facing the same set of external pressures on their VET systems. This is perhaps less so with respect to demographic trends (ageing and levels of migration), but the other factors are relatively common across countries. Of particular interest to this study are:

(a) demographic change (ageing, migrant flows, declining youth cohorts);
(b) globalisation/offshoring;
(c) technical change/digitisation/robotics;
(d) organisational change within workplaces and sectors (including sectoral restructuring) that affects the structure of work;
(e) the outflow from other policy areas (such as systems of social protection that use VET as part of their efforts to combat social exclusion, macroeconomic policy) which affect the demands made of VET systems.

In many respects, the above can be considered long-term structural shifts in the economy that give rise to a number of demands on VET systems. It is expected that these factors will result in changes to various elements of the VET system:

(a) the means used to anticipate emerging skill needs;
(b) curriculum and course design;
(c) the means used to deliver skills (including both teaching/learning methodologies, and the emphasis placed on work-based learning);
(d) funding levels and mechanisms;
(e) the measures used to direct or nudge behaviour in relation to VET (including the use of subsidies, incentives, and markets);
(f) the means used to raise participation levels (especially in particular types of courses or fields of study where demand is in danger of not being met; the role of labour market information systems and careers guidance).

Alongside the longer-term structural shifts there are shorter-term, frictional exigencies that affect VET provision and VET policy. The most obvious is the business cycle and the effect it has on the demand for skills and labour. It is readily apparent that the sovereign debt crisis at the end of the 2000s continues to cast a shadow over the EU economy, especially with respect to the relatively high levels of youth unemployment that prevail in many countries. The impact the

crisis had on government finances resulted in constraints on public investment in VET. This is evident in countries such as the UK where the budget available for publicly funded VET has been substantially reduced in real terms over the past five years (Wolf, 2015). Any attempt to understand the impact of more structural external factors is difficult to disentangle in practice from whatever political/economic needs prevail at any one time.

Both structural and frictional changes in the external environment will be mediated by a number of factors:

(a) national policy priorities and the way in which these are enacted, such as the preference for the use of market mechanisms in some countries versus a more coordinated social partner based approach;

(b) path dependency in VET. Just as countries exhibit a particular approach to policy-making in general – such as the preference for market-based approaches in the UK and Ireland and some eastern European countries – there is also the historical development of the VET system to consider. The way in which they react to structural changes will be partly determined by the way in which they are currently institutionally structured and the behaviours that have developed within those structures.

It is possible to outline schematically how external factors affect events, as shown in Figure 3.

Figure 3. **Approach to the study**

Source: Cedefop.

The general challenges posed to VET systems by each of the external factors of interest can be broadly outlined. Where variation exists is with respect to national approaches (the third box from the left in Figure 3). This where it is possible to understand how different types of VET system accommodate external factors and their implications for meeting labour market skills demand. These demands relate to both now and the future and, more generally, in providing skills to the population as a whole which contributes to fulfilment outside of work (for example, through social inclusion). The overall approach is one of moving from

the general to the specific, to look in detail at how countries have responded differently to a common set of external factors and, based on this analysis, obtaining an indication of the resulting outcomes. Differences are likely to emerge with respect to the way in which national policies – and the historical development of the VET system – determine responses to common issues. For example, the way Germany responds to ensuring that technical change is reflected in the content of training delivered in the dual system is likely to be different from the approach adopted in other countries. The UK not only has marked differences in the type of apprenticeship system and approach to VET provision from Germany, but also has different approaches between the four constituent parts of the UK. Estonia has relatively low IVET participation and an industrial structure that differs markedly from either Germany or the UK.

2.2. Analysing change

When analysing change there is a tendency to concentrate on major exogenous shocks to a system; as much, if not more, change can be observed as piecemeal or incremental over time (Mahoney and Thelen, 2010). Defining 'major' change relative to that of piecemeal or incremental change can prove difficult ([5]); in practice a more nuanced understanding of change is required, such as provided by Streeck and Thelen (2005):

(a) displacement: removal of existing rules and introduction of new ones;
(b) layering: new rules on top of, or alongside, existing ones;
(c) drift: changed impact of existing rules due to shifts in the environment;
(d) conversion: the changed enactment of existing rules due to their redeployment.

It should be noted that our interpretation of 'rules' should be a broad one and encompass the entire gamut of regulations, practices, concepts, values and norms that make up a VET 'system'. Though the above is largely an ex-post classification, there is also an interest in understanding the drivers of policy changes that might result in one of the above outcomes. Understanding the interaction between various agents of change is of interest here. Goodson (2001) makes a distinction between various agents involved in educational change, describing them as:

([5]) For example, in political science there is relatively little consensus about the definition of what constitutes a revolution.

(a) internal change agents who work within school settings to initiate and promote change within an external framework of support and sponsorship;
(b) external change mandated in top-down manner, as with the introduction of national curriculum guidelines or new State testing regimes;
(c) personal change in the personal beliefs and missions that individuals bring to the change process (Goodson, 2001, p. 46).

Goodson's interpretation of change over time suggests that, until the end of the 1970s, internal change agency tended to be dominant. With changes in the external environment – the onset of globalisation is specifically mentioned – government and other corporate bodies became increasingly involved in education matters: the external agency mandates became dominant. Education systems adopted a top-down approach to policy development and overall control of the system. In many respects, the top-down approach was one that increasingly stressed the importance of education and training contributing to competitiveness. Internal actors within the education sector increasingly found themselves responding to change rather than initiating it; this can result in the personal change agents being opposed to the external change they see as being imposed upon them.

The extent to which there is cooperation and conflict between the three agents is important. Change can result in some parties seeking to 'play' the system, where they focus on narrow targets or indicators to the exclusion of other desirable outcomes. For example, learners may be entered for qualifications where achievement suits the institution rather than the learners. The intended outcomes of change are then potentially compromised by the failure to gain the necessary cooperation between the parties.

It must always be considered that the way in which change is decided and how it is implemented will be dependent on the existing configuration of a system.

2.3. The national context and path dependency

The relationship between actors in the education system, the inter-relationship between endogenous and exogenous factors, and the pattern of change these give rise to over time are important. If there is interest in looking at these relationships, there needs to be recognition that each country's starting point is different, both with respect to the existing level of development but also the institutional arrangements in place to design and deliver VET.

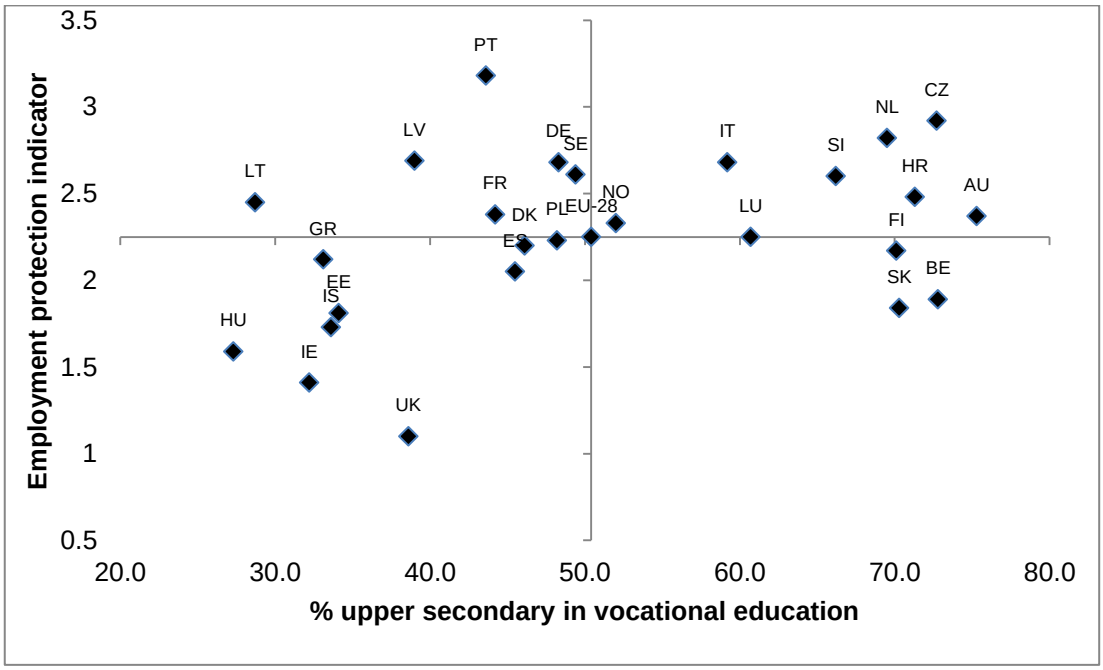
There are several theories that seek to explain why the processes and structures of skill formation differ so much between nation states. The 'varieties of capitalism' theoretical perspective, which tries to get to grips with both the politics and economics of VET provision, sees the process of skill formation within nation states as emerging from different forms of social contract forged over time (for example, Estévez-Abe et al., 2001). The perspective is not fully formed but it is useful in helping to understand both how the systems have come to exist in their current forms and the interplay of the various actors within the system. It illuminates how various exogenous factors that are likely to affect both the supply of and demand for VET are mediated through labour market institutions, whether the institution is the market or the institutions that comprise a more corporatist, social partnership approach. But it is insufficient for current purposes. In many respects one of the primary goals of any VET system is to provide skills that are economically valuable to individuals, employers and, in aggregate, the economy as a whole. Economic value might be defined with reference to the extent to which skills are able to produce a return over the medium to long term (for example, with reference to providing access to employment, and contributing to productivity/efficiency growth within the workplace). A focus on the post-1995 period shows that most EU VET systems have had to accommodate a substantial amount of change taking place in the external environment: globalisation, technical change, the economic crisis, demographic change.

To provide an analysis of how VET systems have responded to, and been shaped by, the external environment there is a need to control a range of starting points. While Member States' VET systems have had to respond to a largely common set of external stimuli (such as technical change and globalisation) they have done so from very different positions. Looks back to 1995 shows that the extent to which economies engaged in trade varied considerably by Member State, as did levels of productivity per hour worked or levels of investment in fixed capital formation. Similarly, VET systems differed – and continue to differ – with respect to levels of participation, structure, governance, and funding. Accordingly, the ways in which VET systems respond to changing external circumstances might be expected to differ, especially in the detail of what is being carried out.

Reference to the degree of flexibility in the labour market offers insight into the policy regimes in place across Europe. Figure 4 uses the OECD's employment protection against dismissal as a proxy measure of a flexible labour market (relatively unregulated). The higher the value, the more protection there is against dismissal. This has been cross-classified by level of participation in VET to provide an indicator of the relative extent of IVET's importance in an economy. The data show distinct groups of countries: those with relatively low levels of

participation in VET and employment protection compared with the EU average (IE, HU, UK); those with relatively high levels of participation in VET and relatively high levels of employment protection (CZ, NL, AT); and relatively low levels of participation in VET and high levels of employment protection (LV, LT, PT). The quadrant with low levels of employment regulation and high levels of participation in VET is more or less empty. In more regulated labour markets there seems more certainty regarding investments in VET. Where occupational licensing, either actual or de facto, is in place there is a relatively high degree of certainty regarding the destination associated with a particular course. Where employers, are engaged in apprenticeship-like training, they are more certain of obtaining a return on their investment in this form of training in a labour market characterised as being relatively less flexible (Acemoglu and Pischke, 1999). In contrast, where there is a high degree of labour market flexibility there is less certainty about what a course might lead to, and more risk attached to the employer making investments in programmes such as apprenticeship (Gambin and Hogarth, 2016b, 2017).

Figure 4. **Labour market regulation and training**



NB: Protection against dismissal is depicted in relation to the percentage of students taking the vocational pathway through upper secondary education.

Source: Eurostat (c). Participation/enrolment in education [educ_ipart_s] and OECD Employment protection database.

From a VET perspective, there is also the possibility of classifying countries according to the percentage of upper secondary education students studying in

vocational programmes and the percentage in combined school and work-based vocational programmes. This is the basis of the country classification of countries in the project's theme on lifelong learning, based on the research of Hanushek et al. (2011) (Box 1).

Box 1. **Classification of countries according to the share of VET delivered in the workplace versus vocational schools**

Type 1.
These are dual systems of apprenticeship. Apprenticeship systems are closely integrated with labour market institutions and the world of work; this has important effects on the labour market value of the qualifications they offer and the consequent incentives this provides for apprentices. Examples include Denmark, Germany, and Switzerland.

Type 2.
These are systems with participation distributed equally between school-based general education and employment-based dual systems of apprenticeship. Austria and the Netherlands belong to this type.

Type 3.
Hungary represents an exceptional type because the percentage of IVET students is low but the percentage of work-based students is high.

Type 4.
The United Kingdom is classified as a separate type because the percentage of IVET students and work-based students are at medium level.

Type 5.
These are predominantly school-based systems with general academic and vocational provision in different types of dedicated upper secondary institutions and with apprenticeships representing separate but residual systems. Most Central and Eastern European (CEE) countries (Bulgaria, the Czech Republic, Croatia, Poland, Romania, Slovenia and Slovakia) as well as Belgium, Italy, Luxembourg and Finland belong to this type.

Type 6.
These are 'non-vocational' countries with the limited vocational systems. This is the modal type in most southern European countries (Greece, Spain, Cyprus and Portugal) and other western countries influenced historically by the French education system (France) but also in Baltic countries (Estonia, Latvia and Lithuania) and in Sweden.

Source: The classification provided above has developed as part of the Cedefop study *The changing nature of VET* and its theme on VET from a lifelong learning perspective Developing a framework to understand change.

Technological and demographic changes, coupled with major geographic shifts in the locus of production, have placed demands on vocational education and training (VET) systems across Europe over recent decades. Not least of these has been that of guaranteeing VET's relevance to the needs of the labour market over a period of increasing uncertainty. The period from the mid-1990s to mid-2000s was one of benign macroeconomic conditions where globalisation was seen to be invigorating economic growth across the western world. The ramifications of the economic crisis that rocked the global economy from 2007 onwards are still working through many national economies today. There is, however, a greater appreciation of the potential for technologies, notably robots and AI, to transform the nature and location of work, though there is, perhaps, less certainty about what the future may hold. No doubt at the time of the first industrial revolution, commentators were similarly uncertain about the consequences of steam-driven machines. Nevertheless, countries have been – and continue to be – buffeted by economic, demographic, and technological turbulence over the past 20 years which has, inevitably, placed pressure on VET systems. That pressure is, at a high level, simply one of being able to anticipate change so that VET remains relevant and attractive to its participants and consumers. But how can the responsiveness of VET systems across the EU to sometimes rapidly changing external environments be gauged? This is made even more arduous given the amount of variation between, and sometimes within, countries, both in their respective histories and structures, and participation levels, and in the esteem in which the populace holds those systems. VET systems may be subject to similar external pressures over time, though not identical ones, but they have very different starting points.

From a system perspective, an understanding is sought of how external factors shape the supply of skills. Much is already known about skills anticipation across Europe and these approaches are largely designed to diagnose and predict skill demand. But much less is known about the way in which the system itself, however configured, responds to whatever signals it receives about demand. Here the interest is in the mix between policy, institutions, and behaviour on the ground (by learners, employers, and training providers). The institutions responsible for VET supply will mediate between policy and behaviour by influencing or interpreting the intent of policy into a series of actions. These actions, however, may be more in alignment with their own interests than those of the policy-makers, and there will be 'friction' at each level.

This can be addressed analytically at a number of levels. The highest level, aims to conceptualise the nature of policy discourse. It is here that the 'varieties of capitalism' approach has had some success in classifying countries on a

continuum between neo-liberal and more statist policy regimes (Hall and Soskice, 2001). This analysis provides the basis for understanding the VET policy interventions introduced over the recent past as these are likely to be shaped by the wider policy context in which decisions are made. Policy, however, does not necessarily result in the changes sought actually taking place. It is necessary to look at the way the various institutions interpret and act on the policies and, from there, the outputs and outcomes this generates. Policy failures for one reason or another will result in further policy initiatives, as will the continuing need to update various elements of the VET system. Further policy reform sometimes results in institutional reform and reconfiguration: a dynamic policy context can also be reflected in a particularly fluid situation regarding the institutional architecture of the VET system.

This can be considered as a series of layers:

(a) policy regime (the ideological dimension that tends to colour all policy-making);
(b) VET policy development;
(c) institutional interpretation and action;
(d) the observable behaviour of the groups at which policy is targeted.

Not every aspect of VET policy can be analysed over a 20- or 30-year horizon, so the scope of the study needs to be reined in by focusing on issues pertinent to the VET debate in the EU at the moment. Those issues at the core of the European Commission's recent policy announcements on skills are an example, especially the *New skills agenda* and its emphasis on achieving an improved match in the supply of, and demand for, skills to improve the competitiveness of the EU economy. Countries within the EU have taken very different routes to achieving this outcome. In some a traditionalist (or neo-liberal) approach places emphasis on a relatively high degree of school-based learning, concentrating on the acquisition of disciplinary knowledge. In others, a technical instrumentalism emphasises equipping people with the technical skills to work in a specific occupation. These perspectives on the role of VET are evident in differing policy regimes (such as neo-liberal versus statist), and they may be combined with differing institutional configurations. This approach then provides the lens through which to analyse the responses of countries to various external factors.

Whether VET systems are better able to withstand the various external pressures to which they are subject, becomes the dependent variable. It is the way in which the tension between being able to respond flexibly to external stimuli and maintaining stability in the system is resolved that provides the focus for the analysis. Repeated change, especially when it is swinging between

different poles, can result in past achievements being devalued or, in some instances, the entire VET system being regarded as dysfunctional. However, moribund systems which are unable to adapt to change may well bring about the same result.

This theory of change represents a technical-rational model of VET system responsiveness to external events. Change, however, can also be generated from within a system because of feelings that the system is not delivering all that is required of a VET system (as defined by different stakeholders). VET systems need to address a variety of challenges:

(a) delivering learning that can support both social inclusion and improving productivity and economic competitiveness;
(b) structuring initial VET to provide an efficient transition between education and work, offer recognised career pathways, and encourage the development of career adaptability, while also providing a wider platform for learning throughout adult life. This is a difficult set of tasks even if the labour market is buoyant;
(c) trying to achieve a balance of responsibility between the education system and employers for different types of VET provision and different sorts of learning;
(d) designing system architecture that is easy to understand, transparent, flexible and accountable;
(e) building progression routes through the VET system that can accommodate changing patterns of demand and shifts in individuals' career pathways; encouraging career adaptability is vital in this respect also. This tends to emphasise the need for flexible learning pathways, lifelong learning, and the permeability of education and training systems.

In simple terms the analytical framework is based on understanding how the endogenous features of VET systems interact with the various changes in the external environment over which it has relatively little influence (exogenous change). The nature of the interaction will change over time and according to the national policy context (c.f. the 'varieties of capitalism' discourse). Figure 5 outlines the framework. For each national VET system over time there is interplay between exogenous and endogenous factors, and a distinction needs to be made between regulatory or policy change and the behaviour it results in from various actors within the system.

Figure 5. **Analytical framework**

<table>
<tr><td colspan="4">System type</td></tr>
<tr><td></td><td colspan="3">Time →</td></tr>
<tr><td></td><td></td><td colspan="2">Exogenous change</td></tr>
<tr><td></td><td rowspan="3">Time→</td><td>Endogenous change</td><td>Incremental</td><td>‘Shocks’</td></tr>
<tr><td></td><td>Policy/regulatory change</td><td></td><td></td></tr>
<tr><td></td><td>Behaviour within the VET system</td><td></td><td></td></tr>
</table>

Source: Cedefop.

This link between policy change and actors’ behaviour is crucial to understanding policy change within VET systems. Within each system there are not only the various ‘horizontal’ layers referred to above, but also at least two further institutional layers: the region or municipality and the training providers and employers themselves. These layers might react in different ways to similar policy inputs ‘from above’ depending on their own structures, processes, norms and values as well as those within the system as a whole. There are also ‘vertical’ layers comprising the different stakeholder groups or ‘policy and practice communities’ involved in the system, such as employers and teachers. Each of these policy communities possesses its own institutional set-up, including norms and values, which may position them in different ways in respect of the same policy. This is likely to affect policy outcomes.

If the change model is conceived as cyclical, then, at the broadest level, policy outcomes feed back into the policy-making process. But feedback mechanisms may also exist at other horizontal levels, and may influence the way in which policy is implemented and therefore the outcomes. The extent to which this takes place is likely to reflect to some extent the degree of autonomy within systems. Where there is much de-centralisation of roles and responsibilities, there may be greater variation in how policies are implemented and their outcomes.

2.4. Conclusion

There are several external changes – some of them incremental, some of them shocks – that have some bearing on the VET system at different levels. VET systems respond in a number of different ways and at different levels. The underlying premise, as evidenced by the 'varieties of capitalism' school of thought, is that VET systems and their policies reflect wider social and economic structures and processes. Accordingly, systemic changes may be witnessed across the entire range from whole system adjustment (as has been taking place in ex-communist countries since the demise of the USSR) to a myriad of smaller adjustments in VET programme content. Within this is seen how the influence of the system switches between different levels over time (and why) and the impact this has on VET policy-making. It is important to consider behaviour. Agents of change will act in different ways depending on their own agendas and client groups. Outlined above is the general approach adopted to analysing the way in which external factors influence the VET system in countries. It is the country case studies that provide the detailed information about the way in which external factors have been accommodated or not; at this level that it is possible to observe the process of policy-making and the factors that influence it in practice.

CHAPTER 3.

Changes in the external environment

3.1. Introduction

The past 30 years or so have proved to be, in equal measure, both invigorating and challenging times for policy-makers across Europe. Technical change, notably that stemming from digital innovation, has been increasingly seen to have a transformative impact on production processes. Robots and artificial intelligence (AI), as encapsulated in the concept of Industry 4.0, have the potential significantly to increase productivity and competitiveness and create new types of economic activity. Previous waves of technical change, such as the rapid diffusion of microelectronics in the 1980s, led to the creation of new forms of employment, the type and content of which could have been barely imagined in the decades before. It was seen to be a source of employment growth but this time there are more uncertainties about the employment impact; some commentators fear that robots and AI will bring about a net loss in employment (Freeman, 2015). It is not only the character and magnitude of change which are significant but also the speed. It took a century to make a transition from an agricultural to manufacturing economy, and around 60 years for channelling jobs from manufacturing to services. The fourth industrial revolution may happen in less than two decades, giving both learning providers and policy-makers much less time to adapt.

At the end of the 1990s, Europe's economy had largely recovered from the relatively deep recession many countries experienced at the start of the decade. Globalisation, particularly the role played by China in stimulating growth, presaged a relatively benign period in world economic history. This contributed to the intensity of the economic shock unleashed on the global economy in 2007; a shock or crisis from which many economies in Europe and beyond are still recovering. In the post-crisis period globalisation is regarded a little more cautiously than hitherto in some countries. Technical change is important here because digital technologies facilitate the production of goods and services via networks spread across the world. While Europe might have been reasonably confident in the past that it could retain a significant share of the high-skill, high-wage jobs to be found in global production networks, this may no longer be so true. Perhaps there is more recognition of the potential threats posed by globalisation and offshoring even if, on balance, they are seen to confer more benefits than costs on Europe's economy.

Human capital has played a large part in Europe's response to the economic and technological challenges it has faced over recent decades. Raising skill levels and simultaneously ensuring that they are better matched to the economy's current and future needs has played a central role in policy-making at both pan-European and country levels. Demographic change has complicated this to some degree. With ageing populations and falling birth rates, simply depending upon declining numbers of young people to acquire many of the new skills needed to sustain economic growth in the future has become a less feasible policy response. Priority has been given to increasing the supply of those skills upon which the labour market confers value and where demand exceeds supply. One consequence is that less attention has been given to tackling skills obsolescence among the adult population, who will spend longer in economic activity than in previous years. The free movement of labour within the EU and EEA might even out demographic pressures to some extent across Europe, as might the recent heightened inflow of migrants from third countries, though this latter development poses a distinct set of VET challenges in its own right. Yet, whether they are able to do so effectively is a moot point. The EU has sought to address the issues through a range of strategies and tools as described in Section 4.1.

In the remainder of this chapter, further information is provided about the external environment within which VET policy has been shaped and the implications of the various changes for the delivery of VET.

3.2. The economy

At an aggregate level, the business cycle will determine the overall demand for labour and skill. Figure 6 shows that the EU economy has been a rollercoaster in recent decades. The impact on employment levels, especially youth unemployment, can place acute pressures on VET systems to respond.

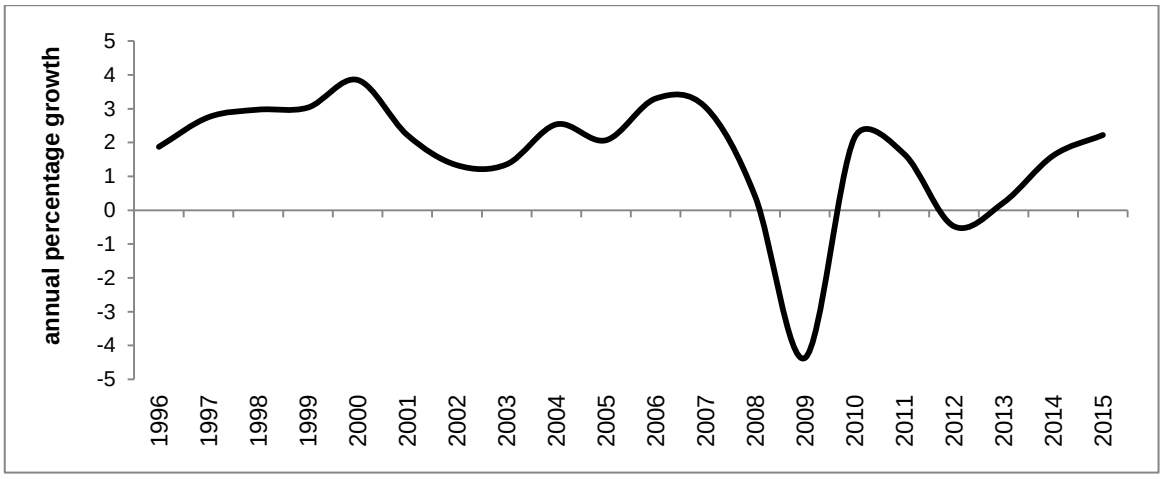
Variation in growth rates across the EU is marked; this can be seen in long-term growth rates by country (Figure 7) and the sharpness of the cycle judging by movements in real GDP growth rates over the period of the financial crisis (Figure 8). The principal mechanism through which these changes affect VET is employment demand but there are related issues to be considered:

(a) some sectors, such as manufacturing and construction (that employ significant numbers of VET graduates) recover more slowly from the impact of economic downturns;
(b) where the external environment becomes more complex and unstable, skills anticipation becomes increasingly difficult;

(c) the resources for VET can be reduced as part of government strategies to reduce public spending.

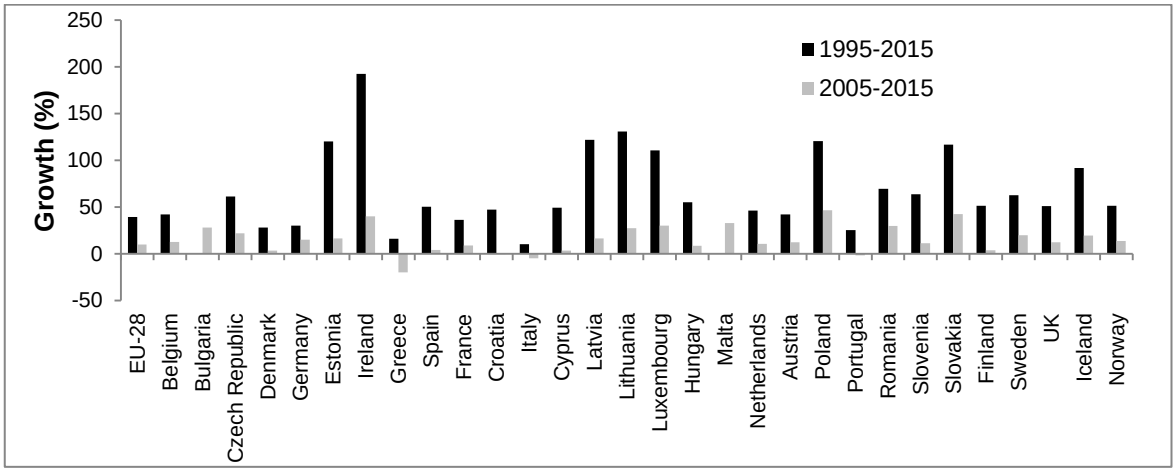
The above, though short-term in some respects, have a cumulative bearing on VET system needs and capacity to respond to the external environment.

Figure 6. **Year-on-year growth in real GDP in the EU-28, 1995-2005**



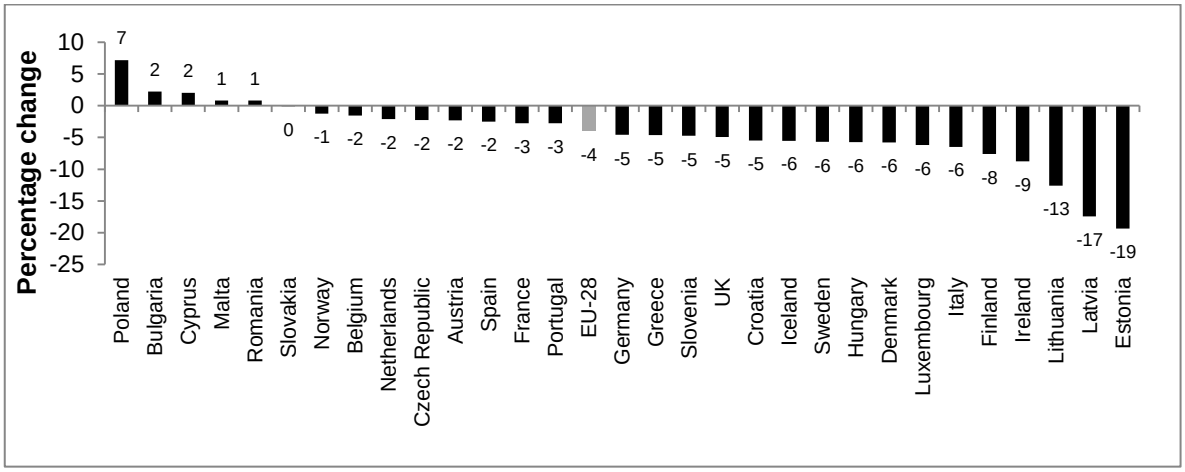
Source: Eurostat (d). GDP and main components (output, expenditure and income) [nama_10_gdp].

