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Apprenticeships