Figure 7. **Long-term percentage change in real GDP, 1995-2005**



Source: Eurostat (d). GDP and main components (output, expenditure and income) [nama_10_gdp].

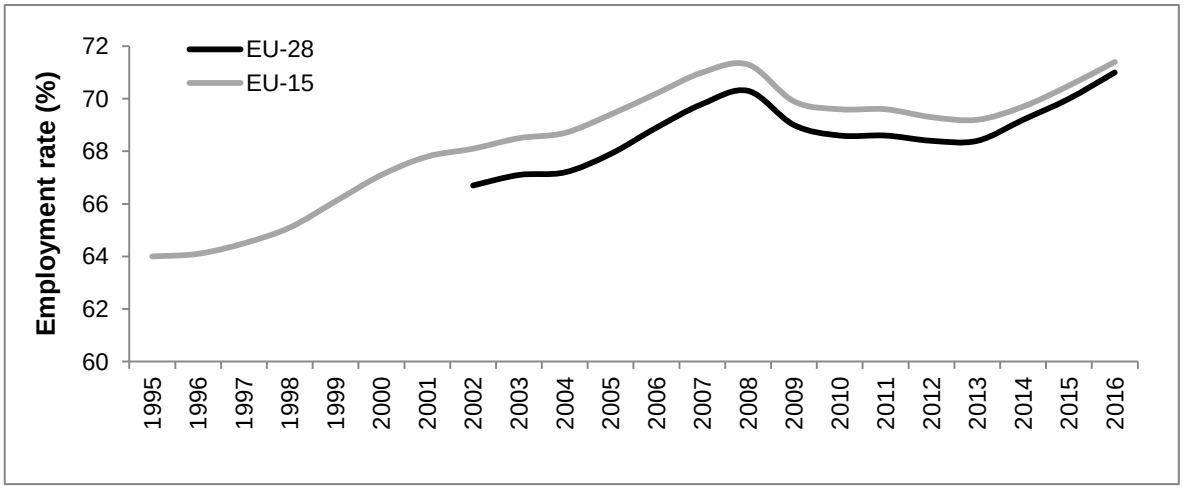
Figure 8. **Percentage change in real GDP, 2007-09**



Source: Eurostat(d). GDP and main components (output, expenditure and income) [nama_10_gdp].

After a steady increase over many years, the EU employment rate for citizens aged 20 to 64 years reached a peak in 2008 of 70.3% (Figure 9). In the years following, employment rates declined, reflecting the impact of the economic crisis on the labour market. In 2013, the employment rate fell to 68.4%, began to increase in 2014 and in 2015 was 70.1%; this is almost at the 2008 level, though still significantly below EU-28 employment target of 75%.

Figure 9. **Employment rate in 20 to 64 year-olds, EU-28, 2002-15**



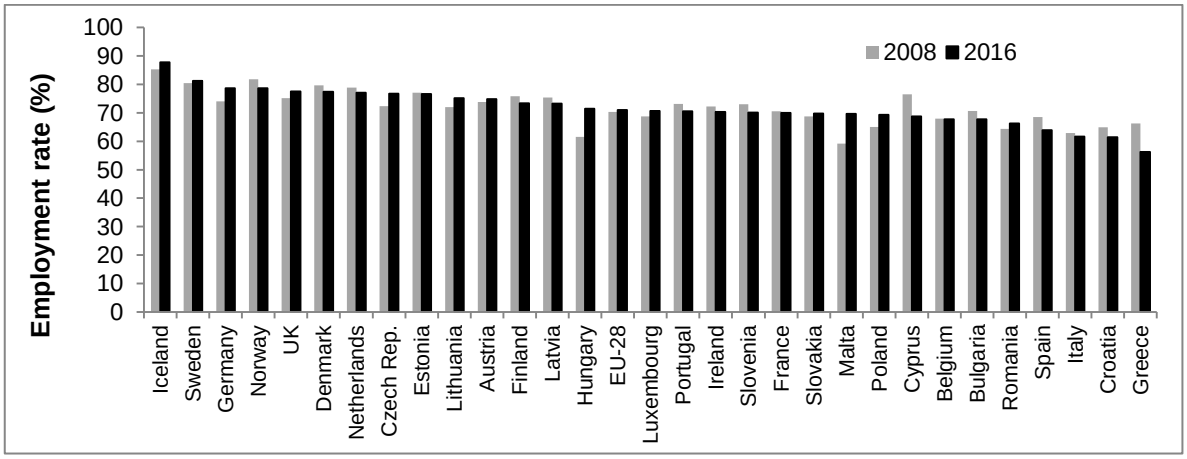
NB: 2020 target is for 75% of the population aged 20 to 64 to be employed by 2020.
Source: Eurostat (a). Employment rates by sex, age and citizenship (%) [lfsa_ergan].

The decline in employment rates from 2009 to 2013 largely affected young people, citizens with low levels of educational attainment, and non-EU nationals. Older people (55 to 64) in the workforce were also at risk as the employment rate for their group grew but remained lower than that for younger people. Gender

differences in employment became smaller in the years since 2002, with the largest gap of 14 percentage points occurring for those in age group 30 to 34 years. These age-related gender gaps may be considered a combination of a cohort effect for women who did not participate in the workforce moving up the age distribution, or a lack of care facilities for children or dependant older adults. The EU employment package *Towards a job-rich recovery* made investment in skills a priority, including improvements to the monitoring of skill needs and greater cooperation between the workplace and education providers. Specific measures targeting young people include support for the transition to work through youth guarantees, quality traineeships and activation measures for youth mobility. One effect of these measures is to extend the period young people are held in transition to permanent employment, especially in countries with high levels of youth unemployment.

The employment rates across the 28 Member States typically show a north-south divide ranging from 54.9% to 80.5% (Figure 10) both at a country level and regionally, with many of the highest performing countries also showing high regional employment rates (Germany, the Netherlands, Austria, Sweden and the UK). Countries with employment rates under 65% included Greece, Spain, Croatia and Italy. The employment rates for the EFTA countries were high with Iceland's exceeding the EU Member States.

Figure 10. **Employment rate in 20 to 64 year-olds by country, EU-28, 2008 and 2015**

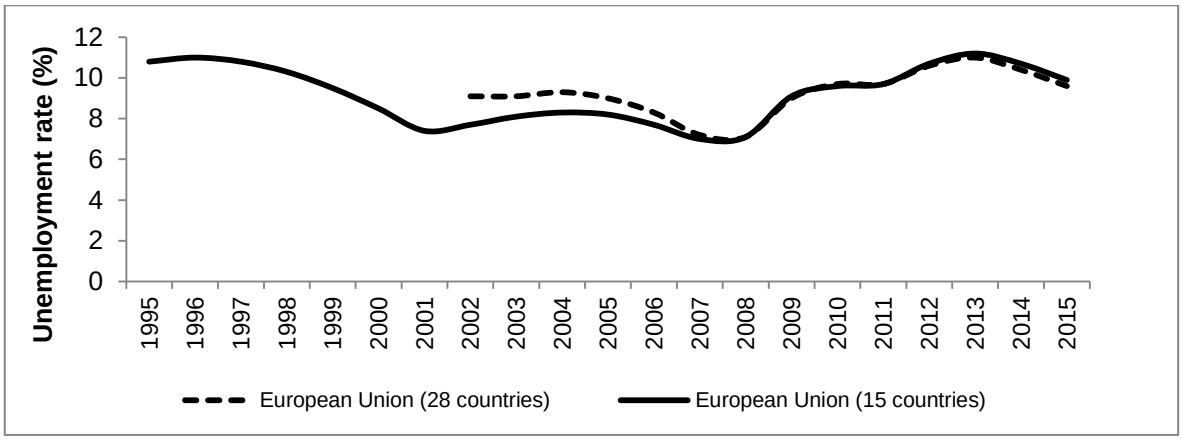


Source: Employment rates by sex, age and citizenship (%) [lfsa_ergan].

Figure 11 shows the unemployment rate across the EU since 1995. The EU economy had a prolonged period of growth over the latter half of the 1990s and the early part of the 2000s, reflected in a fall in the unemployment rate (Figure 11). What is perhaps notable about the unemployment trend is that, given

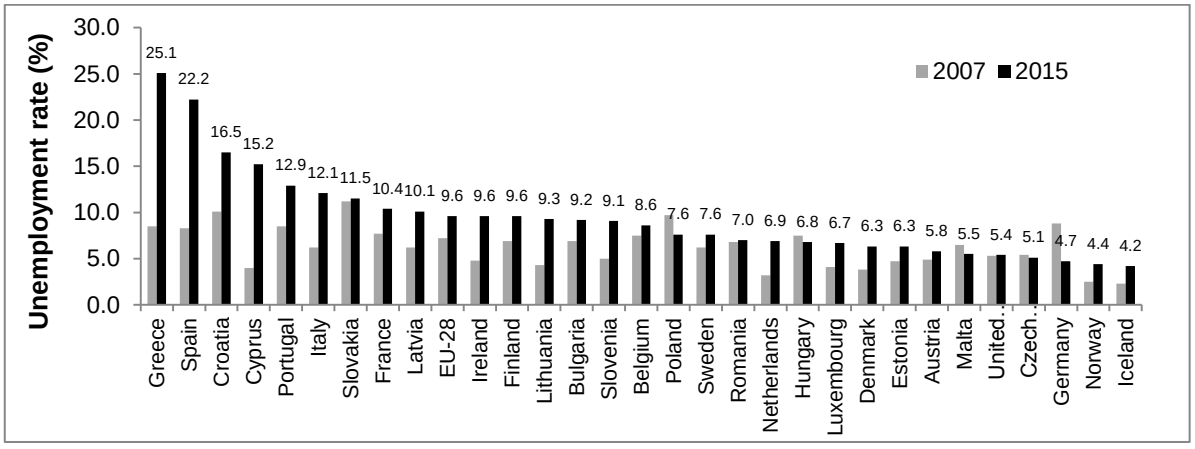
the depth of the recession in 2007-09, unemployment rates did not rise as high as previous recessions would have suggested in many countries. It could be argued that the reasons for this lay principally outside the remit of labour market or education policies. For example, the huge public stimulus allied to the rescue of collapsing banks prevented wider consequences for economy, saving countless jobs. The same may be said for quantitative easing. These effective policy responses could also have been helped by a tendency for employers to hoard skills that they might have been concerned about recruiting when the economy recovered. Not every country escaped as lightly as the data in Figure 11 might suggest; variations by country are large as shown in Figure 12.

Figure 11. **Unemployment rate in Europe, 1995-2015**



Source: Eurostat (a). Unemployment rates by sex, age and nationality (%) [lfsa_urgan].

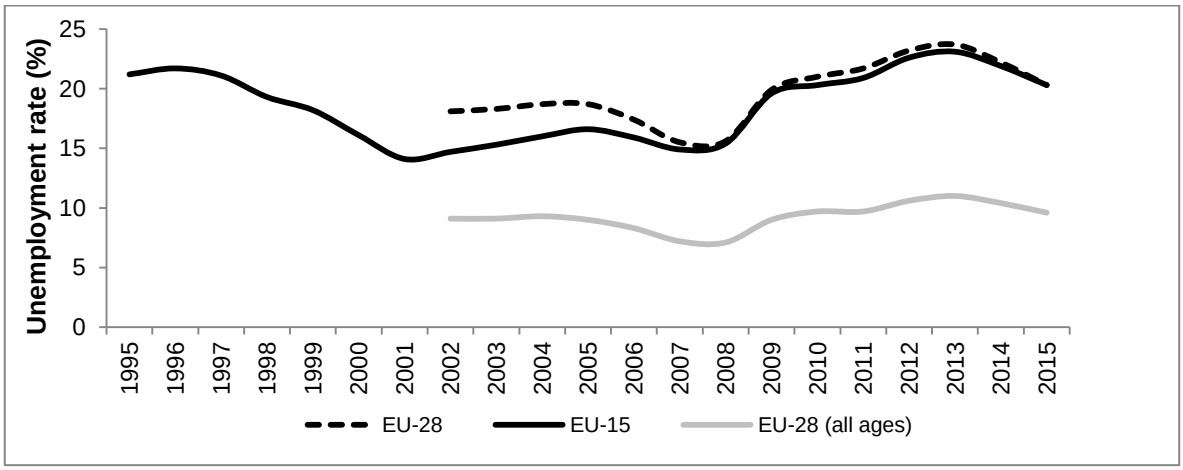
Figure 12. **Unemployment rate by country, 2015**



Source: Eurostat (a). Unemployment rates by sex, age and nationality (%) [lfsa_urgan].

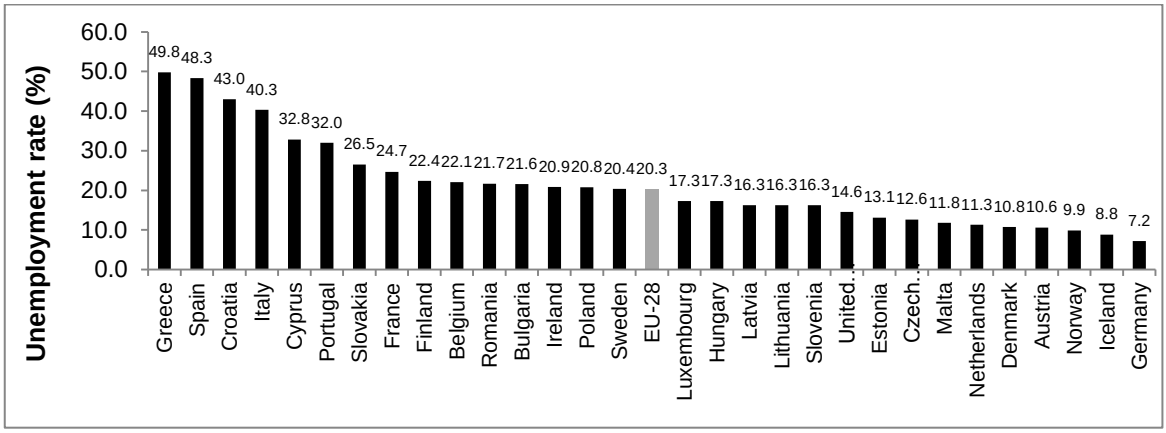
Downturns in the economy adversely affect young people in the labour market. A process of 'bumping down' typically occurs: people looking for work will be prepared to take jobs for which they are overqualified and while those who would normally have taken those jobs are squeezed out (Reder, 1955). It also poses problems for young people, as they are in competition with experienced workers looking for employment and less well placed simply because they lack experience. Figure 13 shows the youth unemployment rate over time. It is around twice that of the labour force overall and showed a marked rise following the recession in 2007-09. Across the EU as a whole it has risen to levels in the post-recession period similar to those observed over the mid-1990s. Again, the variation between countries is substantial as shown in Figure 14. Around half of all the young in Greece were unemployed in 2015 compared with 7.2% in Germany and 8.8% in Iceland. The danger facing young people in some countries is that they will be unable to find the jobs and forms of career progression that their counterparts 10 or 20 years previously enjoyed; their long-term economic prospects are affected. Something similar was observed in the early 1990s in Japan when that country's economy was stagnating. The generation of young people who graduated in the early 1990s did less well than those who graduated before and after (Reiko, 2006). The implications of this for VET systems is uncertain; if people are unable to obtain a return from various forms of VET for a time it can send a powerful signal to the next cohort of would-be VET students.

Figure 13. **Youth unemployment rates, 1995-2015**



Source: Eurostat (e). Unemployment rates by sex, age and nationality (%) [lfsa_urgan].

Figure 14. **Youth unemployment rates in Europe, 2015**



Source: Eurostat (e). Unemployment rates by sex, age and nationality (%) [lfsa_urgan].

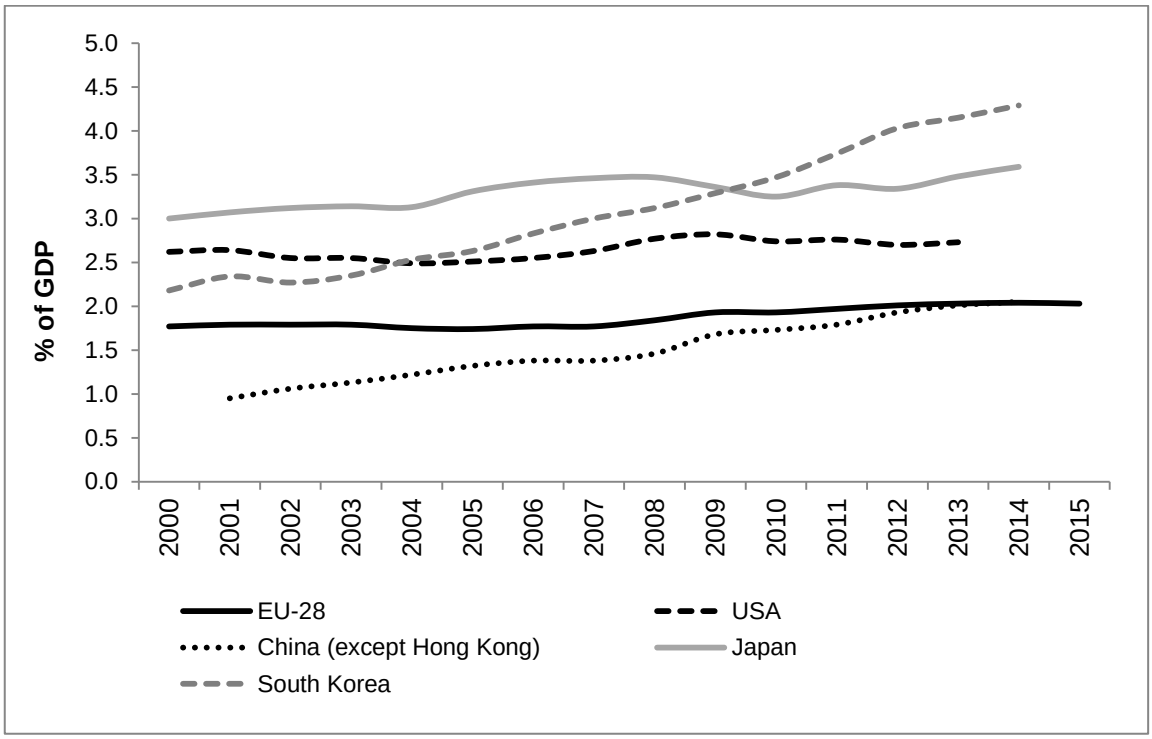
The impact of weak economic conditions on VET systems is complex. Employers' decisions to continue hiring trainees/apprentices will be determined partly by their views of the future flow of benefits likely to follow from making an investment in these forms of IVET (Brunello, 2009). The depth of the recession at the end of the 2000s and the sluggish growth that followed may prove a disincentive for employers to train. Unless a system can be found that minimises the employers' financial exposure to the risks of training, or acts to share the costs of training between all employers (as with training levies) and the State, employers may still be reluctant to train. There is evidence that continuing training might also be affected in recessionary periods, both quantitatively and qualitatively, as it tends to be essential, basic skills training that employers are willing to continuing funding (Mason and Bishop, 2010). Individuals, however, might be more prepared to invest in VET – or any kind of education for that matter – to improve their chances in a labour market where there is an excess supply of labour. In such instances, the challenge for the skills system is to identify those courses/programmes that will provide the best return for the individual making the investment, hence the emphasis now placed on skills anticipation processes that incorporate a forward-looking aspect.

3.3. Technology, economy and employment

The discussion about the economy in the preceding section was principally about cyclical effects and how it affects the demand for labour. In the post-recessionary period, Europe has had to meet the challenge of stimulating employment growth and reducing levels of unemployment which reached alarming levels in some countries in the immediate aftermath of the economic crisis. Technology is seen

as a driver of economic and employment growth but it also brings about structural shifts in the demand for employment and skills. Embracing technical change is embedded within EU policy, as in two objectives of the Europe 2020 strategy for smart growth: job creation through increased industrial competitiveness, labour productivity and the efficient use of resources; and finding optimal solutions to challenges for society that include climate change and clean energy, security, and active and healthy ageing. These challenges require substantial resource allocation, but also offer opportunities for developing innovative products and services. The strategy sets the target of improving the conditions for innovation, research and development, by means of an increase in combined public and private investment, to 3% of GDP by 2020. But, as Figure 15 reveals, R&D expenditure as a percentage of GDP (and in monetary terms) is behind that of other key players in the global economy. The implications of this for future employment and skill demand, given that Europe increasingly operates in a global market, remain to be seen.

Figure 15. **Gross domestic expenditure on R&D (% of GDP), EU-28, 2000-14**



Source: Eurostat (f). Total intramural R&D expenditure (GERD) by sectors of performance [rd_e_gerdtot].

The interest in technical change is its impact on the demand for skills. This is seen to operate in a number of ways:

(a) the direct impact on the demand for skills related to the introduction of new products and services;
(b) the wider, less direct impact with regard to the effect it has on the organisation of work;
(c) globalisation.

Innovation leads to the development of new products, services, and production processes, including the automation of production systems that were previously labour intensive. The pace of technical change is substantial. The ICT revolution which commenced in the 1970s – the second industrial revolution – has continued apace and is likely to do so in the future, especially with the development of key enabling technologies (KETs) including nanotechnologies, nano-electronics, and biotechnology (Scalia et al., 2017), and the digitisation revolution (Industry 4.0). Environmental change, and the technological response to it, also has the capacity to create new demands for products and services. Renewable technologies are the most obvious example where there has been increased demand for new products (such as production of off-shore wind turbines) and services (marketing green energy supply). Depending on the direction of future policy and the price of energy sources with high carbon content, the environmental, low-carbon policy agenda also has substantial scope to affect demand for future products and services. Foresight studies reveal a number of common trends with respect to the future of technology, including the rise of on-demand manufacturing incorporating the production of more personalised products, the emergence of regenerative medicines, and use of new materials. Much importance is attached to creating an infrastructure in which innovations can be developed and take root. This includes developing links between industry, including small businesses, and research institutions (including universities). Attention has been drawn to the need for higher education's capabilities to be harnessed in business-led research and innovation. This reflects a general consensus in many future-looking studies that Europe's competitive advantage is its creativity and it will be creative skillsets which allow ideas to be generated and turned into the products and services increasingly in demand in the future.

From an innovation perspective, the above points to increasing demand for relatively high level skills, often related to science, technology, engineering and mathematics (STEM subjects). But there are wider impacts to consider. The explanation receiving the most attention is the theory of task-based technological change (TBTC) associated with Autor et al. (2003). Technological change is seen to have most impact on routine jobs, which do not require their incumbents to respond to outside stimuli. Such jobs can be replaced by technology, which

automates the tasks they once carried out. Higher-level skilled jobs, requiring their incumbents to use cognitive skills which cannot be readily substituted by automation, and lower-skilled jobs requiring their incumbents to interact with customers – such as deliveries – are similarly not readily substituted by automation. But the once-skilled jobs in the middle of the occupational structure are subject to substitution by the automation which drives productivity change in the sector. Goos and Manning (2007) observed that routine jobs, susceptible to being replaced by automation, are typically found in the middle of the occupational structure: administrative and skilled production jobs. Higher-level skilled jobs which require their incumbents to use cognitive skills cannot be readily substituted by automation and lower-skilled jobs, such as those found in hospitality, require their incumbents to interact with customers such that they too are not readily substituted by automation. Evidence suggests that this trend towards a hollowing out of the skills structure is more notable in countries that have more market-based economies, such as in Ireland and the UK, than in other European countries that are less market-oriented (Eurofound, 2016). Nevertheless, the evidence from Cedefop's projections of future skill demand suggests that there will continue to be a degree of 'hollowing out' in the occupational structure up to 2025 (Figure **16**). It is perhaps relatively high-level jobs (managers, professionals, and associate professionals) where technical change will have an impact on skills, especially in those jobs that have a substantial science, technology, engineering or mathematics component. The projections, however, are based on a continuation of past trends into the future. The pace of technical change may be such that the past is becoming a less reliable guide to the future than it once was.

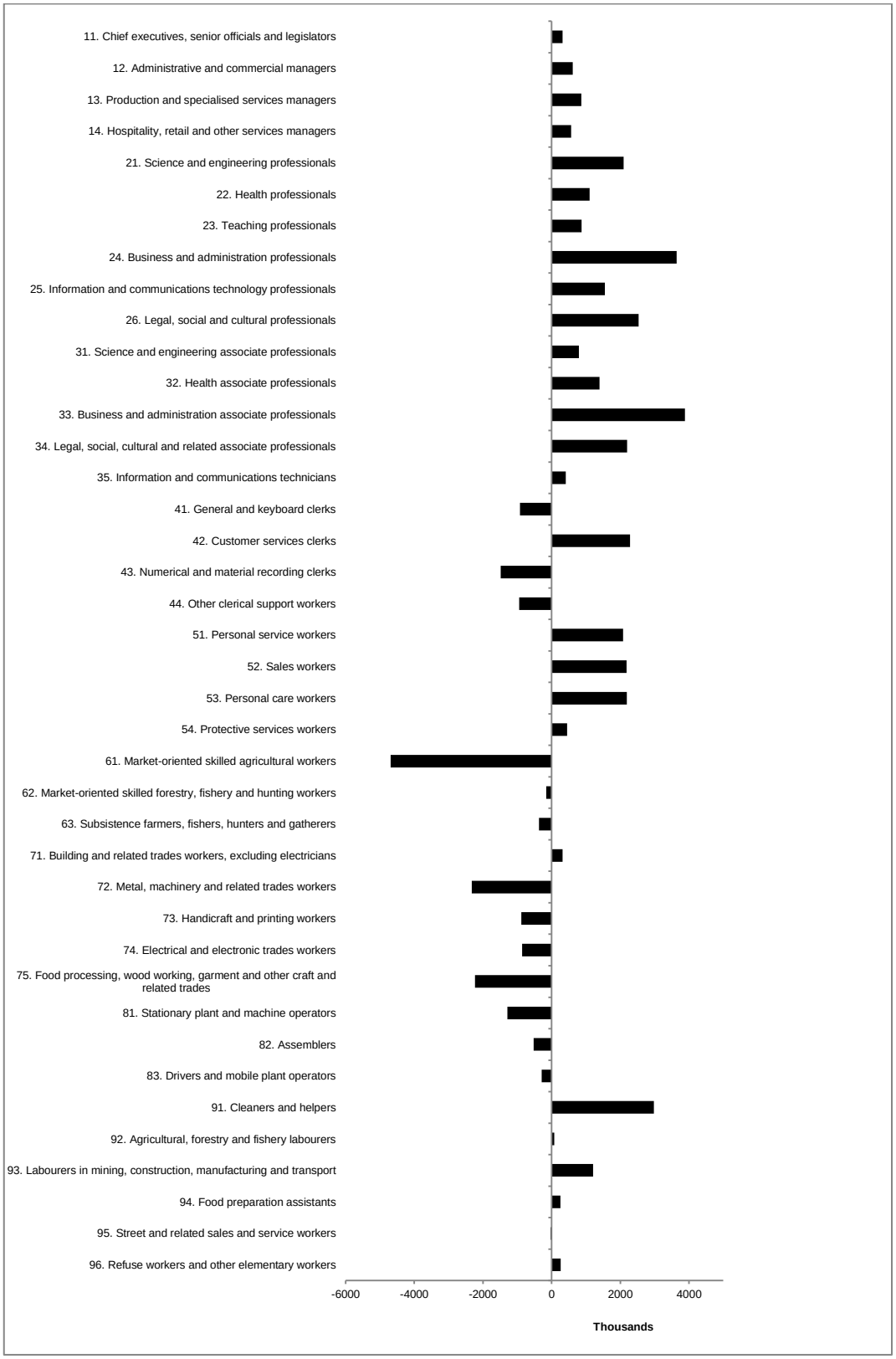
Until recently the received wisdom in economic circles was that technical change has a beneficial impact on economic growth and employment. It tends to boost productivity and workers' incomes (Simon, 1965). A more pessimistic picture, though speculative, suggests that technical change in the future, via the diffusion of robotic and AI technologies, will have an impact on employment levels overall and affect both the demand for relatively high-level and relatively low-level skilled workers (Freeman, 2015). These technologies have the capacity to reduce the demand for both high-level and low-level skills (Skills Panorama team, 2016).

It is also apparent that technical change, especially the digital revolution, has the capacity to change the nature of employment relationships. This is seen most readily in the rise of the platform economy, where digital platforms have the capacity more readily to link suppliers of services to those with a demand for them. There are some insights into how online platforms might affect the

employment of people in different occupations. Professionals can potentially maximise their earnings by serving a wider range of clients but there are risks if this results in higher levels of self-employment, simply because this group sometimes has more difficulty in engaging ongoing professional development. Less skilled workers may also increase their access to employment through online platforms but there are risks that this might result in the increasing precariousness of their employment position if they too are pushed into self-employment (as in the Uberisation of work) (Huws et al., 2016; European Commission, 2016b; Hogarth and Papantoniou, 2017). The issue of how these workers gain access to skills training is of legitimate policy interest. This may all be too pessimistic. The point is simply that more needs to be known about the types of job that are affected by online platforms, how those jobs are transformed (if at all), and what the skill implications are. Using such information it is possible for the *New skills agenda* and related policy initiatives at EU and national levels to be focus more readily on where specific interventions are needed if the wider goals of policy are to be realised.

Technical change also has a link to globalisation, feeding through to which skills are in demand and in what locations. In a global economy with many trade barriers lowered, if not removed, firms have a greater degree of choice regarding the location of production. With the development of ICT it is increasingly possible for products and services to be sourced anywhere in the world and exported. ICT allows complex supply chains to be created which are able to benefit from the relative advantages of a particular country. Companies have a degree of choice about where to locate various elements of the production process, such as, research and development, product design, assembly, sales and marketing. This choice is likely to be determined by a range of factors including the regulatory environment, but the availability of labour and skills is likely to be a key determinant. The impact of globalisation can further hollow out the occupational structure with many production jobs increasingly undertaken offshore. This may have the impact of redistributing work within Europe, but the labour cost advantage in countries such as Asia and South America means that labour can be transferred there.

Figure 16. **Projected changes in occupational employment, 2000-25**



Source: Cedefop skills forecast, 2016.

Patterns of scientific literacy found in OECD studies such as PISA and the IEA's TIMSS ([6]) studies suggest substantial variation in the quality of science education across countries. However, the EU generally has a good education system and produces increasing numbers of tertiary education graduates in science and technology. Comparing 2014 with 2008 for the EU-28, the number of tertiary graduates in those subjects grew by around a quarter, from 14.5 to 18.3 graduates per 1 000 persons aged 20 to 29. There is, however, likely to be some double counting of graduates due to the 'Bologna effect' whereby students with both a masters and bachelor degree are counted twice as tertiary graduates. Similarly the low levels of science graduates in Cyprus and Luxembourg may well reflect the number of students who follow their studies overseas.

Access to broadband and digital skills is a necessary requirement for knowledge diffusion and functional digital literacy underpinning VET and skill development across all areas of society. Internet access across Europe has improved substantially in recent years: in 2015 there was 95% availability for enterprises and 80% of households. However, 45% of the EU population are viewed as having insufficient digital skills, with those citizens having at least basic digital skills ranging from 26% in Romania to 86% in Luxembourg. Countries which exceed the EU average level for digital literacy include the Nordic countries, Belgium, the Czech Republic, Germany, Estonia, France, Luxembourg, the Netherlands, Austria and the UK. Large sections of eastern and southern Member States tend to show limited digital skills; in Bulgaria and Romania, 74% and 69% of the population, respectively, report no or limited levels of digital competence.

Results from the OECD's PIAAC study are also challenging ([7]). PIAAC assessed adult proficiency in a range of skills including literacy, numeracy and problem solving in 'technology-rich environments'. The findings show that, in Europe, individuals with vocational upper or post-secondary non-tertiary education tend to do better in the labour market than general education graduates, but that their level of development of information processing skills, such as literacy and numeracy, lags behind. PIAAC measures skills levels on a proficiency scale and level 3 could be regarded as the level required for adults to

([6]) IEA is an international cooperative of national research institutions, government research agencies, scholars and analysts working to evaluate, understand and improve education worldwide: http://www.iea.nl/about-us TIMSS stands for trends in international mathematics and science study.

([7]) OECD survey of adult skills (PIAAC): http://www.cedefop.europa.eu/en/publications-and-resources/statistics-and-indicators/statistics-and-graphs/adult-skills-and-vet

be fully participant in the labour market, as well as in education and training, and social and civic life ([8]). In many European countries, only a third of adults aged 25 to 64 with vocational education have proficiency level 3 on the PIAAC literacy scale; only one in 20 make it to level 4/5. This suggests that many individuals are ill-equipped in terms of basic skills development for the occupations increasingly required in 21st century labour markets.

3.4. Demographic trends

Demographic trends pose a variety of challenges to VET systems across Europe, as alluded to in the section on employment. There are several elements that have implications for VET systems (BIS Foresight, 2012):

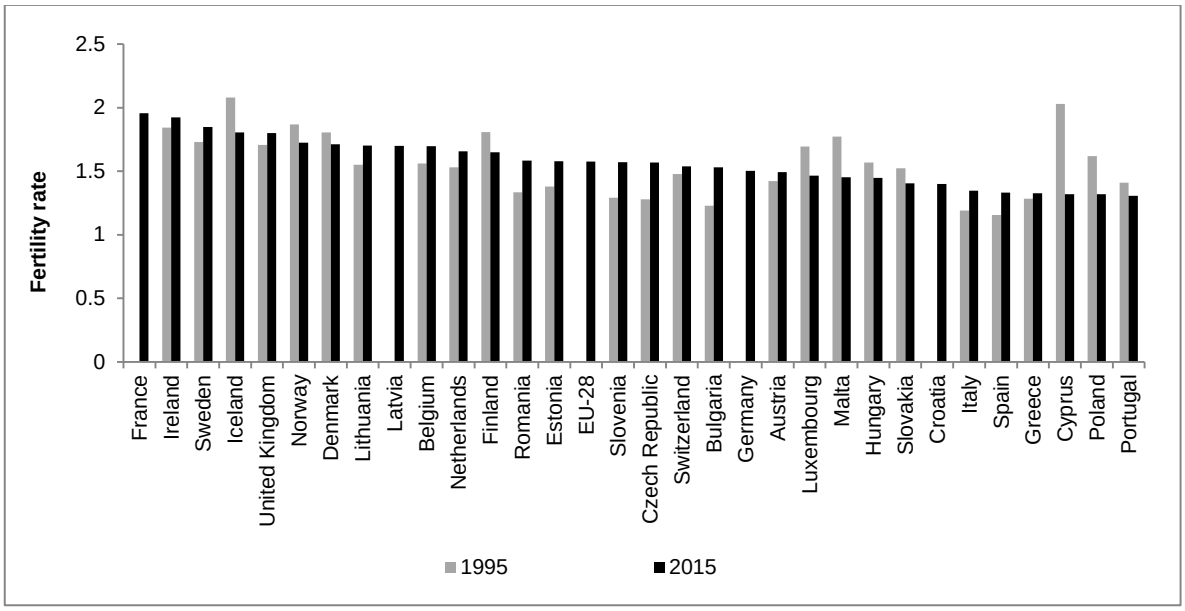
(a) increased longevity – and the pressures on pension schemes – will require people to work longer;
(b) with an ageing population there is likely to be an increase in demand for people to work in jobs that are related to ageing (health and social care) and also in the production of goods that an ageing population will require (such as ambulatory aids);
(c) given changes in the dependency ratio, unless it proves possible to find new sources of labour supply (via migration) or a means to substitute technology for labour, there will be labour/skill shortages;
(d) high levels of replacement demand due to large numbers of workers in some sectors (including many VET graduates) reaching retirement age mean there may still be opportunities for new entrants, even in occupations in decline;
(e) with declining youth cohorts in many countries there is increased competition between the general and VET streams for students.

The general trend for Europeans to have fewer children. The fertility rate measures the mean number of children that would be born alive to a woman during her lifetime if she were to pass through her childbearing years conforming to the age-specific fertility rates of a given year. A total fertility rate of around 2.1 live births per woman is considered to be the replacement level in developed countries, keeping the population size constant in the absence of migration. The

([8]) Adults performing at level 3 on the PIAAC proficiency scale can understand and respond appropriately to dense or lengthy texts, including continuous, non-continuous, mixed, or multiple pages. They understand text structures and rhetorical devices and can identify, interpret, or evaluate one or more pieces of information and make appropriate inferences. They can also perform multistep operations and select relevant data from competing information to identify and formulate responses.

fertility rate is below replacement levels, at 1.58 in 2015, and has been so for some time. There is some variation between countries: in 2015 the fertility rate was highest in France at 1.95 and lowest in Portugal at 1.30 (Figure **17**). More recently, the fertility rate has continued to be below replacement rates such that this has been a relatively long-standing issue for VET systems to accommodate.

Figure 17. **Fertility rates in the EU, 1995 and 2015**

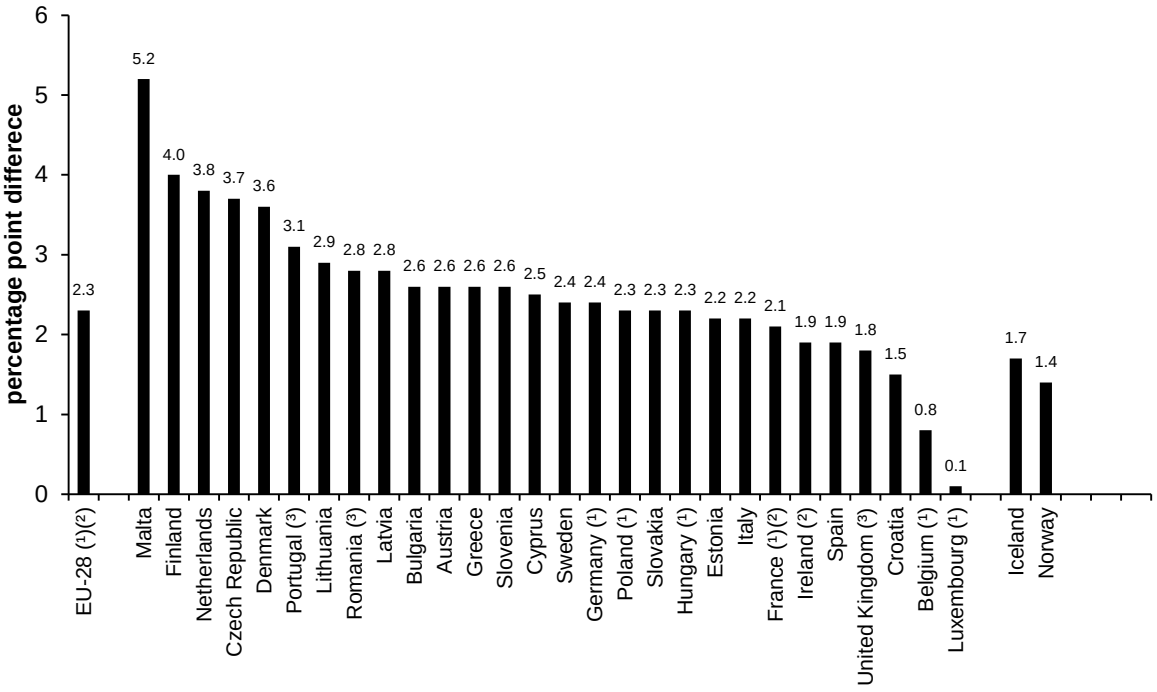


Source: Eurostat (g). Fertility rates by age [demo_frate].

Changes in fertility rates have an impact on the age structure of the population. Figure 18 shows the extent of variation across Europe with respect to changing age structures on a country-by-country basis. Some countries are ageing faster than others, though it is a common phenomenon across the EU. Figure 19 shows how the age structure of the population will change in the future: the relatively large percentage change in people aged over 70 years by 2080 is notable. Perhaps most striking about Figure 19 is the extent to which the population in 2080 will include people who, by today's standards, would be beyond the end of their working life. The change in the age structure is likely to pose substantial challenges for countries: first, how to find a sufficiently large number of people to fill jobs; second, how to ensure that people will be prepared or sustained to spend a longer period of time in the labour market than they are expected to today; and third, how to provide the skills of those who will look after people in extreme old age (given the percentage of the population who will be aged over 80 years of age). It is perhaps the latter two points that have major implications for VET systems, not least being able to tackle any skills

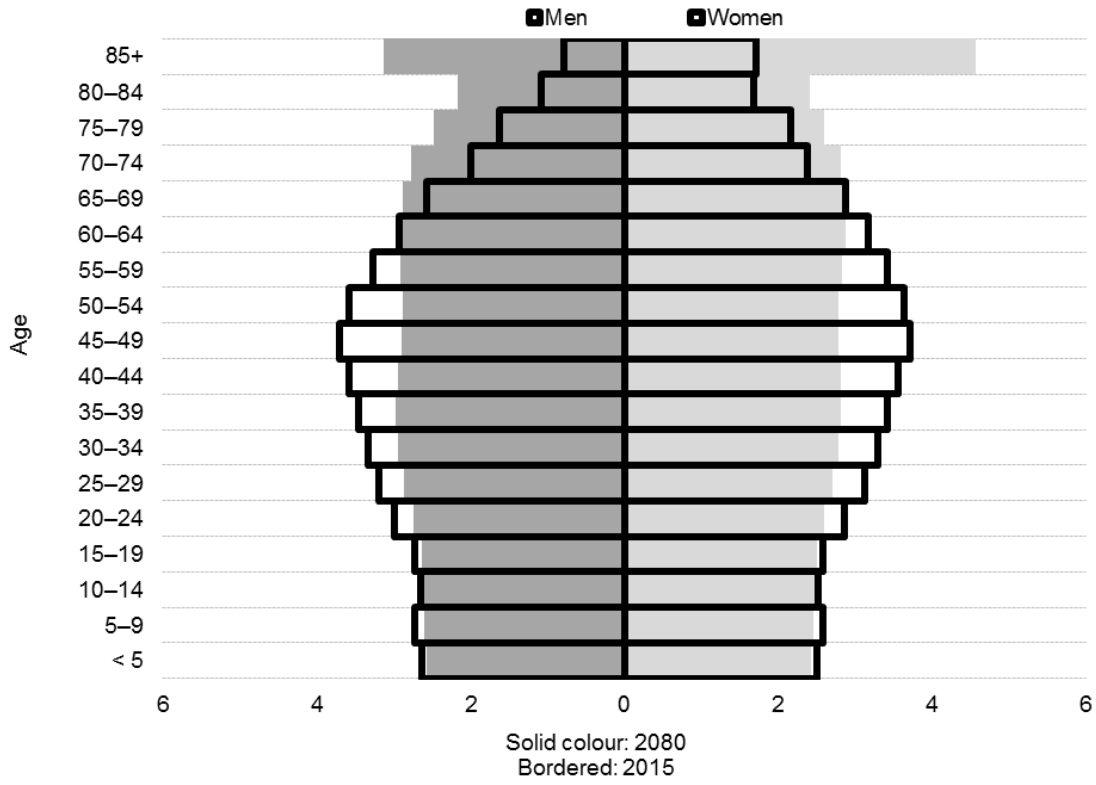
obsolescence through CVET. The period of time people might be expected to spend in the labour market – perhaps 50 years or more – against a background of rapid technical change, will result in those skills acquired in initial education and training being unlikely to be sufficient to serve a full career. This also places pressures on the IVET system to prepare people to learn throughout their careers. It means that the CVET system will need to be prepared to train people in their 40s, 50s or even 60s, to take on jobs which may be radically different to those they have undertaken previously. In some respects, CVET systems will need to look more like IVET ones where they provide the skills necessary for initial entry to a job. For some countries the scale of such change may be substantial and raise a range of questions of who should fund such training.

Figure 18. **Increase in the share of 65+ population between 2005 and 2015**



(1) Break in time series in various years between 2005 and 2015;
(2) Provisional.
(3) Estimation.
Source: Eurostat (h). Population: structure indicators [demo_pjanind].

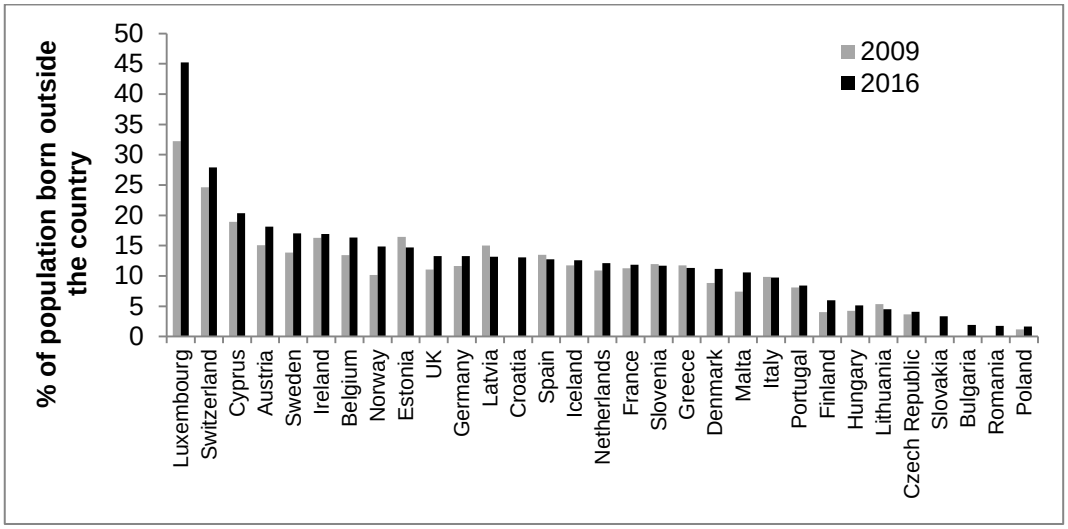
Figure 19. **Projected change in age structure, 2015 and 2080**



Source: Eurostat (h). Population: structure indicators [demo_pjanind].

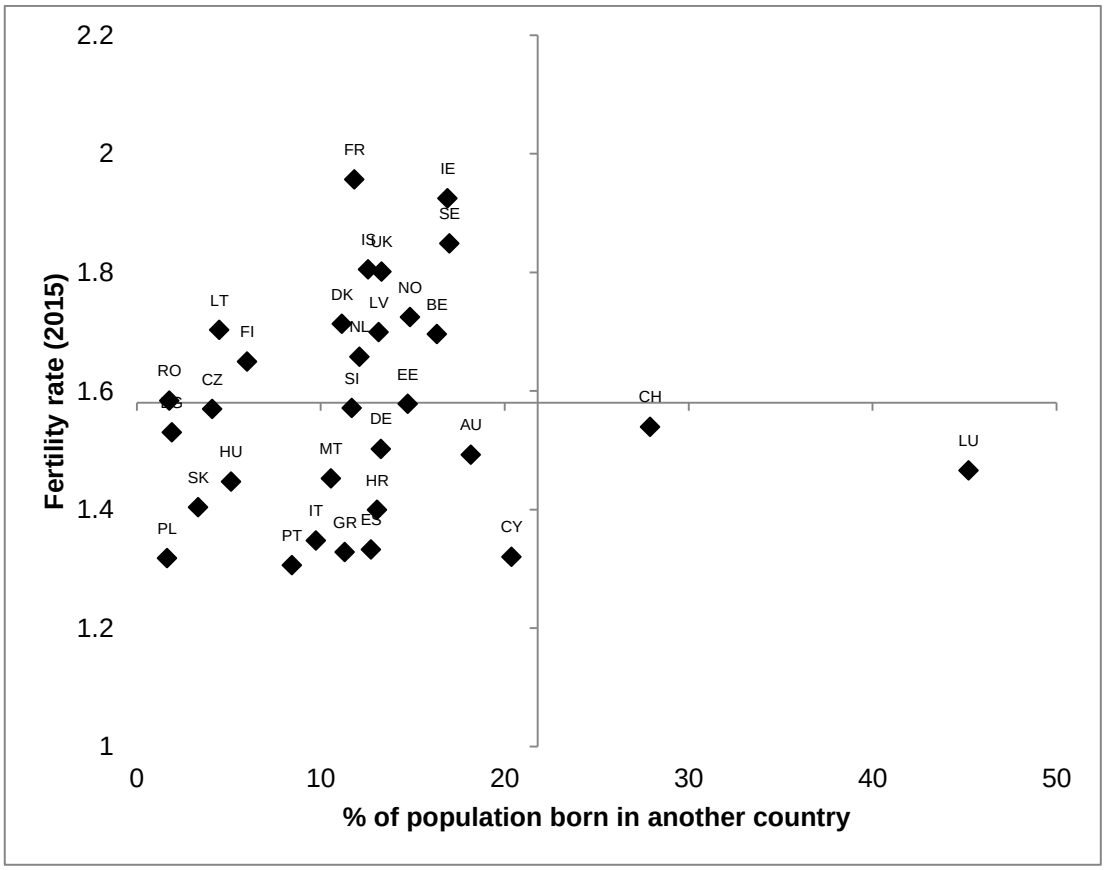
Immigration provides a means for some countries to meet their employment and skill demands. Data on migration reveal that the percentage of people born in another country has increased (though comparable data are available for only a relatively short time span), but there is considerable variation between countries (Figure 20). The extent to which such people might provide a source of skills supply varies substantially by country. There are countries with relatively low fertility rates and relatively low shares of people born in other countries (Figure 21). This group of countries includes those that have experienced relatively high rates of emigration, such as the Baltic Countries, Greece, Spain, Cyprus and Poland (many of these are Type 6 countries mentioned in Chapter 2 – 'non-vocational' countries with limited vocational systems). This suggests, other things being equal, that the labour markets in these countries could tighten substantially, with the VET system having relatively little scope to increase skills supply in the face of labour and skill shortages. The implication is that industrial development does not take place which eventually drives down the demand for labour (creating a vicious cycle).

Figure 20. **Percentage of population born in another country**



Source: Eurostat (l). Population on 1 January by age group, sex and country of birth [migr_pop3ctb].

Figure 21. **Fertility rates and percentage of population born outside the country, 2015-16**



Source: Eurostat (l). Population on 1 January by age group, sex and country of birth [migr_pop3ctb] and Fertility rates by age [demo_frate].

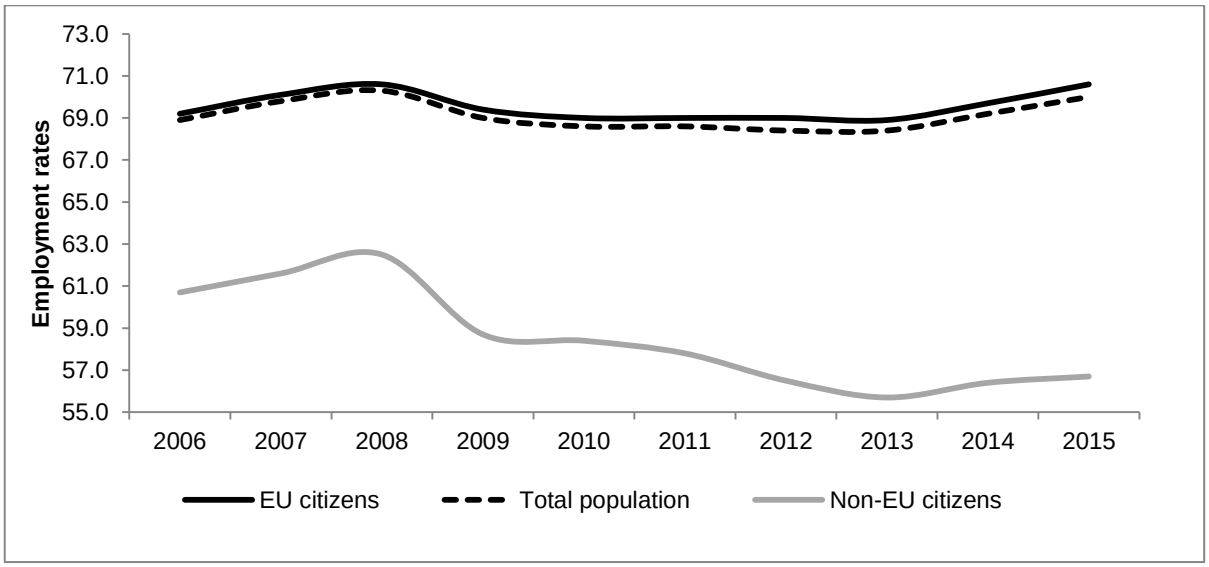
There are implications for VET in the demographic trends outlined above, not least of which is the need for lifelong learning. If people are to spend longer periods in the labour market, it is unlikely that the skills they obtained in their initial VET will carry them through potentially 50 or more years of work, hence the need for lifelong learning to prevent skills obsolescence occurring. It is likely that specific skill needs will arise as a result of an ageing society, including an increased demand for health and social care services, with a consequent demand for workers with skill sets comprising a mixture of emotional, relational and technical skills. There could also be increased demand for goods that provide assistance to older people (such as a range of medical technology devices) that could increase demand for people to work in manufacturing (if the goods are produced in Europe).

Given changes in the old age dependency ratio there is a question about the extent to which labour shortages could arise in given population projections. These can be offset to some extent by people working longer. Migration has also proved a means of increasing labour supply (both intra-EU migration and that from outside) though it creates its own set of demands on the VET system, not least in recognition of qualifications and competences, and language proficiency.

Changes in the demographic structure of the EU population in the long term emphasise the need to increase employment rates. Low fertility rates and increasing life expectancy, against a backdrop of a growing population, suggest a shrinking EU labour force with a large proportion of economically inactive citizens. Increased employment rates, particularly for women, older workers and younger persons, will be needed to compensate for an expected decline in the working-age population (20 to 64) by 2020 of 4.3 million people. For most Member States (19 countries) including Ireland, Spain, Italy and the Netherlands, an increase in the employment rate for older people in the years 2006 to 2015 corresponded to a decrease in the employment rate for younger people. To raise the overall employment rate, policies which are aimed at increasing the employment rate for older people must not be offset by similar or larger increases in youth unemployment. With youth unemployment remaining close to historical high levels it is essential to pursue policies which allow young people to enter the labour market, by improvements in the relevance of education, enabling secure transitions from education to work. VET has an important role to play in this context. The major driver, however, for skill development for people entering the labour market is access to challenging work. If work-relevant VET is not followed by challenging work, the skills developed in VET may not only fail to be consolidated, they may actually atrophy through lack of use.

Economic migration will become increasingly important in addressing Europe's shrinking labour force and shortages in skills. The European Commission estimates that, in the absence of net migration, the working age population can be expected to decrease by 12% in 2030 and by 33% in 2030 (European Commission, 2010, p. 9). Countries experiencing net immigration may well be able to obtain a supply of skills that can reduce pressures on the VET system to produce those skills. That said, workers from countries outside the EU have considerably lower employment rates than EU citizens, such that the major issue is getting them to participate in the labour market in order that their skills may be used (Figure 22).

Figure 22. **Employment rate in 20 to 64 year-olds by citizenship, EU-28, 2006-15**



Source: Eurostat (a). Employment rates by sex, age and citizenship (%) [lfsa_ergan]

The measures proposed in the EU's *Towards a job-rich recovery* highlight the importance of migration in addressing expected skill shortages to meet deficits in qualified job-specific skills (European Commission, 2012). The flagship initiative *An agenda for new skills and jobs* proposed a range of measures to anticipate and match labour market and skill needs: labour market observatories to bring labour market actors together with education and training providers; increasing geographic mobility across the EU; and better integration of migrants, crucially including better recognition of their existing skills and qualifications.

3.5. Conclusion

The implications of the trends in the external environment are formidable for VET systems and education systems in general. Europe faces a situation where technology is radically reshaping the nature of production systems in both manufacturing and services. Technology has accelerated the process of globalisation. It has also had a marked impact on the demand for skills, with much growth at the higher and lower ends of the occupational hierarchy and far less in intermediate level occupations; those that typically require a qualification at upper secondary level and which have traditionally been served by the VET system. But the VET system has also had to deal with demographic changes that have seen a decline in the youth population, which has been its main market for learners, and the need to cope with immigration from third countries where the skills of individuals need to be validated. This has all taken place against a changeable economic cycle: relatively benign economic conditions coming to shuddering halt with the economic crisis in 2007-08, the aftermath of which is still keenly felt in many countries. How VET systems have responded is addressed in Chapter 4.

CHAPTER 4.

The VET response across Europe

4.1. A brief history of VET and skills policies in Europe

Following the end of World War II, politicians in Europe became increasingly focused on economic and political integration. This can be traced back to the creation of the European Coal and Steel Community (ECSC) in 1951 and to the signing of the Treaty of Rome in 1957. The latter gave birth to the European Economic Community (EEC), through to the signing of the Maastricht Treaty in 1991 that brought about the modern day European Union (EU). From the 1950s to the present day policy-makers tackled a number of recurrent problems: improving economic competitiveness and addressing unemployment resulting from structural change while, at the same time, trying to counter skill-shortages in certain parts of the European economy. The ECSC, from the outset, recognised the importance of improving VET provision to bring about productivity gains and simultaneously ensure that any gains were not wiped out as a result of wage-push inflation resulting from skill shortages (Meschi, 2004). The ECSC's Standing Committee on Vocational Training undertook activities including compiling and disseminating documentation on vocational training in the six Member States for the two industries, as well as making training materials available. The Treaty of Rome (1957) incorporated several VET-related articles, including Article 128 that specified that the Council of Ministers would lay down the 'general principles for implementing a common vocational training policy capable of contributing to the harmonious development both of the national economies and of the common market', and Article 118 which stated that basic and advanced vocational training was a matter where the Commission was given the task 'of promoting close cooperation between Member States' (Petrini, 2004, p. 45).

Initially the Commission sought to push forward with a top-down approach to a European VET agenda by establishing the content of the general principles on training as required by Article 128 (in 1963) and by pursuing an action programme on common vocational training policy (in 1965). The action plan sought to offer 'all young people of the Community, and when necessary adults, an appropriate opportunity for training' ([9]). The actions set out in the plan were

([9]) ASCE, BAC 6/1977, 679. *Projet de programme d'action en matière de politique commune de formation professionnelle* [Draft action programme on a common vocational training policy], 1964 – as cited in Petrini (2004, p. 48).

designed to ‘gradually implement a common VET policy that might contribute to the harmonious development of both national economies and the common market, to accelerate the raising of living standards and to improve the prospects of employment for workers, whether in employment or self-employed’ (Petrini, 2004, p. 49). Included in the actions was harmonisation of training standards to bring about the free movement of workers across Europe. Despite approval from within the European Commission and the European Parliament, the initiative was not pursued because it was seen as transgressing national competences. The French delegation, for example, thought the actions strayed into the realm of employment and school policy which were outside the competence of the EEC. The plan was dropped by the Commission and, in the years that followed, it adopted a less ambitious approach concentrating on studying measures for harmonising vocational qualifications. At the beginning of the 1970s, European level actions were essentially those of promoting cooperation and the exchange of ideas between Member States.

Action at European level took place against a backdrop of relatively strong economic growth across the EEC. As economies within the EEC weakened in the early 1970s – especially with the oil price shock of 1973 – some of the ideas initially floated in the early and mid-1960s were revisited. One of these – first mooted in the principles of 1963 – was the creation of a European vocational training institute (Cedefop). Both IVET and CVET were becoming, at least implicitly, of central importance to the wider goals of the EU. The needs to boost competitiveness, tackle unemployment, reduce social exclusion, and improve labour mobility, were all seen to have a human capital and VET dimension. Through a series of communiqués and declarations from Copenhagen to Riga – via Helsinki, Maastricht and Bruges – VET policy in Europe came of age. In the various documents there is an emphasis on increasing access to VET, ensuring that skill systems are responsive to labour market needs, harmonising qualifications/competences across Member States, and increasing transparency. Even if the Lisbon Treaty identified vocational training as being a ‘supporting competence’ – that is the European Union can carry out actions to support, coordinate or supplement Member States' actions – it was apparent that there was room for a European dimension. The Copenhagen declaration (2002) starts by reiterating the need for action at European level: ‘Economic and social developments in Europe over the last decade have increasingly underlined the need for a European dimension to education and training’. It then goes on to identify the priorities for action (Box 2).

Box 2. **Main priorities of the Copenhagen declaration**

European dimension

Strengthen the European dimension in vocational education and training with the aim of improving closer cooperation in order to facilitate and promote mobility and the development of inter-institutional cooperation, partnerships and other transnational initiatives, all in order to raise the profile of the European education and training area in an international context so that Europe will be recognised as a world-wide reference for learners.

Transparency, information and guidance

Increase transparency in vocational education and training through the implementation and rationalisation of information tools and networks, including the integration of existing instruments such as the European CV, certificate and diploma supplements, the Common European framework of reference for languages, and the EUROPASS into one single framework.

Strengthen policies, systems and practices that support information, guidance and counselling in the Member States, at all levels of education, training and employment, particularly on issues concerning access to learning, vocational education and training, and the transferability and recognition of competences and qualifications, in order to support occupational and geographical mobility of citizens in Europe.

Recognition of competences and qualifications

Investigate how transparency, comparability, transferability and recognition of competences and/or qualifications, between different countries and at different levels, could be promoted by developing reference levels, common principles for certification, and common measures, including a credit transfer system for vocational education and training

Increase support to the development of competences and qualifications at sectoral level, by reinforcing cooperation and coordination especially involving the social partners. Several initiatives on a Community, bilateral and multilateral basis, including those already identified in various sectors aiming at mutually recognised qualifications, illustrate this approach.

Develop a set of common principles regarding validation of non-formal and informal learning with the aim of ensuring greater compatibility between approaches in different countries and at different levels.

Quality assurance

Promote cooperation in quality assurance with particular focus on exchange of models and methods, as well as common criteria and principles for quality in vocational education and training.

Give attention to the learning needs of teachers and trainers within all forms of vocational education and training.

Source: (Council and EC, 2002).

In Riga, a decade or so later, a similar set of issues were pursued as in Copenhagen (Box 3). In many respects the issues that are being addressed are

not so very different from those in the 1950s and 1960s with respect to the harmonisation of qualification/competence standards, the need to promote free movement, and tackling skill shortages. Arguably, the difference now is that there are many more tools and resources available to address the priorities outlined in the Riga conclusions, including European quality assurance in VET (VET), Europass, and the European qualifications framework (EQF).

Box 3. **Riga conclusions: new set of medium-term deliverables 2015-20**

With a view to developing high quality and labour market relevant vocational skills and qualifications, based on the learning outcomes approach:

1. Promote work-based learning in all its forms, with special attention to apprenticeships, by involving social partners, companies, chambers and VET providers, as well as by stimulating innovation and entrepreneurship.

2. Further develop quality assurance mechanisms in VET in line with the EQAVET recommendation and, as part of quality assurance systems, establish continuous information and feedback loops in I-VET and C-VET systems based on learning outcomes.

For people's informed choice of pathways and long-term employability and adaptability to evolving skills needs:

3. Enhance access to VET and qualifications for all through more flexible and permeable systems, notably by offering efficient and integrated guidance services and making available validation of non-formal and informal learning.

4. Further strengthen key competences in VET curricula and provide more effective opportunities to acquire or develop those skills through I-VET and C-VET.

In support of successful implementation of reforms and to raise the overall quality and efficiency of VET:

5. Introduce systematic approaches to, and opportunities for, initial and continuous professional development of VET teachers, trainers and mentors in both school and work-based settings.

Source: Riga conclusions 2015 (Council and EC, 2015).

In parallel with the developments described above, in 2016 the European Commission published the *New skills agenda* ([10]). While there have been a number of skill initiatives over recent years, the *New skills agenda* provides a

([10]) The *New skills agenda* on DG EMPL web page: http://ec.europa.eu/social/main.jsp?catId=1223 [accessed 16.3.2018].

starker picture of the challenge facing Europe than previously. It states: 'Tackling the skills challenges will require significant policy efforts and systemic reforms in education and training. It will require smart investments in human capital from both public and private sources, in line with the Stability and Growth Pact'. The *New skills agenda* will achieve its goals through a three-pronged approach based on boosting skills supply, ensuring that the skills national systems produce are measureable against a set of Europe-wide standards, and that information is available that will guide investments in skills. Box 4 outlines the principal components of the *New skills agenda*.

Box 4. **Summary of the *New skills agenda***

Improving the quality and relevance of skills formation

Tackling a lack of basic skills

Developing a core competence framework

Making VET a first choice, in large part through promoting work-based learning as an effective means of skills supply

Improving the supply of digital skills (via the Digital Skills and Jobs Coalition to develop a large digital talent pool and ensure that individuals and the labour force in Europe are equipped with adequate digital skills).

Making skills and qualifications more visible and comparable

Revision of the European qualifications framework in order to improve the mutual recognition of qualifications/learning in a single EU labour market;

Recognition of third country national's skills and qualifications

Improving skills intelligence and information for better career choices

Improving the transparency and comparability of qualifications

Improving labour market intelligence

Boosting skills intelligence in sectors

Better understanding the performance of graduates

Source: European Commission (2016a).

The above commentary indicates the way in which European level VET and skills policies have developed. As the demands on the VET system have increased, the tools developed at EU level, and the exchange of ideas and know-how across countries, have become an important part of the response at national levels to meeting a number of external challenges. The next section looks in more detail at how VET provision has developed over the recent past.

4.2. Key developments in the supply of VET

Education and training are seen as central to the Europe 2020 strategy, acting as important drivers for growth and employment. Two important challenges affecting the context of education are the recent economic crisis and the implications of an ageing population with its economic, labour market, and societal impacts. The two Europe 2020 strategy headline indicators and related targets are:

(a) reducing the share of early leavers from education and training to below 10%;
(b) increasing the share of the population aged 30 to 34 having completed tertiary or equivalent education to at least 40% by 2020.

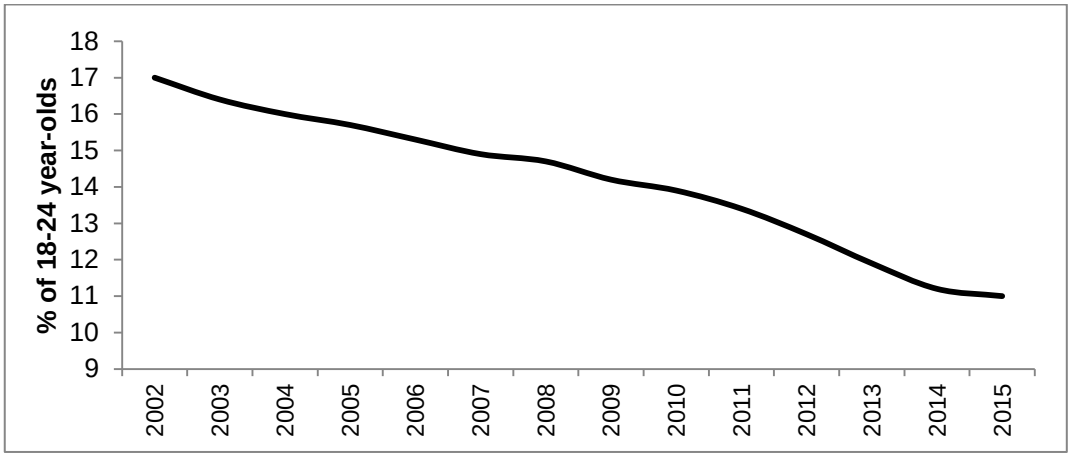
In addition to these two Europe 2020 targets there are five further benchmarks under the strategic framework for education and training 2020 (ET 2020) (Council of the European Union, 2009) that provide relevant statistical information for characterising education, including VET:

(a) an average of at least 15% of adults should participate in lifelong learning;
(b) the share of low-achieving 15-year-olds in reading, mathematics and science should be less than 15%;
(c) at least 95% of children between the age of four and starting compulsory primary education should participate in early childhood education;
(d) an EU average of at least 20% of higher education graduates and of at least 6% of 18 to 34 year-olds with an initial vocational qualification should have had some time studying or training abroad (Erasmus+);
(e) the share of employed graduates (20 to 34 year-olds) having left education and training no more than three years before the reference year should be at least 82%.

4.2.1. Reducing early leaving

Figure 23 shows that there has been a continuous fall in early leaving from education and training from 2002 (17.0%) to 2015 (11.0%). This applies to both women and men, with a gap of 2.9 percentage points in favour of women in 2015 who were already below the overall EU target.

Figure 23. **Early leavers from education and training, EU-28, 2002-15**



NB: The figure refers to 18 to 24 year-olds with at most lower secondary education and not in further education or training.

Breaks in time series in 2003, 2006 and 2014; 2020 target is for <10% of early leavers from education and training by 2020.

Source: Cedefop, The way to 2020 database; also available from - http://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=0&pcode=t2020_40&language=en

The common EU-28 target has been converted into national targets by all Member States (with the exception of the UK), varying from 4% in Croatia to 16% in Italy. By 2015 Denmark, Ireland, Greece, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Austria, Slovenia, and Sweden had achieved their targets for 2020. The countries furthest from their targets were Spain, Malta and Romania (the latter 10 percentage points above its target), also having the highest proportions of early school leavers (at least 19.0%). The lowest proportions were found for Croatia, Cyprus, Lithuania, Poland and Slovenia with fewer than 6.0% early leavers from education and training. Norway was slightly lower than the EU-28 average while Iceland had above average levels. Southern European countries had the largest reductions over the period from 2002 to 2015.

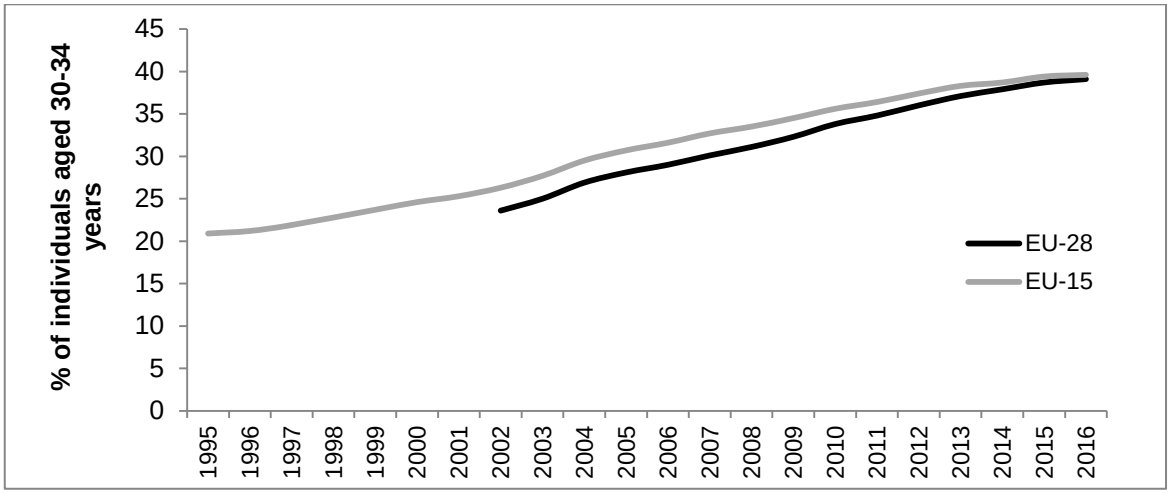
Success in reducing early leaving has been through a mixture of measures such as second chance education and preventative interventions, including the use of VET as a more attractive option for young people who have had negative experiences in general education. It should also be remembered that early leaving may, in some cases, be a positive choice where an individual prefers early labour market entry and can obtain employment, although this may prove to be economically disadvantageous to them in the long term.

4.2.2. Increasing levels of attainment

The share of 30 to 34 year-olds across the EU-28 achieving tertiary education showed a steady increase from 2008 to 2015, rising from 31.1% to 38.7%. This trend suggests that the EU is on track to meet its target of increasing the proportion of the population in this age group to at least 40% by 2020. Figure 24 shows the trend over time with an increasing share of the population achieving tertiary level attainment.

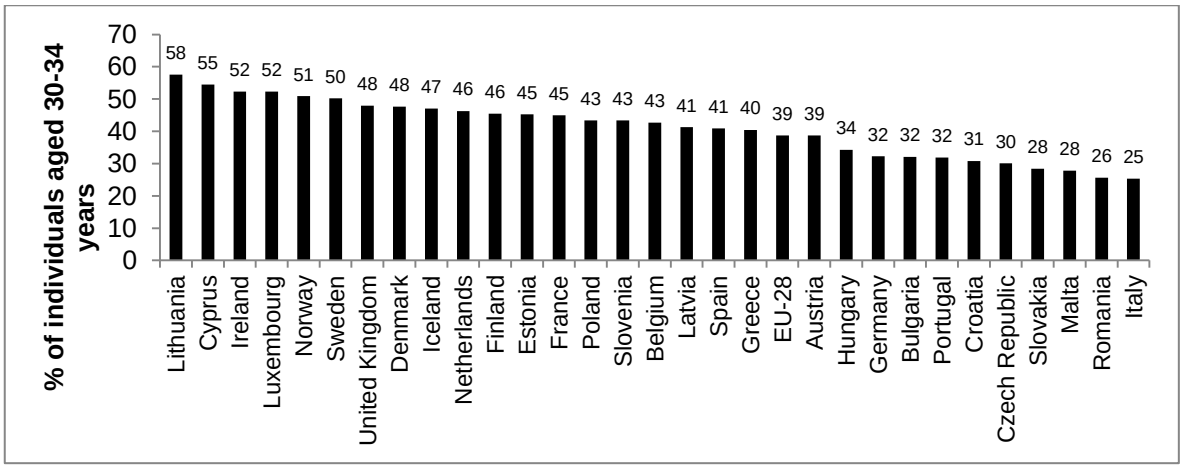
Figure 25 shows how country-level comparisons for 2015 reveal wide variation, from 58% in the UK to 26% in Romania.

Figure 24. **Tertiary educational attainment, 30 to 34 year-olds with completed tertiary education**



Source: Eurostat (i). Population by educational attainment level, sex and age (%) - main indicators [edat_lfse_03].

Figure 25. **Tertiary educational attainment by country, 30 to 34 year-olds with completed tertiary education**



Source: Eurostat (i). Population by educational attainment level, sex and age (%) - main indicators [edat_lfse_03]

The trends reflect increased investment in higher education, but also a shift to shorter degree programmes after implementation of the Bologna process in certain Member States. The national targets varied from 26% for Italy to 66% for Luxembourg. Several variations in the units of measurement of the targets complicate matters: Germany's target includes post-secondary, non-tertiary attainment; in France it refers to the age group of 17 to 33 year-olds; and for Finland the target excludes former tertiary VET.

It is difficult to tease out the implications for VET of these increasing levels of attainment because through-flow data are lacking that would indicate the tracks which people have followed to enter higher education. But, since it is reasonable to assume that most people enter higher education through general education routes at upper secondary level, it is likely that increasing numbers of people with higher education qualifications have been at the expense of VET at lower levels, with fewer people passing through upper secondary VET. In terms of outcomes, some countries have large, and rising, numbers of unemployed or underemployed higher education graduates with general qualifications (Section 4.3). Whether such trends will continue into the future is a moot point. Many countries are improving or developing new vocational provision at higher levels ([11]). This may increase the overall numbers of people entering tertiary education and/or it may re-route people into vocational programmes who would otherwise have followed general higher education programmes. Much will depend on external labour market factors.

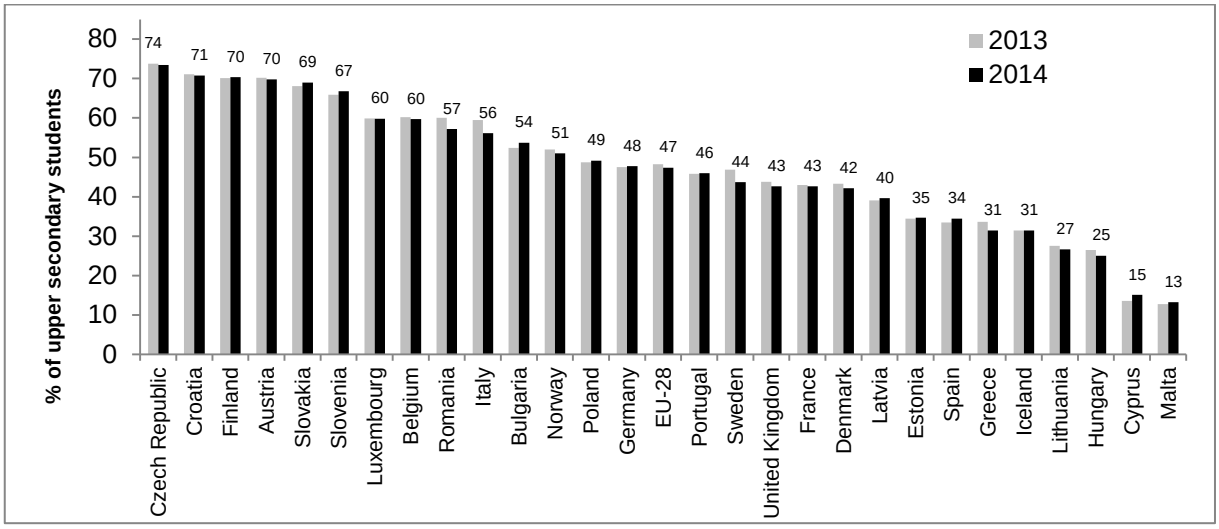
4.2.3. Participation in vocational education

There are limited data available on the extent to which people engage in vocational rather than general education. Figure 26 provides data on the share of pupils enrolled in vocational upper secondary education as a percentage of the overall share of pupils at this level. On average, it is around half of all students, but the variation across Europe is large: from 74% in the Czech Republic to 13% in Romania. Other trends mentioned in this report are likely to influence both the overall size and the relative share of the number of secondary level pupils in vocational studies, such as the extent of early school leaving, uptake of tertiary education and a decline in the size of the youth cohort in many countries ([12]).

([11]) This is an issue being addressed in the project's theme on the role of VET at higher education levels

([12]) The project's theme on the role of traditional VET at upper secondary level uses national data to look into trends in VET in more detail.

Figure 26. **Share of upper secondary level pupils in vocational studies**

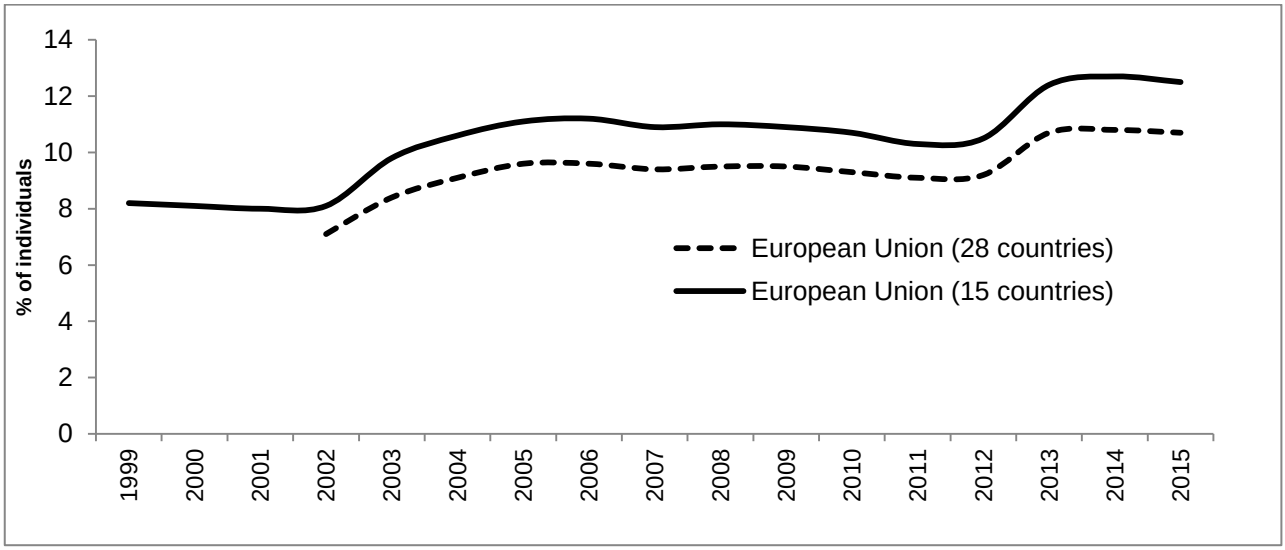


Source: Eurostat (j). Pupils enrolled in upper secondary education by programme orientation, sex, type of institution and intensity of participation [educ_uoe_enrs04].

4.2.4. Increasing participation in lifelong learning

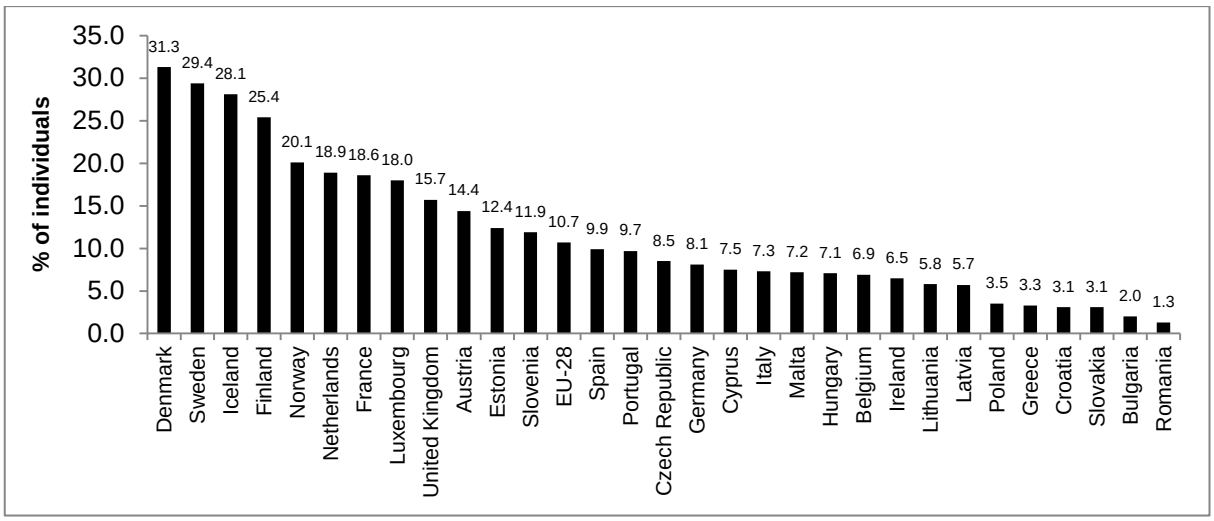
Figure 27 shows the trend in participation in lifelong learning (people who have received training over the last four weeks who are older than 25). It generally shows that there has been a step change in the percentage of people engaging in lifelong learning: in the early 2000s and again around 2013. The variation by country is substantial: from 31% in Denmark to a negligible 1% in Romania in 2015 (Figure 28).

Figure 27. **Percentage of 25 to 64 year-olds participating in lifelong learning, 1999-2015**



Source: Population by educational attainment level, sex and age (%) - main indicators [edat_lfse_03]

Figure 28. **Percentage of 25 to 64 year-olds participating in lifelong learning by country in 2015**



Source: Population by educational attainment level, sex and age (%) - main indicators [edat_lfse_03]

A degree of caution is required in looking at training statistics such as those presented in Figure 27 and Figure **28** since information is not available on the level, quality or duration of training. Studies have demonstrated that training volumes have been maintained, despite the vagaries of the economic cycle, because of the amount of mandatory training employers have to provide to their employees (such as health and safety, induction). (Felstead et al., 2011; Felstead and Jewson, 2014). This may mean that, over time, comparisons of training activity may not be comparing like with like ([13]).

4.3. Matching skills supply to demand

The data indicate that for individuals – and employers – there are benefits to be derived from investing in VET. For instance, educational attainment is related to successful access to the labour market. A total of 58.3% of early school leavers from education and training in 2015 were either unemployed or inactive in the labour market. In the case of recent graduates (those aged 20 to 34 who left education and training within the last three years) the economic and financial crisis has led to falls in their employment rate from 82.0% in 2008 to 75.4% in 2013, with a small increase to 76.9 in 2014; this was still higher than for lower levels of educational attainment. The fact that people with higher levels of

([13]) The project's theme on VET from a lifelong learning perspective looks in more detail at trends in CVET over time.

educational attainment are more likely to be in employment is, in many respects, a poor indicator. It may simply reflect the fact that, in a labour market with weak demand, employers will prefer those with higher levels of educational attainment because they are perceived as being more skilled (other things being equal).

A variety of other evidence suggests that while training volumes and levels of educational attainment have been rising, there remains a skills matching problem (Cedefop 2015a, 2015b). Skills mismatch is a major concern, with implications for VET because rising levels of educational attainment on their own will not address this issue. Skills mismatches are driven by a shortage of particular skills, both technical and soft skills, which VET and vocational streams within higher education could supply. The appropriate provision, however, must be available and learners must find that provision an attractive offer, both at the point of entry into training and into employment itself, while issues around rates of pay and conditions of work also come into play.

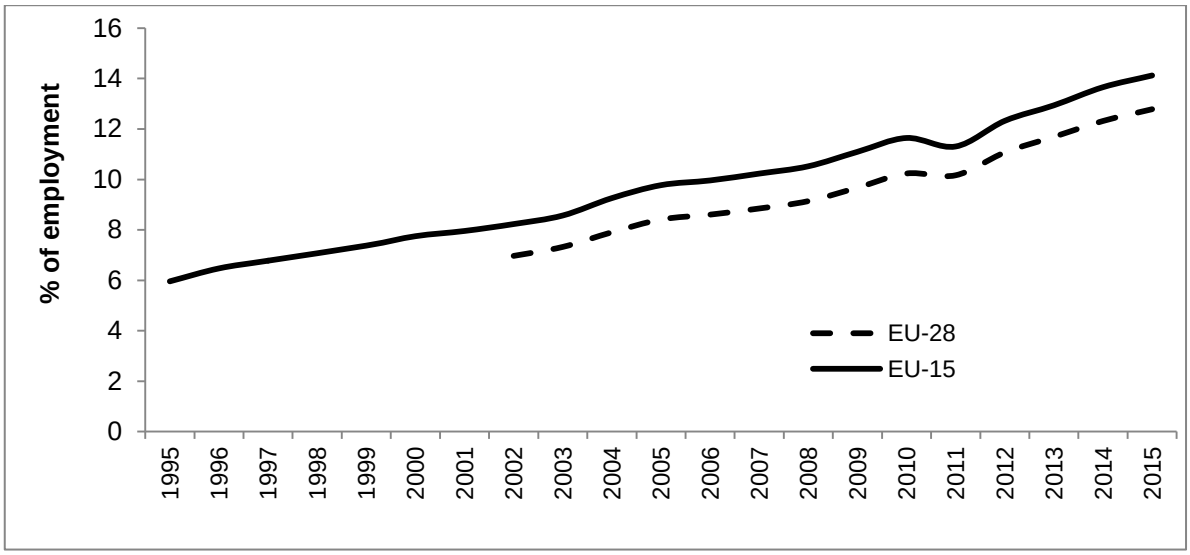
Though media headlines across Europe are often concerned with labour or skill shortages, there have been growing worries in recent years about the potential for skill surpluses and the implications of this type of mismatch on individuals and the economy. There is concern that investments being made by governments and individuals are not achieving sufficient returns in the labour market as the skills acquired through higher education and other forms of training leading to higher level qualifications are not meeting employer demand (Cedefop, 2010).

Skill surpluses can have negative implications for individuals, employers and economies. For individuals, being in a position for which one is overqualified can lead to dissatisfaction; overqualified employees have been found to be unable to recoup the expected returns over their adequately skilled colleagues even after spending time in the job or labour market. In turn, employers may see lower productivity and greater labour turnover where overqualified employees are dissatisfied and demotivated. There is also the possibility that employers may be able to benefit from the presence of overqualified employees where they pass on skills/knowledge to other workers or where the overqualified are able to perform several different roles and can shift around the workplace as needed. In aggregate, though, overeducation represents suboptimal returns being achieved from public expenditure on education and training and also constrains productivity in the economy. With the vast expansion of participation in higher education across many European countries over recent decades, skills surpluses or overeducation represents a major policy issue for governments.

Measuring skill mismatches, especially skill surpluses or overeducation, proves challenging and the available data that indicate the presence and degree

of mismatches are limited and sometimes open to different interpretations. Figure 29 indicates the share of people who have tertiary level educational attainment and not working in managerial, professional, or associate professional occupations.

Figure 29. **Indication of overqualification in the EU, 1995-2015**



Source: Eurostat (j). Employment by sex, occupation and educational attainment level (1 000) [lfsa_egised]

The 2014 European skills and jobs survey found that nearly 40% of all adult employees in the EU felt that their skills were underutilised in their current jobs (Cedefop, 2015c). The share of employees reporting that the skills they possessed were higher than those needed to fulfil their current roles was highest in elementary occupations (47% of adult employees) and plant and machine operators and assemblers (45%). The incidence of this type of overqualification was higher for those with a high level of education (43% compared with 39% for those with medium level education and 31% with low level of education). Austria and the United Kingdom had the highest rates of skills underutilisation (54% and 51%, respectively) in 2014. The implications of these data for VET are two-fold. First, the availability of mid-career career guidance might help those whose skills are underutilised to consider their career options. Second, greater attention should be given to CVET for adults, allowing for changes in career direction.

Data from the 2015 EU labour force survey have been used to look at the share of tertiary education graduates not employed in what can be considered graduate jobs (ISCO 1, 2 or 3). Overall, more than a quarter (26%) of 25 to 34 year-old tertiary education graduates were not employed as managers, professionals or associate professionals (‘graduate jobs’). This figure has increased from 24% in 2011. This overqualification among graduates was highest

in Cyprus, Spain and Greece in 2015 at around 40% of young graduates reportedly being employed in non-graduate jobs. Identification of a skill surplus partly depends on how a graduate job is defined; also, the evidence or measures of overqualification in the data may reflect a transitory phenomenon. The increase in higher education participation, for instance, may be taking considerable time to filter through and be accommodated by the labour market. It may also be that some general education graduates would benefit from developing particular combinations of technical and soft skills in demand in the labour market, which would have implications for VET. There is evidence of general education graduates making use of post-secondary non-tertiary VET to fill gaps in their vocational skills (McCoshan et al., 2008).

VET systems looking to adapt to the challenges posed by the labour market considered increased work experience in IVET, often in the form of apprenticeship training; this was considered to be a particularly effective means of matching skills to supply, given the role of the employer in the design and provision of training. While much of this is at the upper secondary level, the intention in many countries is to increase provision at higher levels. Making education more vocational appears to be the preference of policy-makers in many countries tackling matching problems.

There have been several EU skill mismatch initiatives, often through the European Social Fund, to assist countries to develop more effective means of skills anticipation. The anticipation systems that have been developed use a range of methodologies but are generally concerned with how to anticipate skill demand and how to disseminate the findings so that target groups will be influenced.

4.4. Conclusion

The commentary provided above shows how European level policy has developed to assist countries in responding to the various external challenges that their labour markets face. Substantial investments have been made over recent decades in raising skill levels across the EU by persuading more people to participate in IVET and to engage in lifelong learning. The stock of skills has increased, but the extent of skills mismatch has increasingly become a policy priority. There remains substantial variation across Europe with respect to participation levels in VET and to the skills structure of the workforce. How particular countries have responded is explored in Chapter 5.

CHAPTER 5.

National VET system development

5.1. Introduction

The way VET systems respond to long-term developments in the labour market, as well the various exigencies they need to address from time to time, will be partly shaped by the development paths those systems have taken over the recent past. Evidence below, from the case studies of selected national systems, illustrates the way in which the structure and provision of VET has changed over time. While Chapter 6 illustrates how VET systems have responded to particular external factors (demographic, economic and technical change), this one looks more generally at how systems have changed. It pays particular attention to the interplay between internal and external factors, the types of change that have arisen in the provision of VET, and the degree of divergence or convergence in the trajectories countries have followed.

5.2. Selecting countries to study

The selection of countries for case study was first based on comparing countries in Europe with one another against a number of indicators that reflect the main external factors likely to affect the provision of VET. In Table **1** countries have been grouped according to whether their position with respect to each of the external factors is deemed favourable or unfavourable. The groupings are as follows:

(a) economy;
    (i) long-term growth has been relatively strong (favourable) or weak over the 1995 to 2015 period;
    (ii) the degree of cyclical effect, as in the extent to which the fall in growth during the financial crisis was relatively modest (favourable) or steep;

(b) labour market;
    (i) total unemployment rate and that for young people respectively. A favourable positioning is where the respective unemployment rate is relatively low;

(c) demography;
    (i) this has been measured with respect to the increase in the proportion of the population aged over 65. A favourable rating is where the rate of increase is low;

(d) technical change;

This has been measured with respect to the share of GDP on R&D. Where it is high, this is recorded as favourable.

Table **1** lists the top/bottom six for each characteristic. Based on Table **1**, it is possible to identify particular groups of countries. There is a group of countries (Estonia, Greece, Spain, Lithuania, Portugal) that are relatively weak on measures related to the economy and/or unemployment; and a group of countries that have experienced relatively low rates of unemployment (Austria, Denmark, Germany, Iceland, Netherlands, Norway). Those that appear to have a relatively rapidly ageing population are the Czech Republic, Denmark, Malta, the Netherlands, Portugal, and Finland. For technical change, the grouping with a relatively high level of investment in R&D is similar to those with low levels of unemployment: Austria, Denmark, Finland, Germany, Iceland, and Sweden. The group with the lowest levels of investment in R&D includes those that have displayed relatively weak economic performance (Bulgaria, Greece, Croatia, Cyprus, Latvia, Lithuania, Romania).

As well as using the external factors to identify countries that might be included as case studies, there is also a desire to ensure that there is a mix of countries that includes some variation with respect to the importance of VET and the nature of the policy regime within a country. In Table **1** a measure has been provided that gives an indication of the importance of IVET to a particular country: the share of those enrolled in upper secondary education who are taking the vocational pathway.

Selection was ultimately based on including countries with relatively:

(a) weak economic and labour market performance, where IVET is of relatively less importance, to be selected from Italy, Estonia, and Greece;
(b) strong economic and labour market performance where VET is relatively important, to be selected from Finland, Germany, Norway, and the Netherlands;
(c) strong economic and labour market performance where IVET is or has been relatively less important: France and Poland.

Within the above, there are few examples of countries with relatively flexible approaches to labour market regulation; the UK-England is included for this reason. The final selection for case study analysis reflects a variety with respect to both the nature of VET provision and the external challenges likely to shape responses to VET.

The remainder of this chapter highlights how VET systems in these countries have changed in the period since the late 1980s/early 1990s.

Table 1. **Classification of countries by position of various external environment indicators**

	Economy		Labour market		Demography	Technical change	Importance of VET
	Long-run growth	Sharpness of cycle	Unemployment rate	Youth unemployment rate			
Favourable	EE	PL	IS	DE	FR	SE	CZ
	IE	BG	NO	IS	IE	AT	HR
	LT	CY	DE	NO	SE	DK	FI
	LV	MT	CZ	AT	UK	DE	AT
	LU	RO	UK	DK	NO	FI	SK
	PL	SK	MT	NL	DK	BE	SI
Unfavourable	GR	EE	GR	GR	PT	CY	MT
	IT	LT	ES	ES	PL	RO	CY
	DK	IE	HR	HR	CY	LV	HU
	DE	FI	CY	CY	GR	MT	LT
	AT	IT	PT	PT	ES	HR	IS
	BE	LU	IT	IT	HR	BG	GR

Source: Cedefop.

5.3. The changing role of VET

In most countries VET is defined with respect to certain elements of the education system; typically that related to upper secondary level education which is oriented towards equipping young people to enter a profession or occupation, even if they subsequently choose not to enter that occupation. And this is typically defined in contrast to the general or academic stream, as something related to a profession and not academic. This is an oversimplification but it captures the essence of VET in practice in the late 1980s or early 1990s.

As explained below, all countries have experienced almost continuous incremental changes to their VET systems, interspersed with major reforms and the occasional need to respond to external shocks typically in the form of rapidly rising unemployment as a consequence of economic downturns. This may be regarded very much as a labour-market-oriented interpretation of VET. Allied to it, however, is the social role VET is expected to play in protecting young people from social exclusion, given that VET is often the choice of less advantaged young people. This affects the prestige in which VET is held by the wider public and its attractiveness to young people. Courses perceived to be for those who are disadvantaged in some way transmit a powerful signal about the purpose of VET. This is a point returned to below.

In the period between the late 1970s and early 1990s, many VET systems appeared to undergo a step change. Prior to this point, VET was largely concerned with the provision of education and training to a relatively narrow range of industries (such as manufacturing and construction). Exempting the former Soviet bloc countries for a moment, it is possible to observe, in such countries as UK-England, the Netherlands, Norway and Finland, a need to extend the provision of education and training to young people beyond lower secondary education. This partly reflects the employment decline of traditional sectors – which had historically provided IVET – and the emergence of new, typically service-based, industries. It was also related in some countries to rising levels of youth unemployment. Countries were keen to expand their VET provision to ensure that the education system in general was aligned with the needs of the economy and so met the skill needs resulting from sectoral change and dealt with youth unemployment.

Over time, countries have had to address several common challenges and responses :

(a) making VET more attractive to young people, often by stressing the opportunity to continue with further study beyond the upper secondary level;

(b) ensuring that VET curricula are responsive to meeting labour market needs and relevant to the needs of sectors where there has historically been much less tradition of VET;
(c) changes in the structure of VET, especially with the increasing emphasis given to competence-based approaches to the acquisition of a VET qualification and, in several countries, making VET provision more individualised (such as by allowing a degree of mix and match between various VET courses or modules);
(d) placing emphasis on work-based learning over that located solely in vocational schools;
(e) blurring the definition between what has traditionally been considered initial and continuing VET.

The former Soviet bloc countries exhibit a similar set of factors, except that their VET systems needed to be reinvented in the transition from being a centrally planned to a market economy. The transition in these countries resulted in the collapse of a significant number of employers in less competitive sectors, once they were opened to international competition. This had an especial impact on manufacturing, where there has also been overemployment as a result of low technology intensity. Countless people with former VET qualifications lost their jobs; this is often seen as an important factor at a time when children of this generation had to choose their education pathways. Many were reluctant to choose VET pathways whose esteem had been hit very hard.

It is apparent, notably in the case of Poland, that VET policy took several twists and turns before settling into its current configuration. In a sense, the changes which took place in other countries over several decades had to be enacted in a much shorter time frame without much of a historical foundation to build upon.

In some respects, changes in the 1980s and 1990s were providing a significant break with the past; a step change in the VET system that significantly affected both the structure of provision and its scope (the breadth of the skills training provided). It is equally apparent that VET systems are subject to continuing change, essentially incremental adaptations consistent with the overall direction of policy. These incremental changes – as the example of UK-England and the Netherlands demonstrate – over time can substantially alter the structure of VET systems and behaviour within them. It is also equally apparent that, from time-to-time, countries engage in the substantial change that ushers in radical restructuring or rapidly accelerates progress towards a given goal. Reform 94 (1994) in Norway, the introduction of the Vocational Training Act (1996) in the Netherlands, or the introduction of the Apprenticeship Levy (2017) in UK-England

are examples. In the former Soviet Bloc countries, there are various substantial shifts in policy as attempts are made to, more or less, create a VET system from scratch and then adapt it to needs of the economy and society, as indicated in the example of Poland.

What also becomes apparent across time is the centrality of VET policy to the wider public policy discourse on the economy and society, often in the guise of skills anticipation. This reflects the wider policy debate about competitiveness and productivity within more integrated European and global markets. To some extent countries compete on their relative skills stocks and flows. Germany – and other countries with similar dual systems – is seen to excel in this respect given the high esteem in which its VET system is held. In other countries – such as UK-England – there has been a tendency to place more emphasis on skills supply emanating from tertiary (university) education that, for the most part, is general in its orientation. Being able to match skills supply better in order to offset skills shortages, manage skills obsolescence, and ensure effective transition from school to work for young people, continue to be important considerations for VET systems. But the need to address concerns about economic competitiveness may have focused more attention on a VET system that has expanded in scope since the early 1990s, with some of the more significant changes oriented towards bringing about better alignment between VET and the needs of the economy. How much of a role to hand over to employers in this regard is an interesting question. The Netherlands and Norway, for example, less direct influence is handed to employers/social partners, while in UK-England, increased prominence has been given to employers designing the occupational standards upon which the apprenticeship system is founded.

The role of Europe in skills anticipation and the better aligning of skills supply to demand has been influential. This is more the case in some countries than others, but policy at a European level supports the introduction of national qualification systems and frameworks (linked to the European Qualifications Framework), the shift to competence based systems of attainment, and the validation of informal learning. Skills anticipation systems have often been developed through the assistance of the European Social Fund. In a sense, the transaction costs of introducing certain forms of change have been lowered through the intervention of the EU in providing frameworks in which to develop national policies and tools and sharing of effective practice.

These influences have, over time, resulted in substantial transformation in the scale, structure and nature of VET in many countries. Compared with the situation three of four decades ago, VET appears more central to public policy discourse on issues such as competitiveness and social inclusion: the role of

skills is prominent in a wider range of policy than hitherto. This has resulted from incremental change over time, interspersed with occasional substantial shifts in policy; though the latter tend to capture the headlines, much of the development comes from incremental, piecemeal change.

While more sophisticated analysis has looked at the changing meaning of VET from, for instance, an epistemological and pedagogical perspective (Cedefop, 2017a, 2017b), evidence offers a more prosaic diagnosis. VET's importance is articulated with respect to its capacity to meet a range of labour market and economic needs that will, in turn, afford a degree of protection to young people entering the labour market. The various structures in place designed to bring that about that give meaning to the concept of VET in the policy debate, especially to the prominence given to workplace based training (mainly apprenticeships) as the preferred means of delivering VET. This is common across all of the case study countries, though the exact junctures at which critical changes take place varies by country.

5.4. VET policy shifts in post-1990s

At the beginning of the 1990s, many countries underwent major development in the provision of VET that, in essence, provide at least some of the foundations of the modern VET systems in place today. In the early 1990s – outside of the former Soviet bloc – the major policy shifts are observed with respect to:

(a) creating a mass participation VET system (where this was not extant previously) such that VET is seen as a key element of the overall education system;
(b) integrating VET within the wider education system and establishing parity between vocational and general qualifications;
(c) rationalising VET provision to create more integrated provision, creating a national VET system out of the fragmented systems in place beforehand;
(d) bringing about improved alignment between VET provision and demand.

There was a process of increasing participation and bringing about better alignment between skills supply and demand. These are partly simultaneous inter-dependent processes, where increasing participation is dependent on making the system more attractive to would-be learners and, critically, to employers who might provide workplace based learning opportunities (such as through apprenticeships). Making the system attractive to employers in general means delivering something that employers demand.

The way in which VET became integrated into mainstream education is exemplified by Norway (Box **5**), though something similar is seen in other countries, such as in the 1998 reforms in Finland.

The emphasis on apprenticeships is also observed in other countries. In UK-England, for instance, the establishment of the Modern apprenticeship programme in 1994 was seen as a means of simultaneously increasing participation in VET and ensuring that VET was delivering skills that had value in the external labour market (Box 6).

Creating a system that is responsive to the needs of the labour market (a demand-led VET system) was aided by some noteworthy developments:

(a) the introduction of competence based qualification systems;
(b) reforming the role of employers/social partners in establishing competence-based standards in VET (within the national qualifications system);
(c) ensuring a degree of flexibility to serve local labour market needs.

Box 5. **Reform 1994 in Norway**

During the 1980s Norway experienced revitalisation of the system of collective skill formation within the manufacturing sector, a process driven step by step by local and central actors. The vocational system however, was considered complex, fragmented, and largely filled by older youths and adults; it was also, numerically, a modest apprenticeship system. Building up to the comprehensive school reform of 1994 was an overburdened education system and increasing youth unemployment. This was the backdrop to the efforts made to transform the Norwegian apprenticeship system through Reform 94; subsuming vocational education and general academic education under a common law. In parallel, so-called local training agencies (LTA) emerged in the beginning of the 90s, privately owned and intended to relieve companies from the increased administrative coordination following the integration of vocational training into the general upper secondary education system. The interest among employers in recruiting apprentices from upper secondary school grew significantly. With this reform came expectations that workplaces would not only offer more apprenticeship places, but also to expand and renew their capacity as places for training. This development was welcomed both by employers, and by the social partners, contributing to raising the general status and educational standards of the vocational system.

With the reform of 1994 all young people were given the right to upper secondary education. The core of the restructuring of vocational education during the 1990s was the forging of tighter links between the apprenticeship system and upper secondary education. The vocational track was integrated into the general upper secondary education system; it follows that the apprenticeship system also became evaluated in line with the education system's requirements for effectiveness and transparency. With this integration, the vocational system increasingly developed into an educational arrangement for young people.

Source: Cedefop, *Changing nature of VET*, national case studies.

Box 6. **Modern apprenticeships in UK-England (1994)**

During the 1970s and 1980s policy became increasingly focused on how to increase levels of participation in post-compulsory education. There was recognition that the existing system of employer-funded and delivered apprenticeships trained relatively few people and was affecting the capacity of the country to match the competiveness of, for instance, Germany, France or the Netherlands. At the same time, relatively high levels of youth unemployment and recognition that employment programmes, such as the *Youth opportunities programme*, failed to deliver much in the way of the skills needed by employers working in relatively high-value-added markets. This led policy-makers to introduce Modern apprenticeships, designed to deliver the type of skills training that was observed to work well in economies considered to be more productive. This was to introduce an effective means of training – apprenticeship – to sectors that had little tradition of this form of training and which, importantly, were considered to be those which accounted for most employment growth. Apprentices would receive a qualification – a national vocational qualification – that was to have parity with qualifications obtained in the general education stream.

Source: Cedefop, *Changing nature of VET*, national case studies.

These are common across many countries but exemplified by the case of the Netherlands with the introduction of the Vocational Training Act in 1996 (Box **7**).

Box 7. **Introduction of the Vocational Training Act (1996) in the Netherlands**

A key date in the development of the Dutch VET system was the introduction of the Vocational Education Act (*Wet educatie en beroepsonderwijs*, WEB) in 1996. Under the 1996 WEB Act, hundreds of vocational training centres were merged to form the present 42 regional education and training centres (ROCs), plus 12 agricultural education and training centres (AOCs), and 15 smaller, specialised VET colleges. The introduction of the WEB had several consequences. First, it introduced one national qualification structure for all vocational education courses: this was intended to increase labour market support for vocational education and the willingness of businesses to invest in promoting vocational education. Second, it provided VET institutions with a high level of autonomy in organising VET programmes as long as the curricula led to labour market relevant competences. Third, it brought together vocational education courses within a coherent qualifications structure, where employers set out what students should know to qualify at a certain level of qualification. The WEB also shifted the VET system from being supply-driven to demand-driven, with a shift from learning a subject to developing a competence related to a profession. In 1999 the *Adviescommissie Onderwijs en Arbeidsmarkt*, ACOA (Advisory Committee on Education and the Labour market) recommended strengthening the existing VET structure, based on learning outcomes, by strongly focusing on ‘core competences’. This marked the start of competence-based education in the Netherlands.

Source: Cedefop, *Changing nature of VET*, national case studies.

The general picture at the end of the 1980s/beginning of the 1990s is that of VET systems experiencing a degree of major reform to integrate VET within the education system and increase its attractiveness to young people and employers (as the principal skills consumers). If the early period was characterised by major changes, the more incremental ones that followed cumulatively have had great influence on VET provision. Over time, the changes introduced can be substantial, as the example of the Netherlands demonstrates. By 2004, training centres were delivering competence based education within the MBO. Further changes were introduced in 2015 with a reduction in the number of qualifications available; the Vocational Training Act of 2016 offered greater scope for the individualisation of qualifications with the introduction of the core and optional parts, where the optional parts allowed training to be tailored to local needs. This approach is regarded as more responsive to labour market needs

The example of Italy also illustrates the various twists and turns taken by VET policy over time, which can result in much cumulative change (Box 8). It illustrates the way in which VET systems have faced and needed to adapt to multiple challenges over time. It also illustrates that the changes that need to take place in the VET system to meet the needs of economy and society can take time to develop.

Box 8. **Development of IVET in Italy**

In the 1950-60s initial vocational training was conceived as an instrument for social development and creating employment opportunities. With the crisis in the Italian economy stemming from the oil price shock in the early 1970s, VET became increasingly focused on matching the supply of skills to demand. The 1980-1990s proved a dynamic period in the development of VET as it came to terms with:

- de-industrialisation and the emerging knowledge-economy;
- the need to support the long-term unemployed and the marginalisation of socially vulnerable groups in the labour market;
- ensuring that employees were supported in adapting to organisational and technological change;
- creating an environment of lifelong learning to improve employability and active citizenship.

The 2000s bring the tools and policies that allow the VET system to respond flexibly to external challenges. This includes the adoption of a learning outcomes approach, qualifications frameworks, and increased permeability in the education and training system.

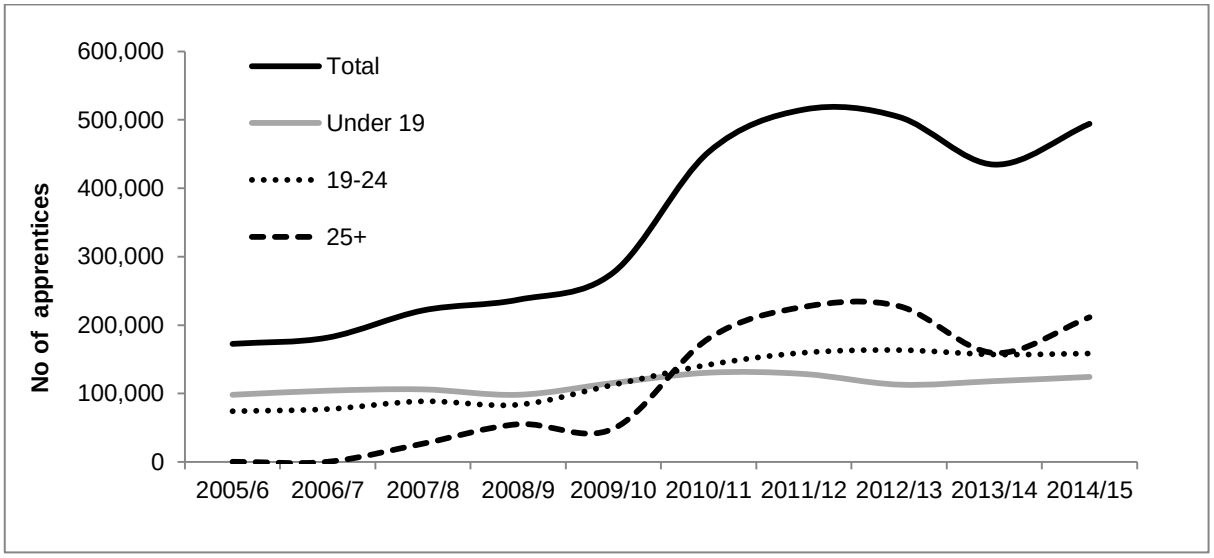
Source: Cedefop, *Changing nature of VET*, national case studies.

The examples illustrate the way in which cumulative change, in response to changes taking place in the external labour market, can have a substantial impact on VET systems.

5.5. VET participation and preference for work-based learning

There is a policy preference in many countries for workplace based learning. This stems partly from the view that the involvement of the employer, almost by definition, ensures that the training delivered is related to employer demand. It is also more likely to give access to key technologies and work practices in a way that a vocational school might find more difficult. But many countries have struggled to increase participation levels in workplace based learning in IVET. This can relate to the structure and regulation of national labour markets. In the German labour market there is a degree of wage compression resulting from collective bargaining which makes it more worthwhile for the employer to train workers than to leave them unskilled. Because collective bargaining establishes worker wage rates, it is difficult for employers that do not train to recruit the former apprentices of those companies that do, so there are incentives in place to train people. In contrast, in a relatively unregulated labour market such as that found in UK-England, the amount of risk faced by the employer in training an apprentice is much greater; without the State offsetting that risk through increased funding, employers will tend to invest less in training apprentices. An employer who trains someone, such as an apprentice, is at risk of losing them to another employer (other things being equal) because the non-training employer can pay a higher wage having not borne the training costs. It is certainly the case that increasing participation rates in apprenticeships in UK-England, especially among young people, has been an uphill policy struggle almost from the time Modern apprenticeships were first introduced (Figure **30**).

Figure 30. **Apprenticeship starts in UK-England**



Source: Skills Funding Agency (2016).

Employer demand for apprenticeships is largely driven by their current and future demand for skilled labour. In the Netherlands there are two tracks in the VET system:

(a) school-based training (*Beroepsopleidende Leerweg,* BOL) where students typically spend four days a week at a VET school and one day at an employer on a work placement;

(b) work-based training (*Beroepsbegleidende Leerweg,* BBL) where students typically spend four days a week on work placement and one day at VET school, and have an employment contract.

During periods of weak aggregate demand in the labour market, the numbers entering the BOL generally increases; during relatively strong periods of growth employer demand for the BBL increases. Despite the policy preference for workplace based training – especially in the guise of apprenticeships – demand for it from employers is sometimes relatively weak. However, it is not just the economic cycle that influences demand for workplace training. The availability of skilled labour has been boosted through immigration. In many instances the availability of skills in the external labour market negates, other things being equal, the employer's need to train. The case of Norway illustrates this (Box 9).

In some respects, the role of immigration, especially where the incomers are relatively highly skilled, is a supply-side shock that has the capacity to dampen employer demand for IVET.

Box 9. **Apprenticeship challenges in Norway**

Apprenticeship as a training model receives widespread political support in Norway, but is challenged by external pressures, such as the supply of relatively low cost labour resulting from immigration, and 'academisation' tendencies in society following the substantial expansion of tertiary education. These external pressures affect the VET system in different ways. First, since EU enlargement in 2004 and 2007, Norway has experienced a large increase in labour immigration, particularly from Poland and the Baltic States, leading to changes in the conditions for VET, notably within the building and construction sector. Increasingly, international labour markets are believed to affect employer willingness to invest in apprenticeship training, due to easy access to cheap foreign labour, which presumably affects the degree to which young people perceive the vocational education system as an attractive and suitable platform for career progression. Second, the development in which higher education credentials are ascribed higher value in society implies a potential weakening of the attractiveness of VET.

Source: Cedefop, *Changing nature of VET*, national case studies.

There are other factors at play. In Germany, the demand for apprenticeship from employers has decreased constantly in recent years. Employers in 2017 are no longer engaged in apprenticeships the way they were 10 years before. This puts pressure on the VET system *vis-à-vis* the Vocational Education and Training Act since the supply of apprenticeship positions is prerequisite to the functioning of the entire VET system. Currently around 40% of German employers provide apprenticeship places. Of those that do not, these have been categorised, with respect to their participation in apprenticeships, as (Mohr et al., 2015):

(a) those committed to the apprenticeship model, but experiencing difficulty finding applicants who have the qualities that the employer is looking for in an apprentice;
(b) those that stress that there is no need for internally skilled staff. They prefer to recruit skilled workers from the external labour market;
(c) the cost-benefits optimisers that place emphasis on the on the costs and benefits of apprenticeship training.

Even within the German system there is an element of employer behaviour that is predicated on the cost-benefit of engaging in apprenticeships.

There is a sense in which the traditional employers of apprentices have declining demand for apprentices as a consequence of changes in the sectoral and occupational structure of employment (as with arguments about task-based technical change and its impact on the skill structure). In Norway, the apprenticeship scheme has struggled to gain traction in the service sector where the idea of an apprenticeship has little tradition. Data are available for three categories of trade: craft and craft-oriented trades, industrial and industry-related

trades, and other trades, or new trades within sectors previously not included under the law on vocational education. The data show that the trades/crafts and industry account for the most significant share. Carpentry, hairdressing and construction have contributed strongly, while the smaller, traditional crafts have declined (Høst et al., 2008a, 2008b). The new trades that emerged in the service sector in the wake of Reform 94 have not been able to gain sufficient foothold.

Workplace based learning – particularly apprenticeships – has gained prominence in policy discussions over recent years (as with the *New skills agenda* and the European alliance for apprenticeships). The evidence points to this type of VET having the potential to confer substantial benefits on employers and would-be apprentices/learners, and there have been policy initiatives across Europe – including pan-European ones – designed to promote its take-up. But, as the evidence above indicates, persuading employers to provide apprenticeships can involve a number of challenges that stem from the overall level of aggregate demand from employers for the types of skill that apprenticeships deliver; and the relative cost-benefit of using apprenticeships instead of something else.

5.6. Attractiveness, standards, and skills matching

Having a VET system that is attractive to employers and learners is important. If VET is not attractive to employers and learners, it is unlikely to satisfy its societal and economic objectives; it must meet both current and future skill needs of employers and individuals. One of the major shifts in the early 1990s was the move to a competence based model of VET provision. This approach, allied to professions/occupations, potentially creates a tension between providing training that is related to one particular profession and makes the trainee/apprentice ready to work in that profession, and providing training that is less occupation-specific but provides increased opportunity for mobility. The latter approach has a stronger focus on transversal skills and career adaptability (the ability to apply your skills, knowledge and understanding in a variety of contexts). Such an approach also provides a degree of protection from future economic change.

A potential outcome of allowing employers to have a central role in design is that it could lead to a proliferation of fairly narrow occupational standards. Such standards may not provide the breadth of learning that will afford a degree of protection to the learner and/or the employer from the forces that lead to skills obsolescence (for the learner) and skills shortages (for the employer). Some employers in standard-setting bodies may recognise the importance of the development of transferable skills, but they may also be concerned that this could

increase the likelihood that too many learners choose another career direction rather than staying in the occupation for which they initially trained.

One of the attractions for employers of providing apprenticeships is the degree of influence they have over the training delivered. Although there are curricula to be followed, while the apprentice is in the workplace the employer has a degree of flexibility in deciding how skills are learned and used in practice. This might be regarded as an essential ingredient that will ensure an apprenticeship is tightly tied to the demand for skills in the labour market. It then relates to a wider set of issues about the extent to which the social partners – particularly employers – are engaged in design and delivery of VET.

There are pressures in different directions on this. In UK-England, employers have been granted increased influence over apprenticeship standards (see Box 10) and the risk here is that the occupational standards developed are both numerous and narrow. At the same time, away from apprenticeship and among vocational qualifications with many more participants, the government is seeking to simplify the system into a small number of 'technical education routes' aimed at 16 to 18 year-olds as attractive alternatives to the long-established general 'advanced' level qualifications. The general European trend, as highlighted by countries such as the Netherlands and Finland is to reduce the number of qualifications. There has been a twin-track policy of simplifying the VET system to make it more transparent, by reducing the number of qualifications on offer, while increasing the subject breadth of those that remain, to increase their attractiveness to young people. There is sometimes more emphasis on transversal skills. In Finland, the inclusion of optional modules is important to allow the tailoring of broad qualifications to local and sub-sectoral needs.

Box 10. **Employer influence and shared investment in UK-England**

From May 2017 in UK-England there has been a major shake-up in the way VET is designed and funded. Large employers – with a payroll over GBP 3 million a year – are expected to pay the apprenticeship levy, and those who fall outside scope of the levy are expected to share investment in VET (meeting around 10% of the cost of training delivered outside the workplace). In return, employers have been granted more say in the design of the occupational standards that determine the content of a specific apprenticeship. Subject to meeting certain criteria, an employer or group of employers can design an apprenticeship standard for an occupation where one does not already exist. This is seen as placing the apprenticeship at the heart of the VET system and ensuring that it is demand led.

Source: Cedefop, *Changing nature of VET*, national case studies.

The example of UK-England contrasts with that of other countries – such as Finland, the Netherlands and Norway – where the trend is towards broader standards with a emphasis on the inclusion of transversal skills. This is has sometimes been achieved with less engagement of employers or social partners more generally (Box 11).

Box 11. **Broadening occupational standards in Norway**

A key reform in Norwegian vocational education was the Knowledge promotion reform of 2006. Following this, the VET system offered vocational training in fewer trades with the consequence that many vocational students had broader and less trade-specific vocational education and training during the first two years of their training in vocational school (the final two years being based with the employer). Another significant change was the introduction of the school subject called the 'in-depth study project', implemented in the two school-based years of vocational education. Critics had warned against the negative consequences of abstract and theoretical courses at the expense of practical training. The distance between the subjects taught in school and the trades and occupations might have negative effects on student motivation as well as on skills development. An important aim of the in-depth study project was to introduce VET students to authentic work methods and tasks within relevant trades and occupations at an early stage of their training, partly to counteract the presumed negative effects of broad vocational programmes (Olsen et al., 2015). Currently, several trades are clustered together in eight vocational programmes, branching out to 52 second-year courses. The first school-based year in a vocational programme has a broad vocational content with students prepared, potentially, for many different trades within the same programme. The second year involves further specification yet usually still encompasses several trades (Bråthen and Fløtten, 2017). Recent research shows that the content and learning provided in the placement periods is arbitrary and non-standardised, owing to decentralised school responsibility (Nyen and Tønder, 2012).

Source: Cedefop*, Changing nature of VET*, national case studies.

In the Netherlands there has been a similar trend towards reducing the number of VET qualifications/standards, but with more flexibility in IVET delivery. While there are fewer standards to work towards, there is greater scope for mixing and matching particular modules or elements from other courses by providing for core and optional elements in the delivery of courses.

The changes in the Netherlands and Norway have been undertaken with reduced involvement of employers; more influence seems to lie with vocational training schools and/or regional agencies. There is a shift from relying on employers (or their representative organisations) to vocational schools and, in some cases, regional agencies, to determine how the skills system should meet local labour market needs. Employers may be represented on regional agencies but they are not the main drivers of the system in the way they might have been

in the past. The example of France illustrates the way in which regionalisation is designed to bring about more alignment between IVET and the labour market (Box 12).

Box 12. **Regionalisation in France**

A process of decentralisation has recently given more responsibilities to the regional level in IVET as well as CVET. The law of 2014 gives regions authority over vocational training, career advice and coordinating job support policies: managing training policies, implementation of VET including apprenticeships for young people and adults, and supporting small and medium-size enterprises in their territory. This new law also created regional public training services and regional public guidance services. The dynamics of this decentralisation is an essential element of VET strategy that contributes to more effective public action by bringing the decision-making and management bodies close to local realities.

Source: Cedefop, *Changing nature of VET*, national case studies.

A general divergence is beginning between:

(a) providing the employer with increased influence in return for meeting more of the cost of the training delivered by publicly funded IVET systems (UK-England) with the risk that occupational standards might be narrow;
(b) developing broader occupational standards (more occupations grouped together) in response to being better able to support occupational mobility and future skill needs (Norway); at the same time, providing a degree of flexibility with respect to the mixing and matching of modules so that the learner can individualise their training to some extent (the Netherlands). The risk here is that the IVET system proves to be less attractive to employers, especially in relation to offering apprenticeships.

The above are relatively recent developments. The impact of the trade-offs, between delivering what employers want now and a longer-term view about what the economy might need in the future, is difficult to discern.

5.7. Higher education access – Including adults

Many countries are facing a declining youth cohort (see Chapter 6) which increases the competition between the general and VET streams for students. There are two clear developments:

(a) providing a pathway from VET at upper secondary level to higher education;
(b) increasing levels of adult/lifelong learning.

The idea that VET is in some way a dead end, providing few opportunities to continue study beyond the end of upper secondary education, is seen by policy-makers as a disincentive for young people to take the VET pathway. However, it should not be assumed that all young people want the opportunity for further study since they may select IVET precisely because it offers early labour market entry.

There should be differentiation between access for upper secondary VET graduates to general and to vocational higher education. Dead ends to general higher education were eliminated from most systems some years before through bridging courses and double qualifying pathways (McCoshan et al., 2008), despite well-known objections from many universities. At the same time, as was pointed out a decade ago, where pathways to general higher education have been available, they have tended to remain underutilised, perhaps because of the extra effort involved in double qualifying pathways and the extra effort and delayed access to higher education involved in bridging courses. A further barrier has been the different pedagogies and learning environments, which have been a challenge to VET graduates, with consequent high rates of early leaving. The challenge in respect of VET graduate access to general higher education is less about bringing pathways into existence and more ensuring that they are well promoted and that upper secondary VET graduates are well supported so that they remain in the programmes.

Most countries over recent decades have been seeking to develop post-secondary level VET. France is pertinent in this regard with its creation of the bac pro and harmonising the time taken to complete the *baccalauréat professionnel* with its counterpart in the general stream (Box **13**). Such developments are comparatively new, reflecting the needs of the economy and the labour market for higher level VET skills. It remains to be seen how popular such developments will be and whether they will suffer from the same issues of underutilisation and early leaving traditionally experienced by VET students in general higher education.

France is not the only country to have developed such an approach, though it may have been ahead in the availability of apprenticeships at higher education level. Finland has historically had a system that gave access to higher education through the VET pathway and other countries have initiatives designed to grant vocational students at EQF level 3 access to higher education. In UK-England, for example, apprenticeships have been developed at EQF levels 4 to 8 though it is not always clear whether this, in practice, allows people to continue their studies to the higher level via apprenticeship, or whether continuing professional development courses are being rebadged as apprenticeships. In the financial

sector, for example, the level 4 course in accountancy largely subsumed an existing professional qualification (Gambin and Hogarth, 2016b).

Box 13. **Increasing access to higher education through VET in France**

The main changes to have an impact on VET's image and attractiveness in France over recent years were: the creation of the vocational baccalauréat (*baccalauréat professionnel*) in 1985; the possibility to take higher education exams through apprenticeships starting in the 1990s; and, more recently, the 2009 decision to set the duration of the *baccalauréat professionnel* to three years (instead of four years as before) to make it the same as the technological and the general baccalauréat.

The decision to create the vocational baccalauréat (*baccalauréat professionnel*) increased considerably the attractiveness of upper secondary VET: the upper secondary vocational pathway could now lead to certification at level EQF4 or higher. It opened the possibility to go on to higher education, mainly through two types of two-year post-baccalauréat institution: the *sections de technicien supérieur* (STS) (post-baccalauréat classes in *lycées généraux et technologiques* (LEGT) preparing for a *Brevet de Technicien Supérieur* (BTS); and the *Instituts Universitaires de Technologie* (IUT) institutions which are within universities and prepare for a *Diplôme Universitaire de Technologie* (DUT). Both of these are at level EQF5 and are increasingly followed by a supplementary year of training leading to a *licence professionnelle* (professional bachelor) which is a qualification at level EQF6.

Source: Cedefop*, Changing nature of VET*, national case studies.

The provision of VET in higher education – especially where it is delivering courses that may have previously been delivered under the rubric of gaining a professional certificate – demonstrates the blurring of the boundary between IVET and CVET. The debate about IVET is often framed by one about the transition from school to work. It is clear that the boundary between IVET and CVET is breaking down, with various IVET programmes being amendable to reskilling individuals at risk of skills obsolescence. By giving IVET providers a degree of autonomy with respect to what is delivered, there is potentially more scope to meet the needs of adult learners. In some countries, such as UK-England, IVET programmes such as apprenticeships have always been open to adults; much of the growth in participation in this form of training has been due to adults participating rather than young people. In Figure 30, above, showing the number of apprentice starts by age; it is notable that much of the growth in apprenticeships has taken place among those over 25. It is also apparent in countries such as Finland that apprentices are often relatively old.

5.8. Change in the former Soviet bloc countries

Discussion has concentrated on countries outside the former Soviet bloc but Estonia and Poland are examples of countries that had to make the transition from centrally planned economies to liberal market ones and, in doing so, transform their VET systems. Estonia is an example of a country that developed its VET system in the post-communist period so that it responded to labour market demand, undertaking multi-stage reform. During the 1990s the VET infrastructure fell into disrepair as it served the needs of an economy that disappeared with the collapse of the Soviet Union. By 2000, however, it had developed professional standards via a process of social partnership and, with assistance from EU-PHARE, had begun to develop a VET system that was responsive to the demands of the labour market. By 2004/5 national VET curricula had been developed that corresponded to professional/occupational standards. The system eventually created is highly centralised and regulated.

That process can be contrasted with Poland where, during the communist period, vocational schools were divided into three types depending on the level of learning they delivered:

(a) basic vocational schools;
(b) vocational education schools;
(c) technical colleges.

Basic vocational schools were the most commonly chosen at the time, with about 55% of all primary school graduates. For most, this was their last level of education. In the 1970s the first public criticism of the VET system were aired. A report suggested that vocational schools were second rate. Most of the graduates went straight to work with no prospect of further study, and the courses offered were narrow, used outdated methods and equipment, and provided little or no basis for continued study. With the emergence into a liberal market economy, the VET system needed to be completely rebuilt. In 1991, the Education System Act was passed – it is still valid today though it has been amended several times – but it treated VET marginally. For the most part there was not much interest in VET at this time. The number of students decreased, many VET schools were abolished, and the remaining ones, due to their underfunding, offered a low quality of service.

A key change in the Education System in Poland was the *Handké* reform in 1998. This led to the introduction of the lower secondary school ‘gymnasium’ as a new type of school. The decision was made to reduce the duration of primary school education to six years, after which pupils would continue their education in secondary school (gymnasium) for three years; only on completion of this cycle

would a decision be made about whether they would continue in the general track (specialised lyceum) or enter a two-year cycle of education in vocational school. In the period following the reforms there was a feeling that the VET system had failed to flourish; it was still very much a second choice for students. After 2008, and encouraged by EU regulations, the aim was to develop a more coherent VET system. The 2012 vocational education reform focused on increasing the attractiveness of VET and adjusting it to the needs of the labour market. The reforms introduced in 2012/13 included a learning-outcomes-based curriculum, a new formula for external assessment, new procedures for validating non-formal and informal learning, and workplace based VET. The reforms also led to an integrated qualification system. In 2016 the Polish qualifications framework (PQF) came into being, which means that qualifications in formal and non-formal education will be assigned to designated PQF levels. The integrated qualifications register was launched in July 2016. By extending the possibility to accumulate and transfer learning outcomes achieved in various contexts, the new VET system allows for greater flexibility in obtaining further qualifications and makes learning pathways more flexible (European Commission, 2016c).

Both Poland and Estonia have quickly had to come to face the same challenges as other countries in the EU in making VET relevant to the needs of the economy and ensuring that sufficient people participate in it. The pressures faced by these countries are perhaps exacerbated by demographic change (high levels of emigration) but they are still the same as their western counterparts. What is readily apparent is the important role that the EU has played in bringing their VET systems up to speed. The example for Poland provides clear evidence of this development (Box 14).

Box 14. **EU support to VET development in Poland**

The EU has played an important role in driving change in the VET system in Poland. Resolutions by the European Commission in 2004 ([14]) and 2009 ([15]) obliged EU countries to develop a national qualifications framework on the basis of the EQF (European Commission et al., 2014). As of 2016 this is in place along with a competence-based approach to completing a vocational qualification. There are signs that the VET system has become more flexible over time. There is a registry of professions, with VET qualifications designed to grant entry to these professions. The registry lists the qualifications necessary to gain access, with the curriculum for that qualification increasingly being drawn up with the involvement of industry (for example, via sector skills councils). With the introduction of a core VET curriculum, there is more autonomy for vocational schools (and employers) to determine the skills, competences, and knowledge to be delivered.

Source: Cedefop, *Changing nature of VET*, national case studies.

5.9. Conclusion

Over the past three decades VET has become an integrated part of the formal education and qualification system in many EU countries. There have also been concerted efforts to increase participation rates and ensure that the VET system was increasingly demand-led. From the 1990s onwards IVET became competence-based, with the associated certification of those competences integrated into national qualifications frameworks, increasing transparency in the competence based VET system.

Prior to integration of VET into formal education there tended to be a fragmented, uncoordinated industry-led system in place; this is perhaps less so in Germany than in the other countries selected. The first step was creating a formal VET system that met the needs of industry and learners both currently and in the future. The latter is important given that economies were experiencing

([14]) Council of the European Union (2004). *Draft resolution of the Council and of the representatives of the Member States meeting within the Council on strengthening policies, systems and practices in the field of guidance throughout life in Europe.* Brussels, 18 May 2004, No 8448/04, EDUC 89, SOC 179. http://register.consilium.europa.eu/doc/srv?l=EN&f=ST%209286%202004%20INIT [accessed 4.5.2018].

([15]) Council of the European Union (2009). Council conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training (ET2020). Official Journal of the European Union, C 119, pp. 2-6. http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52009XG0528(01)&from=EN [accessed 4.5.2018].

substantial change because of external factors causing structural changes in employment.

The changes introduced in the 1980s and 1990s could be seen as a major development in the provision of VET in Europe: they brought today's system into being. Incremental changes since then have cumulatively transformed VET provision. This is seen in the tension between, on the one hand, making sure the VET system is attractive to employers and would-be learners and, on the other, ensuring that it meets the wider societal and economic needs of a country both now and in the future. There has been a continuing struggle in some countries to convince young people that VET offers them the opportunity to engage in learning with relatively good employment prospects; there is a continuing preference for the general stream among young people. The VET system is typically mandated not only to provide high quality training that the economy needs, but also to assist those who may be struggling to make the transition from school to work or return to employment, hence the association with disadvantage. However, countries have worked hard to overcome this perception and to drive up participation levels.

As well as making the VET system attractive to employers and individuals by emphasising its direct links to the world of work (via workplace-based learning), there is also a need to ensure that it can accommodate change. This has caused, in some countries, a reduction in the number of occupations/trades available for training; there has been a merging of standards so that they cover a broader range. While this might reduce the attractiveness of VET to employers, as there is a less of a one-to-one match between training and jobs in the workplace, some offset has occurred through increasing flexibility in provision. There are sometimes core and optional elements of a programme, enabling learners, via the selection of options, to ensure their individual skill needs are met. Whether or not the learner chooses an appropriate mix, however that might be defined, is dependent on the advice and guidance available. Most countries have invested in improving skills anticipation over the recent past, highlighting the tension policy-makers have had to address in balancing a VET system attractive to learners and employers over the short term, and one that meets longer term societal and economic needs. Some countries have sought to achieve this through a lesser degree of social partnership, with more State control over the system through devolution of some responsibilities to vocational schools and regional authorities so that local provision meets local need. This is not to say that social partnership has come to an end in VET, more that its role may have become less influential.

Following the incremental change from the 1990s onwards, the next major shock to the system is that of the economic crisis in the late 2000s; this

substantially affected the demand for skills, the capacity of employers to continue to invest in workplace learning, and the funding available to the VET system. This occurred at a point when VET systems were facing pressures of demographic change and the need to meet the skill needs of the new technologies ushered in by Industry 4.0; it created an environment where the challenges have become increasingly complex but sometimes allied to less resource with which to deal with them. This is the subject of Chapter 6.

CHAPTER 6.

Responses to external factors

6.1. Introduction

In Chapter 5 consideration was given to major changes that have affected VET. In some respects, demographic change is a supply-side shock, especially where there are high levels of immigration or emigration. It is analogous in some countries to economic shocks periodically visited on labour markets with consequences for labour supply and demand. In contrast, the introduction of technical change in the workplace can be piecemeal or incremental but, over time, can have substantial impacts on the demand for skills across a wide range of jobs. There is varied talk of industrial revolutions resulting from technical change but, in practice, technologies often enter the workplace in an incremental fashion even if the ultimate effect is radical restructuring of occupational employment structures and the content of jobs. This chapter outlines how VET systems have responded to different types of change.

6.2. Economic change

From the mid-1990s to the mid-2000s was a period of relatively benign economic conditions in the world economy (see Chapter 3 for more details). GDP growth was relatively strong and this manifested itself in employment growth. Conditions for constructing skills policy were fairly stable. In 2007, the world economy experienced a seismic shock unlike any seen before. The impact was described in the following terms by Paul Krugman (2008):

'…it might be more accurate to say that it's like everything we've seen before, all at once: a bursting real estate bubble comparable to what happened in Japan at the end of the 1980s; a wave of bank runs comparable to those of the early 1930s (albeit mainly involving the shadow banking system rather than conventional banks); a liquidity trap in the United States, again reminiscent of Japan; and, most recently, a disruption of international capital flows and a wave of currency crises all too reminiscent of what happened to Asia in the late 1990s'. (Krugman, 2008, p. 15).

While Krugman's analysis emphasises the financial aspects of the crisis, its impact was also felt on output, employment and unemployment. In all of the countries included as case studies the crisis had a dramatic impact on employment, especially in Greece and notably in relation to young people. It also

resulted in employment growth, rather than issues relating directly to human capital, being policy priority. This was especially noticeable in Greece, where the impact of the crisis was felt hardest, but it is evident in the other countries as well. Even if the recession did not affect employment to the extent initially feared in some countries, it had a calamitous effect on youth employment. Even if employers were not laying off workers, the resulting spare capacity in the workplace meant that there was little need to recruit new trainees. And where employees were laid off, there was a glut of experienced workers in the external labour market that meant employers had little need to take on new trainees.

For some countries, the economic crisis brought about a situation where a pressing policy concern was how to appropriate the return on any VET investment; economic conditions were such that, for individuals, the acquisition of additional skills was easier by leaving the country. This was most experienced acutely in Greece where GDP fell by quarter between 2008 and 2014 (Box 15).

Box 15. **Appropriating the returns from VET: the case of Greece**

The challenge facing the VET system – and the education system in general – is to encourage investments in human capital that can be captured by the Greek economy. But there is a preference for people to take the general route through the education system because this gives access to higher education; it this then potentially provides the means to leave the country to work abroad. There is now an emphasis on apprenticeships, with their potential to improve the attractiveness of vocational education to young people. The danger is that economic recovery could be hampered by a lack of skills, which may be a disincentive to investment. It is apparent that the country is investing skills anticipation and this may provide the means to ensure that it is able to match skills supply better to skills demand as the economy begins to grow.

Source: Cedefop, *Changing nature of VET*, national case studies.

As the example of Greece illustrates, the economic crisis exacerbated emigration trends in some countries. This is presented in more detail below in the section on demographic trends; countries with relatively high standards of living and where employment growth was less adversely affected by the crisis became even more of a magnet to those from less economically advantaged countries. In some countries this results in a vicious spiral: the emigration of young, highly skilled people has the effect of lowering participation rates, which leads to tightening of skill supply. This potentially results in skill shortages (over the short-run) which constrains productivity growth that that will allow a country to increase its standards of living so that there is less incentive for the highly skilled to emigrate (as with Estonia, Greece and Poland).

Where the impact of the crisis has had a lasting impact is in relation to public expenditure on VET in some countries. Finland is interesting in this regard because it has experienced a particularly sharp economic cycle over the past 30 or so years (Box 16). There is a constant worry that where the VET system experiences cuts in expenditure, they are not subsequently reinstated when the economy begins to grow. Each economic crisis ratchets down VET provision.

Box 16. **Impact of the cycle on VET provision in Finland**

The macroeconomic environment is mostly visible in VET through public expenditure. Because of the depression in the early 1990s, much public funding was cut from all sectors, including secondary education. After the situation started to improve and the economy started growing again, these cuts were never restored. Instead, more funding has been cut and public expenditure is expected to continue decreasing. VET is facing budget cuts of EUR 190 million at the beginning of 2017. The macroeconomic problems may have resulted in a shift in the government's education policy which now emphasises faster graduation and entrance to the labour market. This is meant to tackle costs (shorter time at school means lower costs) and provide more labour supply to increase employment levels. At the VET level, this can be seen in an increase of acquired skills acceptance. The structural changes have affected VET. When there have been massive lay-offs in sectors such as the paper industry or electronics, vocational colleges have needed to adjust. Sometimes the structural changes have taken place over a long time, as with the textile industry, and sometimes they have been more acute, such as when factories have been closed. The VET system has been mainly reactive to the external changes. The major impact has been economic fluctuations, cutting funding in the bad years which has been not restored in the good ones. The results are still visible in less contact teaching and less vocational teaching units.

Source: Cedefop, *Changing nature of VET*, national case studies.

The impact of the crisis on VET was also seen in Greece (Box 17). Italy has suffered a reduction in budgets available at regional level for IVET, leading to closure of some training institutions (sometimes in the more economically deprived areas) and pushed other training institutions to find efficiency savings. In UK-England there has been, in the post-crisis, a reduction in the VET budget such that the government has increasingly asked employers to meet more of the cost of programmes such as apprenticeships (Gambin and Hogarth, 2016c, 2017; Wolf, 2015).

Box 17. **Impact of the crisis on VET expenditure in Greece**

One impact of the crisis has been to reduce the amount of public funding available for VET. Initial vocational education is part of upper secondary education of the Greek education system and vocational schools – EPAL and EPAS – are funded from the State budget. Initial vocational training at post-secondary level, delivered by vocational training institutes (IEKs) and supervised by the Ministry of Education, is funded by the money allocated to the ministry from the national budget as well as by European funds. Although relevant data are not available, the budgetary constraints implemented as a consequence of the economic crisis are likely to have had the impact of significantly reducing public expenditure on VET. This has led to deep concern being expressed by social partners and private companies.

Source: Cedefop, *Changing nature of VET*, national case studies.

The impact of cuts in VET experienced in some countries is essentially that of more needing to be done with less. A number of effects can be observed:

(a) it tends to reinforce the need to ensure that the VET system delivers the skills the country needs. This almost becomes a value-for-money test for many VET systems;
(b) VET schools have fewer resources to invest in the technologies that people need to be trained in if their skills are to be relevant to the labour market, and it can be more difficult to recruit lecturers/trainers in certain subjects because VET schools cannot pay the wages required;
(c) transferring the costs of training away from the State to employers and learners. This can be partly seen in the preference for apprenticeship training where more of the training cost is met by the employer than would be the case if the student remained in a vocational school ([16]);
(d) identifying the means to stimulate skills supply more efficiently, such as focusing more on recognising workers' skills that they have acquired on the job, outside formal training.

Often there are deep-rooted reasons for such changes other than the effects of the economic cycle on public expenditure on VET. For example, in the UK ensuring that the costs and benefits of VET are 'fairly' shared between the employers, learners and the State has been a long standing policy objective. However, the economic cycle can have the impact of accelerating these types of change.

([16]) The extent to which the employer is able to recover the costs of apprenticeship training via the productive contribution of the apprentice in the workplace is somewhat uncertain – see Gambin and Hogarth 2016b, 2015.

6.3. Technical change

Technical change is generally seen as having a positive impact on employment though, it tends to give rise to new forms of employment and associated skill needs (Simon, 1965). Considerations include:

(a) the long-term impact of technical change on the demand for skills;
(b) the contemporary debate about impact of AI, robots, Industry 4.0 and such on employment and skills.

The long-term impact on technical change can be seen in relation to its effect on de-industrialisation ([17]). Some VET systems, such as in Norway and Germany, are based on clearly defined occupational knowledge and skills. In certain service sectors jobs do not have the well-defined occupational background of those typically found in manufacturing, which makes it difficult to define the jobs which leaners/apprentices are being prepared for. As a result, trade certificates in the service industries sometimes have low labour market currency and employers have come to prefer training and recruitment strategies disconnected from the formal VET system. In UK-England, where the apprenticeship system has permeated the service sector, there is debate about whether an EQF level 2 qualification in, for instance, retailing is really equivalent to that of the same level in electrical engineering. The former will be largely completed by undertaking on-the-job training, while the latter will require substantial periods of off-the-job training with completion dependent upon passing an external examination.

The VET system has responded to this challenge of promoting apprenticeships/workplace-based training in 'non-traditional' sectors by trying to strengthen employer engagement in the development of training standards. In this way the training standard gains currency with employers, but this can be an uphill struggle as Box 18 shows.

([17]) Apprenticeships have traditionally been associated with the manufacturing and construction sectors. Productivity gains in manufacturing bring about an overall reduction in employment, so future employment growth is dependent on the service sector. If the aim is to increase participation in apprenticeships, this will inevitably mean boosting the number of apprentices in the service sector.

Box 18. **De-industrialisation and apprenticeship system challenges in Norway**

The share of apprentices compared to young labour market entrants who have other types of qualifications varies greatly across the sectors of the Norwegian labour market. While 99% of young people employed in building and construction are apprentices, in the retail sector apprentices have only a 10% share. Active employer engagement in the development of vocational education and apprenticeships is considered essential in ensuring that apprenticeships remain an important part of training and recruitment policy in Norway. However, within weakly established trades, such as those directed towards the service sector, concerns have been raised about the lack of employer influence.

Source: Cedefop, *Changing nature of VET*, national case studies.

More recently, the debate has tended to regard technical change as having a less benign impact on employment and skills. There has been the debate about robots and the extent to which they will substitute for employment at a rate which outstrips their positive impact on economic growth to create new jobs (Brynjolfsson and McAfee, 2012). The risk here is that robots (essentially an advanced form of automation) reduce the demand for good jobs while leaving humans to undertake relatively low-skilled, low-paid ones (Freeman, 2015): there is a de-skilling effect. This is partly a recasting of the task-based technological change explanation: technological change is seen to have most impact on routine jobs, which do not require their incumbents to respond to outside stimuli, so their jobs can be replaced by technology, which automates the tasks they once carried out (Autor et al., 2003). Goos and Manning (2007) observed that routine jobs, susceptible to being replaced by automation, are typically found in the middle of the occupation structure: administrative and skilled production jobs. Higher-level skilled jobs, which require their incumbents to utilise cognitive skills, cannot be so readily substituted by automation; lower-skilled jobs, such as those found in hospitality, require their incumbents to interact with customers, so these jobs too are not readily substituted by automation. The impact of this is to bring about a hollowing out of the skill/occupational structure that sees a growth in high-skill jobs and low-skill ones, but not much between. This phenomenon appears more apparent in the UK than in other countries (Eurofound, 2016), but is in evidence across all the case study countries. Rather than being seen as a natural consequence of technical change, the hollowing out of the labour market may result from the combination of industrial and employment policy. The implication is that policy-makers have a degree of strategic choice with respect to how they want to develop employment in their countries. The nature of the social contract may make it easier to create relatively low-skill, low-wage jobs in the UK than it would be in, for instance, Germany or the Netherlands. This points to the real and

pressing need to ensure that VET policy – alongside that in other domains – is able to deliver something to benefit economy and society.

Across all countries technical change has created pressures to ensure:

(a) people possess the latest technological skills (related to Industry 4.0);
(b) VET gains traction in emerging service sectors;
(c) a VET infrastructure is in place to deliver skills that value in the labour market;
(d) people are equipped with the skills that will provide them with the means to move job when necessary as a result of structural skills;

Responding to these pressures can result in developing a VET system:

(a) better aligned with the needs of the economy (more demand-driven, but also trying to develop links with skills anticipation systems);
(b) more broad based, with an emphasis on delivering transversal skills;
(c) better able to meet higher level skill needs.

The previous section outlined the way in which all VET systems have been transformed so that they are better able to meet current and future skill needs; this includes improved systems for skills anticipation and the introduction of competence-based VET programmes and qualifications. It was also noted that the way in which the social partners are engaged in the process has changed. In countries such as the Netherlands and Norway, the State seems to have increased control over the VET system (relative to other stakeholders) but, at the same time, has sought to tighten the links between training supply and demand, with individual companies by promoting the workplace learning option.

Box 19. **Promotion of workplace-based learning in the Netherlands**

Although VET in the Netherlands is shaped by collaboration between VET schools and labour market stakeholders, there are major concerns about whether provision is able to align properly with new developments and changing labour market needs. Recent reports stress the importance of strengthening learning at the workplace, in particularly the work-based training pathway (*beroepsbegeleidende Leerweg*, BBL), as a means to bring education providers and companies closer (SER, 2016). This emphasis is a sign that the adjustment of VET programmes does not rely so much on elaborate feedback loops, labour market demand surveys, and systems to forecast future demand, but on more direct forms of feedback through interaction between VET teachers and trainers and companies. This was also the outcome of a discussion between the SER and VET directors in January 2017 (SER, 2017) and illustrated in an increased interest in the idea of 'hybrid-model teachers', who work in their professional field and are engaged in delivering education/training (including VET and WBL) (Dorenbosch et al., 2017).

Source: Cedefop, *Changing nature of VET*, national case studies.

Something similar has been observed in Poland (Box 20).

Box 20. **Vocational schools and fast-changing skill needs in Poland**

While it is important to increase skills supply, it must also be relevant to the needs of the labour market. In the post-communist period the IVET system has not been able to meet the needs of the labour market; this has, in turn, contributed to its lack of attractiveness to young people. There has been a tendency for vocational schools to teach subjects they have the resources to teach rather than what is in demand in the labour market. It has been further noted that vocational schools often do not have either the equipment or the teachers with the knowledge to develop the (new) skills in demand in the labour market. The latest reforms of the VET system look to bring vocational schools and employers closer together, so that employers can share their expertise more in teaching young people.

Source: Cedefop, *Changing nature of VET*, national studies.

Promoting the workplace-based option seems more likely to deliver skills in line with the needs of employers. Delivering skills in the workplace ensure that they are those the employer has a demand for, otherwise why would the employer deliver them? There is the danger that the balance between delivering skills needed now and preparing the student or trainee for the future is tipped in favour of the former. The extent to which employers have influence over the VET system is important: countries such as the Netherlands seems to have moved away from direct employer influence over the content and structure of VET, while in countries such as UK-England the employer is gaining influence.

Workplace-based training develops links between vocational schools and employers which ensure that the schools are able to gain access to the latest technologies and that their students are able to benefit from the experience of skilled workers within companies. The climate of austerity has meant that there is sometimes less funding available for vocational schools to purchase new technologies or offer wages sufficiently high to attract trainers with the skills and experiences required. In Finland and the UK on-the-job training of VET students is seen as not only the best way to ensure that students become familiar with the latest costly technologies, but also reflects that this may be the only way in which they will be able to get access to them.

In recognition that technical change brings about a need for more mobility in the labour market, the VET curriculum is becoming more oriented towards delivering transversal skills. This issue was covered extensively in Chapter 5. Transversal skills increasingly encompass digital skills in an effort to prepare people for a fast-changing technological environment. For example, in the Netherlands, the introduction of 21st century skills into the VET curriculum

includes entrepreneurial and digital skills. And new technologies are being embedded in the VET curriculum in other ways. In Finland, as part of the current VET reform, there is a plan to implement new technologies (such as AI and robotics) in vocational education and training. A key element of the reform is to 'digitalise' the VET system by incorporating digital learning platforms and simulators into learning delivered by vocational schools. There are also pilot projects in vocational colleges to explore how to make more use of robotics and big data.

Regardless of whether technical change brings about a hollowing out the labour market, the evidence points to increasing demand for high level skills across Europe. This has been driven, at least in part, by globalisation which, in itself, is a consequence of technical change. Europe has sought to carve out a higher share of high-value activities in the global market. There has been segmentation, with mass production undertaken in relatively low labour cost countries both inside and outside of Europe, and relatively high-value, high-wage activities, such as R&D, design, and the production of prototypes undertaken in western Europe, North America and Japan. There has also been the development of high-value-added services in, for example, financial and business services. These have all created a demand for relatively high-level skills. There have been developments in many countries to allow VET students to progress from upper secondary education to higher education and/or develop a distinct VET track through higher education ([18]). What is perhaps less clear from the data is the extent to which technical change creates a demand for higher level VET skills or a higher demand for higher education graduates (typically from traditional higher education institutions). Countries have a degree of strategic choice in how they manage this state of affairs. Some have made substantial efforts to develop a separate VET track at the higher education level (as in France and the UK), while others have placed more emphasis on allowing people to progress from upper secondary VET to general higher education (Finland). But it is not clear, from the evidence available, whether the economic value of the qualifications the VET system at the higher level confers on participants is any greater or lesser than comparable qualifications delivered by traditional higher education.

The above paints an optimistic picture of the way in which VET systems have responded to technical change, but there are problems. In some case study countries, the VET system has not responded well to the challenge of technical

([18]) In some countries this takes place on a relatively small scale because the VET track through upper secondary school is designed to lead directly to employment at the end of the training.

change. In Italy, for instance, the system continues to focus on the skills needed in the manufacturing sector and SMEs, which are characterised by low R&D investment and a non-strategic approach to innovation. Some national VET systems – such as the Netherlands, the UK, and Poland – have struggled to accommodate the demand for higher level or broader skills in the VET system and meet their commitment to assisting young people with low levels of school achievement ([19]). These students were traditionally steered towards the VET system; as the demand for low level vocational skills is gradually decreasing in some countries or employers demand a wider range of skills, there are fewer opportunities for this group to achieve a qualification and find employment, as in the Netherlands (Box 21). This puts more pressure on vocational schools to meet a wider range of demands.

Box 21. **Meeting student needs: low attainment levels in the Netherlands**

The demand for higher level skills puts a strain on the VET system as it still has a responsibility to provide skills to those people with a lower level of ability, who need the qualifications to make the transition to the labour market. The problem here is that the jobs these people might have gained access to in the past, with level 1 or 2 qualifications, are not as numerous as they once were, and their numbers are expected to decline further. Given the economic developments, graduates need to be able to change professions and sectors, so increasing attention is paid to delivering more transversal competences. The balance between providing technical skills directly related to a specific job and providing more transversal, generic skills has shifted. More emphasis on transversal skills means there is a greater likelihood that skills will remain valid over the long term. This idea was initially articulated in the 1997 SER report which asked questions about how the secondary VET system should deal with increasing flexibility and mobility in the labour market (SER, 1997). It was given prominence in the action plan *Focus on Craftsmanship 2011-15* (*Actieplan: Focus op vakmanschap 2011-15*) (Ministerie van Onderwijs/Cultuur en Wetenschap, 2011); and echoed in the 2015 revision of the qualification structure. Forward looking projections also emphasise the need for transversal competences.

Source: Cedefop, *Changing nature of VET*, national case studies.

The above commentary has concentrated on how VET systems respond to technical change but there are sometimes formidable barriers to the VET system being able to meet the challenges posed by technical change, as the example of Italy illustrates (Box 22). Sometimes those employers which potentially have much to gain from investing in vocational skills are reluctant to engage with the

([19]) It is recognised that these countries deal with these issues differently.

VET system, partly because they are not making the investments in technology that would give rise to a demand for skills.

Box 22. **Skills as a derived demand: the example of Italy**

The major challenge faced by the VET system in Italy is technological change. This is reflected in the high levels of skills mismatch that are widespread across the country. The VET system continues to focus on providing skills for the manufacturing sector, which has a low- to medium-skilled workforce, and a large number of SMEs normally characterised by low R&D investment and a non-strategic approach to innovation. One of the key issues here, in the first instance, is ensuring that the investment in new technologies takes place. It is only then that the VET system can step in and ensure that the skills are available that will optimise the utilisation of new plant, machinery and equipment in the workplace. But the first step is often missing. There is also a wider question of how the VET system needs to adapt so that it can serve wider needs of labour market, including the service sector.

Source: Cedefop, *Changing nature of VET*, national case studies.

A point made in the introductory chapters is worth repeating: skill is a derived demand that emanates from the extent of change taking place. In this case the change is in the technological environment.

6.4. Demographic change

Demographic change poses a number of challenges for VET, especially those related to an ageing population and managing the inflows and outflows resulting from migration. The evidence from the national case studies points to countries experiencing the following challenges, though to different extents:

(a) the need to fill those jobs which people retiring from the labour market will leave. Replacement demands, even in jobs where the overall number of people is expected to decline over the next 10 years, can be high;

(b) being able to equip people with lifelong learning in their later years to prevent their skills becoming obsolete. The skills people acquire in their initial vocational education in their early years is even less likely than in the past to carry them through the labour market to their retirement, particularly as the age of final exit from the labour market is expected to increase;

(c) there are questions about the future financial wellbeing of older people which might induce them to continue working beyond the age at which they become eligible for a State pension. This might place pressure on employment and VET systems to equip people with the skills that will grant

them access to jobs that older people – especially at the upper end of the age distribution of the economically active – are willing to take;

(d) the demand for people to work in jobs that related to the ageing of the population (including health and social care jobs);
(e) being able to maintain a VET infrastructure, especially where the number of entrants to VET is projected to decline;
(f) managing the process of migration;
(g) responding to the fall in the number of young people.

Traditionally the VET system has served the interests of young people making the transition from school to work. In many countries the youth cohort is declining either because of emigration and/or declining birth rates. In some countries the impact of emigration is stark, as in the case of Poland (Box 23).

Box 23. **The disappearing youth cohort in Poland**

In some instances, the impact of demographic change is stark. One of the most formidable challenges facing Polish society – and the education system – is demographic change. The population is declining quickly as a consequence of emigration and a declining birth rate. The scale of demographic change can be seen readily from the Central Statistical Office forecast. The number of people aged under 17 will decrease by 1.2 million in the period to 2040, and by 2050 the population in this age group will be 30% lower than in 2013. Taking the age groups into consideration, the number of people in the range of 19 to 24 will decrease the most.

Source: Cedefop, *Changing nature of VET*, national case studies.

It is not only high rates of emigration that have created problems for the VET system. Even in Germany, with its 'gold standard' dual system, the combination of a declining birth rate and a preference for higher education has resulted in fewer young people entering the VET track.

A consequence of the declining number of young people is increased competition between VET institutions for students and between the general and VET streams for students. In Italy there has been competition for students between upper secondary schools (general education) and VET providers since 2000, when the number of 14 to 15 year-olds reached a critically low level. In recent years the number of students enrolled in three-year certificate regional VET courses has increased, while enrolments in national vocational education have stagnated. If the dwindling numbers of VET graduates is combined with

high replacement demand due to increasing retirements in VET-driven occupations, the consequences for skills shortages might be severe ([20]).

More competition between vocational schools for students, resulting in falling VET enrolments, means less income/revenues for the schools. This begins to threaten the economic viability of some vocational schools and leaves them looking for alternative sources of income. This situation can be exacerbated by policies in some countries where increasing financial responsibility has been placed on training providers to find the means to make their operation viable by being responsive to labour market needs (as in the Netherlands and UK-England). Training providers/vocational schools are developing a market for their services.

Decreasing student numbers has prompted some VET schools/centres to cut down on the variety of courses on offer and, consequently, employ fewer teachers; in some instances schools have closed, especially where they are situated away from major population centres. The following example from Finland is fairly typical of the effect of demographic change (Box 24).

Box 24. **Moving towards economies of scale in Finnish VET**

Finnish geographic and demographic pressures led to the merging of municipalities. In 2007, the government introduced a law that stated that the organisation of vocational education requires a population of 50 000 inhabitants. This led to municipalities founding consortiums to organise VET, since most Finnish municipalities have less than 50 000 inhabitants and even the larger ones typically collaborate with smaller municipalities around them. This led to the closing of many VET units across the country to save costs.

Source: Cedefop, *Changing nature of VET*, national case studies.

This might have the effect of making the vocational choice less attractive and, in doing so, undermine one of the major thrusts of VET policy over the past few decades. There has, however, been a degree of innovation. By establishing

([20]) A more detailed analysis of the trends in VET was carried out under the project's theme on the role of traditional VET at upper secondary level, based on the use of national statistics. It reveals different country patterns: VET enrolment rates have been increasing in both general and vocational education at the upper secondary level (France, the Netherlands, Sweden and United Kingdom); increasing in the vocational but not general stream (Spain and Cyprus); there has been a decline in both vocational and general (Bulgaria, Greece, Estonia, Latvia, Lithuania, Poland and Romania); and there has been a decrease in the vocational but an increase in the general stream (Denmark, Italy, Hungary and Austria). There are several countries where participation rates in VET are in decline.

closer links with employers, vocational schools have been able to circumvent some of the problems falling school rolls and reduced income might otherwise lead to: employees in local companies can become trainers and the companies can provide access to the technologies that the vocational school cannot afford.

But with falling school rolls, it has become important for vocational schools to find a new market, as seen in the example from the Netherlands (Box 25).

Box 25. **Expanding the supply of would-be VET students in the Netherlands**

Student numbers in secondary VET have been declining since 2009: partly because of demographic change and partly because more young people study in higher education. The government is currently investigating how to introduce a demand-driven financing of VET providers. The VET system – and the policies supporting the system – understands the implications for participation levels of demographic developments in the Netherlands. Each year reference-projections (*referentieramingen*) are produced by the Ministry of Education, Culture and Science (*Min. Onderwijs, Cultuur en Wetenschap*, OCW) to estimate the number of participants by sector. One of the key indicators used is demographic change. It is projected that by 2029 the number of enrolled students will have dropped to around 410 000 from the current 480 000, far below the number in 1995. In response, policy discussions are considering establishing incentives for adults to enter the VET system, to mitigate any potential future labour shortages and skills mismatches. VET centres are offering more flexible delivery and modular courses to make VET more attractive to adult learners.

The formal VET system is not a key player in the provision of learning linked to continuous upskilling and reskilling: this is predominantly delivered by private providers. Should the formal VET system fail to fully engage with the increasing emphasis on lifelong learning, its relevance to the labour market might be further questioned.

Source: Cedefop, *Changing nature of VET*, national case studies.

As the example from the Netherlands demonstrates, some VET schools have responded to falling student numbers by focusing on CVET and broadening their offer to adult learners (individuals and companies) ([21]). But this is not an easy solution since VET schools trying to enter the lifelong learning market face severe competition from private providers.

([21]) This is taken up in more detail in the project's theme on traditional VET at upper secondary level.

Box 26. **Opening the VET system to adults through EU funds in Estonia**

Successive cohorts of younger people have become smaller in Estonia but the number of IVET students has remained stable since 2007, indicating a growing share of adult students. The proportion of students aged 25 + has increased from 14% in 2007 to 34% at present. This has been partly due to financial support from European Union: a large share of EU funds in Estonia has been dedicated to improving 'human resources', in various forms of training. Formal VET institutions offer CVET courses at no or low costs to unemployed and inactive adults, many of whom are referred to the courses by the public employment service.

Source: Cedefop, *Changing nature of VET*, national case studies.

6.4.1. Migration and demand for VET

The impact of migration on the demand for VET is substantial. As the example above Poland demonstrates, emigration has resulted in the exit of many skilled workers to elsewhere in the EU; because many of those emigrating are young, it has an overall impact on the age structure of the population and the demand for VET. Poland has responded by recruiting people from outside the EU (such as Ukraine) whose skills need to be validated in some way. But evidence suggests that high levels of emigration of young skilled workers can result in a tightening of the labour market. The consequent skill shortages may constrain growth, which has been relatively high in Poland over recent years in comparison with the rest of the EU. The room the VET system has for manoeuvre in this scenario is severely constricted.

Immigration also has an impact on VET. In the short-run, it increases the supply of skills which has implications for employer demand for VET, as the example of Norway illustrates (Box 27).

The immigration and integration of refugees in Germany is increasingly viewed as a policy option that might help solve skills shortages, even if this has posed substantial challenge to the authorities in validating the skills of refugees. In the UK, the immigration of young skilled workers has eased many of the skills shortages that would otherwise affect the labour market and VET system. However, employers have been accused of not investing in training, because a skilled migrant workforce is easily available to them (the construction and built environment sector is an example).

Box 27. **The impact of immigration on the VET system in Norway**

Net migration is predicted to fall from the current 40 000 to 50 000 a year. In the main projection, net migration will stabilise at around 15 000 to 20 000 individuals a year from 2040 onwards. An increased flow of immigrants might pose a strain on the Norwegian welfare system, so policy-makers are keen to integrate immigrants rapidly into the labour market. Recent measures have included piloting modularisation within the VET system, to speed up the qualification route by which immigrants access the labour market. Modularisation requires vocational competence to be divided into smaller components, where immigrants may obtain a qualification after completing each module. Through this, the government aims to create a more flexible adult learning system. It remains to be seen how the current VET system, and employers, respond to such modularisation efforts. Labour migration is believed to have had an impact on the VET system, particularly within labour market sectors such as building and construction. In a high labour-cost country such as Norway, the consequences of opening up international labour markets in the wake of EU-expansion, was to see an influx of labour migrants willing to work for lower wages compared with Norwegian workers.

Source: Cedefop, *Changing nature of VET*, national case studies.

6.5. Conclusion and summary

Table 2 provides a summary of the main challenges posed by various external factors and how countries have responded to them. The challenges facing VET systems resulting from these changes are formidable: maintaining a supply of VET allied to the needs of the labour market during a period where the configuration of skills is more complex (supplying skills companies need but also skills that will protect learners from future economic change), and the resources to deliver those skills have become squeezed for a variety of reasons (the continuing impact of austerity, demographic change increasing competition between different kinds of education providers). The national case studies indicate that countries have been inventive in developing responses, but the challenges are formidable and will continue to be experienced, at least over the short to medium term.

Table 2. **Responding to the challenges of economic, demographic and technical change**

	Challenge	Response
Economic cycle	In some countries the economic cycle has been sharp over recent years and the after effects of the economic crisis is still being felt in many countries (e.g. less public funding available for VET). The emphasis given to WBL means that it can be vulnerable to the economic cycle (because of its impact on employer demand for skills and labour).	In some countries there is less reliance on WBL with school-based courses available which helps even out cyclical effects. There is a more general expectation that ensuring the skills supply system is tied to employer demand may ameliorate some cyclical effects.
Demographic change	Securing sufficient students to teach in competition with the general stream, especially so where the number of young people is in sometimes sharp decline	Finding new sources of students/learners. The demographic challenge results in a need to find new sources of skills. Accreditation of existing skills has assumed greater importance in many countries, as has the accreditation of the skills of migrants. Opening up VET systems to train adults is also important in countries such as Finland, Norway, and the UK.
Technological change	Ensuring that the system can be responsive to the changes resulting from technological change with respect to both mitigating the impact of skills obsolescence and ensuring that the demand for new skills in new jobs is met	Important here is the role of skill anticipation systems where the skills system is able to respond flexibly to emerging/foreseen skill demands in a timely fashion
	Ensuring that those employed in vocational schools possess the technical knowledge and have access to the latest technologies so that the teaching they deliver is relevant to the needs of industry;	Reconfiguring the ties between industry and the VET system in specifying competences and curricula. This is sometimes reflected in giving the social partners more say over the content of VET)

Source: *Changing nature of VET*, national case studies.

CHAPTER 7.

Reflections on VET's responsiveness to external conditions

7.1. Introduction

The research questions which the report set out to address were the following:

(a) to what extent are demographic developments influencing the need for and provision of VET?
(b) to what extent are changes in the labour market, notably occupational profiles, influencing VET?
(c) to what extent are changes in VET based on targeted labour market intelligence, for example, on skill needs analysis at national/regional, sectoral or local level)?
(d) to what extent is the role and nature of VET influenced by changing policy priorities at national level?

Before providing an answer to these specific questions, a summary of the main findings from the study is presented. This then forms the basis for answering the questions listed above.

7.2. Change over time

In the early 1990s VET looked very different to how it does today (Table 3). While there were countries that had established VET systems which were well integrated into their education and training systems and had extensive coverage (such as Germany), there were others that were much less advanced in this regard.

Table 3. **VET in the early 1990s compared with today**

	Early 1990s	**Mid 2010s**
Formal part of the education system	Emerging from the fragmented provision of largely industry led training	A coherent system of VET with qualifications accredited under NQFs
Participation levels/attractiveness of VET	Often relatively low (often because continuation into post-compulsory education low)	Still a struggle to increase rates, but seen as a mainstream choice at upper secondary level

	Early 1990s	Mid 2010s
Standard setting	Often in the hands of specific industries who set their own standards	Centralised control of standard setting with some autonomy granted to vocational schools/regional authorities
Competence based approaches	Only just being established	Now an accepted part of the VET system
The prioritisation of workplace-based learning	Recognition that 'apprenticeship' style training is advantageous but nothing more than this	The preferred means of delivering VET in many countries
Skills anticipation	Not much in evidence/piecemeal	Increasing integrated systems being put in place
Accreditation of skills acquired outside formal education system	Not much in evidence	An integral part of the VET system
Higher level VET/progression to higher education	Not much in evidence	Still patchy, but an active area of policy development

Source: Cedefop.

The extent to which the situation in the early 1990s differs to today varies by country, but Table **3** captures some of the key differences between then and now. There has been considerable amount of change in a relatively short period. Over the past 30 or so years there has been the creation of the modern VET system in countries across Europe. This is perhaps less true of Germany among the countries selected for case study as its VET system was more firmly established than that of other countries at the beginning of the 1990s. But it holds true for the other countries. By way of context, Table **4** provides an indication of some of the key events associated with the transformation of VET since the early 1990s. It indicates the activity – much of it at a European level – that has shaped the way in which VET systems are able to anticipate and respond to changes in the demand for skills.

Table 4. **Major VET developments from the 1990s onwards**

Timeline →	**1990**	**1995**	**2000**	**2005**	**2015**
Establishing the VET system	The integration of VET in the education system as a mainstream choice upon completion of lower secondary education				
Major thrust in building participation	Increasing participation levels in VET especially where little previous history of delivering, for example, apprenticeships				
Emphasis on WBL			Increased emphasis on workplace based learning as a relatively effective means of delivering skills		
Increased emphasis on skills matching		Major developments in trying to match skills supply to skills demand better			
Developing a competence based approach		Creating competence based systems			
			Introduction of qualifications frameworks that recognise competence		
				EQF/NQF	
Focus on transversal skill needs				Broadening occupational skill profiles Increased recognition of transversal skills (especially digital ones in the context of Industry 4.0) – e.g. the agreement between MS on key competences in 2006	
Consolidation of the VET market for training				Austerity affects VET budgets leading to some rationalisation of provision	
		Importance of finding ways to accredit skills learning outside of formal learning			

Timeline →					
	1990	1995	2000	2005	2015
				Increased emphasis on CVET within the formal VET system	
Skills supply			Substantial boost to skills supply with accession of nine countries to EU		
				Further boost to skills supply with inflow of refugees to EU	
The push to higher level VET		Push toward provision of VET at higher levels			

Source: Cedefop.

Change over time is also affected by the external environment. From an economic perspective, it was a benign period, over which employment continued to grow, until the global economy fell apart in 2007. It was also a dynamic period with technical change, especially in the form of digital technologies, gathering pace. And with the accession of nine countries to the European Union there was, for Europe as a whole, a massive boost to skills supply, even if the benefits of this were not shared equally across countries (especially those that observed the exodus of their skilled workers to work elsewhere in Europe).

7.3. Challenges and responses

Based on the national case studies, it is possible to identify a set of common challenges facing VET systems in all or most countries:

(a) developing the capacity of the VET system so that it is better able meet the needs of the labour market (to counter the tendency in some countries for vocational schools to teach what they have the means to teach rather than meet the needs of the labour market);
(b) increasing the attractiveness of VET to both would-be vocational students and employers;
(c) securing a sufficient volume of students to teach in competition with the general stream, especially so where the number of young people is sometimes in sharp decline;
(d) ensuring that the system can be responsive to the changes resulting from technological change with respect to both mitigating the impact of skills obsolescence and ensuring that the demand for new skills in new jobs is met;
(e) ensuring that those employed in vocational schools possess the technical knowledge and have access to the latest technologies so that the teaching they deliver is relevant to the needs of industry;
(f) maintaining a balance between provision of broad based education and the demand, from some quarters, for VET to be tightly focused on supplying the skills for a specific, narrowly defined occupation;
(g) being able to do more with less given the pressure on public finances that has reduced, in some countries, funding for IVET.

The common responses – though not necessarily evident in every country – to the various challenges outlined above, include:

(a) substantial investment in skill anticipation systems (sometimes with assistance from the EU);

(b) moving to an outcome/competence-based system of IVET (in some instances shortening the duration of training);
(c) finding new sources of students/learners. The demographic challenge results in a need to find new sources of skills. Accreditation of existing skills has assumed greater importance in many countries, as has the accreditation of the skills of migrants;
(d) the development and utilisation of qualifications frameworks to make the VET system more transparent (often with assistance of the EU in several instances);
(e) reconfiguring the ties between industry and the VET system in specifying competences and curricula. This is sometimes reflected in giving employers (or their representatives more say over the content of VET);
(f) attempts to increase participation in apprenticeship training, as this is seen as a particularly effective means of linking training to the needs of the labour market/employers;
(g) trying to increase the participation of industry/employers in VET so that learners have access to the latest technologies (those typically not available in vocational schools because of their cost);
(h) increasingly extending VET so that it is available at the post-secondary level and/or ensuring that VET at upper secondary level potentially provides the means to continue education at higher levels (either in or outside the VET stream).

The responses set out above are those seen today. Refers back to either Table 3 or Table 4, it is clear that the tools/solutions available to policy-makers were much more limited in the early 1990s.

7.4. Trends over time

The above lists a number of common responses to common factors over the past 20 or 30 years. But adaptation to change is influenced by the respective starting points of countries. For instance, the former Soviet bloc countries had to reinvent their VET systems in the 1990s; in other countries, change was more piecemeal or incremental, even if over the longer term the changes introduced have had the impact of substantially reforming the structure and content of VET provision.

7.4.1. The resilience of VET

VET appears to go in and out of fashion over time. The 2010s has proved to be a period of increased public policy interest in VET. In part this is a response to increasing concerns about the degree of skill mismatch in the economy. But, at

other junctures, there has been much less public policy interest in VET; especially during the 1990s and 2000s when, for some countries, the concern was with boosting participation in higher education (general education). In Germany, for example, the fact that young people would appear to be more interested in entering higher education has meant that VET is no longer regarded in the same way that it was at the beginning of the 1990s. In the UK, where the VET system in the form of apprenticeships is much less developed than in Germany, there was an initial flurry of interest in developing the apprenticeship system in the post 1994 period. But policy interest was always more focused on developing the higher education sector; it was only with the concerns that further increases in higher education participation rates might worsen skill mismatches that interest returned to the VET system, particularly apprenticeships.

7.4.2. The changing nature of VET

IVET today, in many countries, looks very different to how it looked at the beginning of the 1990s in several countries (Table 3). Even if the esteem in which IVET is held is not as high as that in which general/academic education is held, in many countries it has matured over time into a major constituent part of the formal education system. This differs by country, but in some countries VET was not as firmly established a part of the formal education system in the late 1980s and early 1990s as it is today. In part this reflects the elongation of the transition from school to work and increasingly flexible labour markets (and the effect this has upon employer willingness to fund VET). It is likely that developing qualification systems that allow direct comparisons with general education has helped to improve the public's understanding of what the VET system delivers. Even if VET is in a much better place than it was in the early 1990s with respect to the esteem in which it is held, it is still almost uniformly considered a second-best option. Although the situation might have improved, policy-makers think that there is still much to be achieved if the vocational is to have parity of esteem with the general.

7.4.3. Devolution of control

Policy shifts are apparent between centralisation and decentralisation with respect to which institutions are responsible for VET. In some countries – such as the Netherlands, Italy, and the UK – there have been shifts in the extent to which authority and autonomy is granted to the regional and local levels (even to the level of the individual vocational school or college). This is not necessarily unidirectional: even if there are pressures to grants parts of the VET system more autonomy so that it is more responsive to the labour market, there appear to be forces that sometimes operate in the opposite direction (towards centralised

authority over the VET system). In those countries that had, at best, nascent VET systems in the early 1990s, the essence of the system was a top-down process led by central government. In the period since then a degree of responsibility has been granted to regional authorities and/or vocational schools. The role of social partnership in those systems where it was firmly established in the early days (such as the Netherlands or Norway) appears to have been marginalised to some extent.

7.4.4. Broadening the scope of occupational standards

Although there is some evidence of more autonomy with respect to aspects such as standard setting and course design, it is not yet clear whether this results in a broadening or narrowing of the education provided. In making courses/qualifications more relevant to the labour market and, in some cases, granting employers (and their representative organisations) more say over course content, there are, perhaps, initial pressures that lead to a narrowing of the scope of some courses. This is evident mainly in relation to UK-England where employers are centre stage in developing occupational standards for apprenticeships. In other countries the trend would appear to be directed more towards broadening the content of VET by placing much more emphasis on transversal skills. The increased autonomy key institutions in the VET system have acquired over time – and the flexibility this potentially confers on the VET system – means that it is better placed to respond to changes in the labour market and economy. In some countries this potentially allows change to be introduced in curricula relatively quickly, in others less so. There is a tension here between being able to adapt courses speedily, with the attendant risk that the skills they provide quickly become obsolete, and having courses that have relatively broad foundations. The latter have flexibility in accommodating change, but may be inherently more difficult to reform and run the risk of becoming dated over the longer term. The comparison of UK-England with countries such as France and Germany is instructive.

7.4.5. The quality of the VET infrastructure

The nature of recent technological changes (including robots, AI) has resulted in some VET schools struggling to keep pace with the rate of change. They are expected to equip people with skills that are in short supply in the labour market and have access to the latest technologies. Accordingly, they struggle in recruiting staff with the skills required and having access to the latest technologies. The economic climate of austerity and its impact on public finances also means that they have more limited financial resources with which to respond to change, especially technical change. There is a potential vicious circle where

falling levels of investment by the State in the VET infrastructure reduces its attractiveness to employers and would-be learners. To counter this, vocational schools in several countries are moving closer to employers – or are being encouraged to do so: the anticipation is that employers will give access to their technologies and general know-how. This is partly driving the public policy interest in apprenticeships although it is far from being a panacea; the evidence demonstrates that increasing participation in apprenticeships is far from straightforward.

Demographic change, in combination with austerity, has led to some consolidation in VET provision. There is evidence that VET schools have had to look at how to broaden their markets to survive. Increased pressures are placed on the VET system to deliver the skills a country needs while resource provision is becoming tighter, with consequences for the VET infrastructure. This is apparent in some countries more than others and the situation is quite stark in some. In Poland, for example, low fertility rates, high levels of emigration of young people, and low levels of immigration, have resulted in the youth cohort decreasing substantially. The logistics of delivering VET in such circumstances becomes challenging. Even in France with a relatively high fertility rate (though low in historical comparison) coupled with low levels of emigration and high levels of immigration, has experienced only a modest impact on the population VET might serve.

VET providers are increasingly being pushed into a market environment. Their continued survival is dependent on them being able to capture a sufficient market share to make the service they provide sustainable. This should not be overstated as the difference between, for example, the UK and Norway or Finland is substantial in this regard. But the notion of making the VET system responsive to the labour market implies that VET providers need to deliver something the market needs or face the consequences.

7.4.6. Extending VET to higher levels

IVET is often being extended to higher levels, beyond its upper secondary level heartland. This is part of the process of ensuring that VET is attractive to young people (it does not close off access to higher education), but also of meeting the need for vocational skills at higher levels. Where there is less clarity is with respect to whether the VET stream: becomes embedded within existing higher education institutions and structures; develops along its own parallel track; or embodies a mixture of both. There is a degree of policy experimentation in some countries but not necessarily a common trend.

7.4.7. The disappearing boundary between IVET and CVET

CVET has largely been a private investment decision for employers and individuals. Although this situation prevails, it is noticeable that the division between IVET and CVET has become less well-defined over time. This is mainly a consequence of labour markets becoming more flexible and people being expected to spend longer in them before retiring. It creates a need for the skills of the workforce to be replenished over time; such a need is not necessarily met by in-company CVET (especially in more flexible labour markets) but can fulfilled by various IVET programmes. In many respects this stems from the formalisation of CVET with the accreditation of non-formal learning and the use of national qualifications to accredit CVET.

7.5. Patterns of convergence and divergence

The national case studies were selected on the basis of their labour market performance and the relative importance of IVET. The countries fell into the following groups:

(a) weak economic and labour market performance, where IVET is of relatively less importance, to be selected from Italy, Estonia, and Greece;
(b) strong economic and labour market performance, where VET is relatively important, to be selected from Germany, Norway, and the Netherlands;
(c) strong economic and labour market performance, where IVET is or has been relatively less important, France and Poland.

UK-England was also included because it represents a different approach to the provision of VET given its reliance on the use of markets to guide VET policy.

The selection also includes countries that have made the transition from centrally planned to market economies (Estonia and Poland) and those with differing institutional arrangements for the delivery of VET:

(a) those with centralised and coordinated systems of VET provision (Germany, Finland and Norway);
(b) those with decentralised systems for VET policy and delivery (France, Italy and the Netherlands);
(c) those with multiple agency involvement (Greece);
(d) market-driven approach (UK-England).

The key issue is the extent to which the type of system has some bearing on the provision of VET and direction of VET policy travel since the early 1990s.

There is a generally high degree of commonality in the direction of travel. What differs is the relative starting point (the extent to which the VET system was

already established at the start of the 1990s) and the extent to which external shocks in the period between the early 1990s and 2016 have had an impact on the economy and labour market. The impacts are mediated through different institutional settings but the types of change introduced in response to external factors shows are similar. The resemblances, rather than the differences, are the interesting findings.

7.6. Questions and answers

7.6.1. To what extent are demographic developments influencing the need for, and provision of, VET?

The key demographic trends with which national VET systems have had to, and will increasingly need to address relate to:

(a) an ageing population;
(b) increasing longevity;
(c) migration.

Many EU countries face ageing population structures stemming from declining fertility rates. This poses a number of challenges for VET systems:

(a) being able to attract a critical mass of students to take the VET track through the education system. Given the declining youth cohort, there is increased competition from the general stream for students;
(b) being able to meet the skill and training needs of people who are likely to spend many more years in the labour market than their counterparts from a few decades ago, as countries raise the age at which people become eligible for their State pensions;
(c) meeting the skill needs that result from an ageing society, mainly those that relate to caring.

Several initiatives include an emphasis on lifelong learning and blurring the distinction between CVET and IVET. This latter development is important in that many older people may well need to engage in something like a traditional IVET programme to avoid their skills becoming obsolete and avoid entry to unemployment.

In some western European countries immigration has mitigated the problems posed by an ageing population. And because many immigrants are young and of child bearing age, this has – or will have – a positive impact on the size of the potential population of young people who might be persuaded to engage in IVET. While migration has let some IVET systems partially off the hook in responding to the challenges of demographic change, there are implications

for the countries the immigrants are drawn from. Countries such as Poland and Estonia have suffered the emigration of many highly skilled young people, which has accentuated the ageing of the population structure. While these countries have sought to recruit people from third countries (typically those that border the EU), the extent to which this will solve their long-term skill needs is a moot point.

The more profound challenge which VET systems face in countries where the ageing of the population is a particular problem (such as Estonia and Poland) is how to ensure that there is a critical mass of VET provision at a relatively high level. Economic development may be strangled because of problems related to labour supply. A vicious spiral is created where new skills are not in demand because the economic activities that would give rise to them are not taking place because employers have legitimate concerns about labour and skills supply. VET systems have not and cannot respond to this challenge in isolation. In the meantime, young people prefer to invest in general education that provides them entry to higher education and, from there, the possibility of migrating to countries with more dynamic labour markets (as observed in the case of Greece).

7.6.2. To what extent are changes in the labour market, notably occupational profiles, influencing VET?

The impact of the fourth industrial revolution on the skill content of jobs appears to taking place much more quickly than that of the preceding three. This creates uncertainty for VET systems. The way in which that uncertainty is being managed is essentially through broadening the provision of VET programmes:

(a) incorporating more transferable, generic skills within programmes;
(b) reducing the number of courses available (such that the range of occupations covered by any VET programme increases);
(c) increasing flexibility within courses.

Examples have been provided from countries such as Finland and Norway where the number of courses or qualifications on offer has been reduced as the VET system endeavours to deliver provision relevant to both current and future labour market needs. There is also evidence of flexibility with respect to what is delivered within a particular course or programme, such that it is possible to provide a degree of individualisation within programmes designed to meet a particular learner's or employer's needs. There are examples of optional courses being built into programme provision that can be effective in meeting local labour market demand (given that most courses are designed at the national level).

Occupational profiles can be useful in identifying the key skills required in an occupation or group of occupations but they need to be kept up to date. This is becoming increasingly difficult in an environment where new technologies are

transforming the content of existing jobs and leading to the emergence of new jobs. The problems may be partly circumvented by the increasing preference for workplace based training in IVET (either in the form of apprenticeships or other programmes that have a significant amount of training time spent with an employer). If students are placed with the employer they are confronted with changes taking place within their chosen occupation and how they will need to adapt to them. This also provides access to the latest technologies which some VET schools report cannot afford, given cuts to public budgets.

7.6.3. To what extent are changes in VET based on targeted labour market intelligence?

The fluidity in the changing demand for skills in the labour market has drawn increased attention to the need for labour market information and intelligence to be made available to support individuals and employers in making informed decisions about the skills in which they should invest. There is evidence of all countries making significant investments in their skills anticipation systems. In many countries the European Union has played an important role in funding and developing these systems, especially in identifying future skill needs. The aim is to signal where there is current skill demand and how skill demand is likely to develop in the future (including replacement demands).

The importance attached to skills anticipation – especially at the local level, given that this is where most people look to find jobs – partly reflects the increasing uncertainty resulting from rapid developments in the external environment, stemming from technical and demographic change. Some countries have sought to decentralise IVET provision so that there is scope to tailor it to local need. The availability of local skills intelligence is limited in some countries but is circumvented by developing institutions that bring key stakeholders together to consider local skill needs from both short-term and longer-term perspectives. It remains a significant challenge to ensure that labour market intelligence is well integrated into the process of updating and reforming VET in response to the external environment.

7.6.4. To what extent is the role and nature of VET influenced by changing national policy priorities?

The perspective on these questions has been generic, focusing on common trends across countries, but there are country specificities to consider:

(a) countries are at different stages in the development of their VET systems. The former eastern bloc countries have had to reinvent their systems in a relatively short space of time. In doing this they are unencumbered by the past and starting with a clean sheet of paper in some respects. However, as

the case of Poland demonstrates, the extent to which policy-makers have seen VET as a priority has varied over time. In west European countries the tradition of VET provision provides a degree of path dependency. This is not a negative: it is simply a reflection that countries have, over many years, adopted differing approaches to the development of their VET systems – and wider system of employment – that influences approaches to VET reform and their responses to the external environment;

(b) the nature of the social contract. There are differing ideological outlooks that affect the provision of VET and how it responds to the external environment. UK-England is an example where the VET system is primarily seen as meeting an economic need; it is a system which uses market mechanisms to ensure that skill demands are met. Government sees its role as providing labour market intelligence to a wide variety of labour market actors to guide their investments in VET. The public funding system is then used to overcome market failures to ensure that training demand, which might not otherwise be delivered, is met. This simplifies the true state of affairs but serves to illustrate the point. In other countries, there is a more corporatist, coordinated approach to deciding both the content and volume of provision. This can have a major impact on how VET systems respond to the external environment and to deciding the content of training, who should fund it, and how much should be provided;

(c) national economic exigencies. There are various economic factors that need to be considered. Macroeconomic conditions vary between countries, with some experiencing much sharper economic cycles than others. This has implications for VET demand and the capacity of public authorities to fund it. The economic factors that affect countries tend to be common given the degree of inter-connectivity between EU countries, but local conditions can have a significant bearing. The particularly sharp economic cycle that Finland has experienced over recent years has meant that the scale of the challenge to its VET systems and the resources available to deal with it makes it situation different to that of Norway, which has experienced more benign economic conditions. But, as the report has highlighted, there are many points of convergence in the way VET systems respond to external challenges.

List of abbreviations

ACOA	Advisory Committee on Education and the Labour market
AI	artificial intelligence
AOCs	agricultural education and training centres
BBL	work-based training / *beroepsbegleidende leerweg*
BOL	school-based training / *beroepsopleidende leerweg*
BTS	*brevet de technicien supérieur*
CVET	continuing vocational education and training
DUT	*diplôme universitaire de technologie*
ECSC	European Coal and Steel Community
EEA	European Economic Area
EEC	European Economic Community
EFTA	European Free Trade Association
EQAVET	European quality assurance in vocational education and training
EQF	European qualifications framework
ET	education and training
EU	European Union
GDP	gross domestic product
HE	higher education
IUT	*instituts universitaires de technologie*
IVET	initial vocational education and training
KETs	key enabling technologies
LEGT	*lycées généraux et technologiques*
LMI	labour market intelligence
LTA	local training agencies
NQF	national qualifications framework
PQF	Polish qualifications framework
R&D	research and development
STEM	science, technology, engineering and mathematics

STS	*sections de technicien supérieur*
TBTC	task-based technological change
TIMSS	trends in international mathematics and science study
VET	vocational education and training

References

[URLs accessed 15.3.2018]

Acemoglu, D.; Pischke, J-S. (1999). Beyond Becker: training in imperfect labour markets. *Economic journal*, Vol. 109, pp. F112-F142.

Autor, D.; Levy, F.; Murnane, R. (2003). The skill content of recent technological change: an experimental exploration. *Quarterly journal of economics,* Vol. 118, No 4, pp. 1279-1333.

BIS Foresight (2012). *What are the supply (workforce) and demand (product) implications of an ageing society?* Future of manufacturing project: evidence paper 22. London: UK Government – Department for business innovation and skills. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/283896/ep22-ageing-society-implications-manufacturing.pdf

Bråthen, M.; T. Fløtten (2017). *The Norwegian social model: an inspiration for Greece?* Oslo: Fafo. Fafo report 2017/38.

Brunello, G. (2009). *The effect of economic downturns on apprenticeships and initial workplace training: a review of the evidence*. Paper prepared for the Education and training policy division. Paris: OECD.

Brynjolfsson, E.; McAfee, D. (2012). *Race against the machine: how the digital revolution is accelerating innovation, driving productivity, and irreversibly transforming employment and the economy*. Lexington: Digital Frontier Press.

Cedefop (2010). *The skill matching challenge: analysing skill mismatch and policy implications*. Luxembourg: Publications Office. http://www.cedefop.europa.eu/en/publications-and-resources/publications/3056

Cedefop (2013). *Renewing VET provision: understanding feedback mechanisms between initial VET and the labour market*. Luxembourg: Publications Office. Cedefop research paper; No 37. www.cedefop.europa.eu/files/5537_en.pdf

Cedefop (2015a). *Skill shortages and gaps in European enterprises: striking a balance between vocational education and training and the labour market.* Luxembourg: Publications Office. Cedefop reference series; No 102. http://dx.doi.org/10.2801/042499

Cedefop (2015b). *Skills mismatch: more than meets the eye*. Briefing note; March 2014. http://www.cedefop.europa.eu/en/publications-and-resources/publications/9087

Cedefop (2015c). *Skills, qualifications and jobs in the EU: the making of a perfect match?* Luxembourg: Publications Office. Cedefop reference series; No 103. http://dx.doi.org/10.2801/606129

Cedefop (2017a). *The changing nature and role of vocational education and training in Europe. Volume 1: conceptions of vocational education and*

training: an analytical framework. Luxembourg: Publications Office. Cedefop research paper; No 63. http://dx.doi.org/10.2801/532605

Cedefop (2017b). *The changing nature and role of vocational education and training in Europe. Volume 2: results of a survey among European VET experts.* Luxembourg: Publications Office. Cedefop research paper; No 64. http://dx.doi.org/10.2801/548024

Council of the European Union (2009). *Council conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training (ET 2020).* Official Journal of the European Union, C 119, 28.5.2009, pp. 2-10.

Council of the European Union; European Commission (2002). *The Copenhagen declaration.* http://ec.europa.eu/dgs/education_culture/repository/education/policy/vocational-policy/doc/copenhagen-declaration_en.pdf

Council of the European Union; European Commission (2015). *Riga conclusions 2015*. http://ec.europa.eu/education/policy/vocational-policy/doc/2015-rigaconclusions_en.pdf

Dorenbosch, L. et al. (2017). *Crux van het Combineren: actieonderzoek naar gecombineerde rollen, beroepen en (loop)banen [The crux of combining: action research on combined roles, occupations and career paths].* https://cruxvanhetcombineren.atavist.com/longread

Elsby, M.W.; Hobijn, B.; Sahin, S. (2011). *Unemployment dynamics in the OECD*. San Francisco: Federal Reserve Bank. Working paper 2009-04. https://www.frbsf.org/economic-research/files/wp09-04bk.pdf

Estévez-Abe, M.; Iversen, T.; Soskice, D. (2001). Social protection and the formation of skills: a reinterpretation of the welfare State. In: Hall, P.; Soskice, D. (eds). *Varieties of capitalism: the institutional foundations of comparative advantage*. Oxford: Oxford University Press.

Eurofound (2016). *What do Europeans do at work? A task-based analysis: European jobs monitor 2016.* Luxembourg: Publications Office. https://www.eurofound.europa.eu/publications/report/2016/labour-market/what-do-europeans-do-at-work-a-task-based-analysis-european-jobs-monitor-2016

European Commission (2010). *An agenda for new skills and jobs: a European contribution towards full employment*. COM(2010) 682 final. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0682:FIN:en:PDF

European Commission (2012). *Towards a job rich recovery*. COM(2012) 173 final. ec.europa.eu/social/BlobServlet?docId=7619&langId=en

European Commission (2015). *Annual growth survey 2016: strengthening the recovery and fostering convergence: communication from the Commission.* COM(2015) 690 final. http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52015DC0690&from=EN

European Commission (2016a). *A new skills agenda for Europe: working together to strengthen human capital, employability and competitiveness: communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.* COM(2016) 381 final. https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-381-EN-F1-1.PDF

European Commission (2016b). *The future of work: skills and resilience for a world of change*. Brussels: European Political Strategy Centre (EPSC). EPSC strategic note; No 13/2016. https://ec.europa.eu/epsc/sites/epsc/files/strategic_note_issue_13.pdf

European Commission (2016c). *Education and training monitor 2016: Poland*. Luxembourg: Publications Office. https://ec.europa.eu/education/sites/education/files/monitor2016-pl_en.pdf

European Commission; Cedefop; ICF International (2014). European inventory on validation of non-formal and informal learning 2014: country report Poland. http://libserver.cedefop.europa.eu/vetelib/2014/87072_PL.pdf

Felstead, A.; Jewson, N. (2014). Training floors and training ceilings: metonyms for understanding training trends. *Journal of vocational education and training*, Vol. 66, No 3, pp. 296-310. DOI: 10.1080/13636820.2014.916739

Felstead, A.; Green, F.; Jewson, N. (2011). *The impact of the 2008-09 recession on the extent, form and patterns of training at work.* London: LLAKES Centre, Institute of Education. LLAKES research paper; No 22. http://www.llakes.ac.uk/sites/default/files/22%20Felstead%20Green%20Jewson%20-%20final.pdf

Ford, M. (2016). *Rise of the robots: technology and the threat of a jobless future*. London: Oneworld Publications. https://oneworld-publications.com/the-rise-of-the-robots-pb.html

Freeman, R.B. (2015). *Who owns the robots rules the world: workers can benefit from technology that substitutes robots or other machines for their work by owning part of the capital that replaces them.* Bonn: IZA Institute of Labor Economics. IZA World of Labor article; No 2015/5. *https://wol.iza.org/articles/who-owns-the-robots-rules-the-world/long*

Frey, C.B.; Osborne, M.A. (2013). *The future of jobs: how susceptible are jobs to computerisation?* Oxford: Oxford Martin School.

Gambin, L.; Hogarth, T. (2017). Employers and apprenticeships in England: costs, risks and policy reforms. *Empirical research in vocational education and training,* Vol. 9, No 16. https://ervet-journal.springeropen.com/track/pdf/10.1186/s40461-017-0060-5?site=ervet-journal.springeropen.com

Gambin, L.; Hogarth, T. (2016a). Understanding the national policy dimension: a case study of England. Working paper No 4 presented at the Cedefop workshop *VET in the 21st century: new pressures and changing*

expectations, Thessaloniki, 16 and 17 February 2017. http://www.cedefop.europa.eu/en/events-and-projects/events/vet-21st-century-new-pressures-and-changing-expectations

Gambin, L.; Hogarth, T. (2016b). Counting the cost, reconciling the benefits: understanding employer investment in higher apprenticeships in accounting. *Accounting education,* Vol. 25, No 5, pp. 502-518.

Gambin, L.; Hogarth, T. (2016c). *Employer investment in intermediate STEM skills: how employers manage the investment risk associated with apprenticeships.* London: Gatsby Foundation. http://www.gatsby.org.uk/uploads/education/gatsby-employer-investment-apprenticeships.pdf

Goodson (2001). Social histories of educational change. *Journal of educational change,* Vol. 2, No 1, pp. 45-63.

Goos, M, A.; Manning; A. Salomons (2011). *Explaining job polarisation: the roles of technology, offshoring and institutions*. Leuven: KU Leuven - Centre for economic studies. Discussion paper series; No 11/34. https://lirias.kuleuven.be/bitstream/123456789/331184/1/DPS1134.pdf

Goos, M.; Manning, A. (2007). Lousy and lovely jobs: the rising polarisation of work in Britain. *The review of economics and statistics*, Vol. 89, No 1, pp. 118-133.

Hall, P.; Soskice, D. (eds) (2001). *Varieties of capitalism: the institutional foundations of comparative advantage.* Oxford: Oxford University Press.

Hanushek, E.A.; Woessmann, L.; Zhang, L. (2011). *General education, vocational education, and labor-market outcomes over the life-course*. Bonn: IZA Institute of Labor Economics. IZA discussion paper; No 6083.

Hogarth T.; Gambin, L. (2016). Who pays for skills? Differing perspectives on who should pay and why. In: Buchanan, J. et al. (ed). *Oxford handbook of skills and training*. Oxford: Oxford University Press.

Hogarth, T.; Papantoniou, A. (2017). *New forms of self-employment: the Hollywood model and the gig economy.* Skills Panorama blog. http://skillspanorama.cedefop.europa.eu/en/blog/new-forms-self-employment-hollywood-model-and-gig-economy

Høst, H.; Gitlesen, J.P.; Michelsen, S. (2008a). Læreplasser mellom politikk og konjunkturer [Apprenticeship between politics and conjunctures]. In: Høst, H. (ed.). *Fag- og yrkesopplæringen i Norge - noen sentrale utviklingstrekk [Vocational education and training in Norway - central developments*]. Oslo: NIFU. STEP report No 2008/20.

Høst, H.; Gitlesen, J.P.; Michelsen, S. (2008b). How the number of apprenticeships are influenced by policy and economic cycles. In: Høst, H. (ed.). *Continuity and change in Norwegian vocational education and training*. Oslo: NIFU. STEP report No 2008/29, pp. 17-30.

Huws, U. et al. (2016). *Crowd work in Europe: preliminary results from a survey in the UK, Sweden, Germany, Austria and the Netherlands*. Hertfordshire: FEPS, UH, UNI Europa. http://researchprofiles.herts.ac.uk/portal/files/10749125/crowd_work_in_europe_draft_report_last_version.pdf

Krugman P. (2008). *The return of depression economics and the crisis of 2008*. London: Penguin Books.

Mahoney, J.; K. Thelen (2010). *Explaining institutional change: ambiguity, agency and power*. Cambridge: Cambridge University Press.

Mason, G.; Bishop, K. (2010). *Adult training, skills updating and recession in the UK the implications for competitiveness and social inclusion*. London: LLAKES Centre, Institute of Education. http://www.llakes.org.uk

McCoshan, A. et al. (2008). *Beyond the Maastricht communiqué: developments in the opening up of VET pathways and the role of VET in labour market integration.* Consolidated final report. Birmingham: ECOTEC. http://www.pedz.uni-mannheim.de/daten/edz-b/gdbk/08/vetreport_en.pdf

McIntosh, S. (2013). *Hollowing-out and the future of the labour market*. BIS research paper; No 134.

Meschi, L. (2004). Vocational training from the birth of the ECSC to the early years of the EEC. In: Cedefop; Varsori, A. (eds). *Towards a history of vocational education and training in Europe in a comparative perspective:* proceedings of the first international conference, Florence, October 2002. *Volume II: The development of VET in the context of the construction of the EC/EU and the role of Cedefop*. Luxembourg: Publications Office. Cedefop Panorama series; No 101.

Ministerie van Onderwijs/ Cultuur en Wetenschap (2014). *Ruim baan voor vakmanschap: een toekomstgericht mbo [Make way for craftsmanship: a future-oriented VET].* Ministerie van Onderwijs/ Cultuur en Wetenschap Den Haag. https://www.rijksoverheid.nl/documenten/kamerstukken/2014/06/02/kamerbrief-over-een-toekomstgericht-middelbaar-beroepsonderwijs

Mohr, S. et al. (2015). *Rückzug von Betrieben aus der beruflichen Ausbildung. Gründe und Muster [Withdrawal of companies from vocational training. Reasons and patterns].* BIBB report 4/2015. https://www.bibb.de/veroeffentlichungen/de/publication/show/7878

Nyen, T.; Tønder, A.H. (2012). *Fleksiblitet eller faglighet? En studie av innføringen av faget prosjekt til fordypning i Kunnskapsløftet.* [*Flexibility or professionalism? A study of the introduction of the in-depth study project in the Knowledge Promotion reform*]. Oslo: Fafo. Fafo report No 2012/47.

Olsen, O.J. et al. (2015). *Institutional innovations in Norwegian VET: responses to key challenges.* Roskilde: Nord-VET. http://nord-vet.dk/indhold/uploads/report1c_no.pdf

Petrini, F. (2004). The common vocational training policy in the EEC from 1961 to 1972. *European journal of vocational education and training,* Vol. 32, pp. 45-54. http://www.cedefop.europa.eu/en/publications-and-resources/publications/322004

Reder, M. (1955). The theory of occupational wage differentials. *American economic review,* Vol. 45, No 5, pp. 833-852.

Reiko, K. (2006). Youth employment in Japan's economic recovery: 'freeters' and NEETs. *Japan Focus*, Vol.5, No 5. http://www.japanfocus.org/-Kosugi-Reiko/2022

Scalia, T. et al. (2017). *Study on the dual-use potential of key enabling technologies (KETs).* Brussels: Executive Agency for Small and Medium-Sized Enterprises. https://publications.europa.eu/en/publication-detail/-/publication/c092b731-f415-11e6-8a35-01aa75ed71a1

SER (1997). *Versterking secundair beroepsonderwijs: Advies Versterking secundair beroepsonderwijs uitgebracht aan de Staatssecretaris van Sociale Zaken en Werkgelegenheid [Strengthening secondary vocational education: advice strengthening secondary vocational education issued to the State Secretary for Social Affairs and Employment].* SER: Den Haag.

SER (2016). *Deel 1 Voorstellen ter versterking van de beroepsbegeleidende leerweg; Advies 2016/07: 21 oktober 2016 (commissie Arbeidsmarkt- en onderwijsvraagstukken) [Art. 1 Proposals for strengthening the vocational guidance pathway; Advice 2016/07:21, October 2016 (Labour Market and Education Issues Committee)].* SER: Den Haag.

SER (2017). *Maatwerk van belang voor toekomstgericht beroepsonderwijs, 12 januari 2017* [*Customization of importance for future-oriented vocational education, 12 January 2017]*. SER: Den Haag. http://www.ser.nl/nl/actueel/nieuws/2010-2019/2017/20170112-beroepsonderwijs.aspx

Simon, H. A (1965). *The shape of automation (for men and management).* New York: Harper and Row.

Skills Funding Agency (2016). *Statistical first release: apprenticeship starts by age*. Coventry: Skills Funding Agency.

Skills Panorama team (2016). *Preparing for the age of the robots.* Skills Panorama blog. http://skillspanorama.cedefop.europa.eu/en/blog/preparing-age-robots

Streeck, W.; Thelen, K. (2005). *Introduction: institutional change in advanced political economies.* Oxford: Oxford University Press.

Wolf, A. (2015). *Heading for the precipice: can further and higher education funding policies be sustained?* London: University of London, King's College. http://www.kcl.ac.uk/sspp/policy-institute/publications/Issuesandideas-alison-wolf-digital.pdf

Databases

Eurostat (a). EU labour force survey statistics. Unemployment rates by sex, age and citizenship [database: lfsq_urgan]. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsq_urgan&lang=en

Eurostat (b). Job vacancy statistics by NACE Rev. 2 activity - quarterly data (from 2001 onwards) [database: jvs_q_nace2]. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=jvs_q_nace2&lang=en

Eurostat (c). Participation/enrolment in education [database: educ_ipart_s].

Eurostat (d). GDP and main components (output, expenditure and income) [database: nama_10_gdp].

Eurostat (e). Unemployment rates by sex, age and citizenship (%) [database: lfsa_urgan]

Eurostat (f). Total intramural R&D expenditure (GERD) by sectors of performance [database: rd_e_gerdtot]. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdtot&lang=en

Eurostat (g). Fertility rates by age [database: demo_frate]. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_frate&lang=en

Eurostat (h). Population: structure indicators [demo_pjanind]. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjanind&lang=en

Eurostat (i). Population by educational attainment level, sex and age (%) - main indicators [edat_lfse_03].

Eurostat (j). Employment by sex, occupation and educational attainment level (1 000) [lfsa_egised].

Eurostat (k). Pupils enrolled in upper secondary education by programme orientation, sex, type of institution and intensity of participation [educ_uoe_enrs04].

Eurostat (l). Population by age group, sex and country of birth [migr_pop3ctb]. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=migr_pop3ctb&lang=en%20

OECD. Indicators of employment protection. http://www.oecd.org/els/emp/oecdindicatorsofemploymentprotection.htm

The changing nature and role of vocational education and training in Europe

Volume 3: the responsiveness of European VET systems to external change (1995-2015)

This publication is the third in a series produced as part of the Cedefop project The changing nature and role of VET (2016-18). Based on analysis of developments during the past two decades (1995-2015), the report provides important insights into the responsiveness of national VET systems, notably in relation to changes in demography, technology and the economy. Building on detailed national case studies, the report demonstrates how 'big shocks' (the fall of the Berlin wall, the economic crisis of 2008), national policy reforms and incremental developments over time have changed the character of this crucial part of the European education and training landscape.

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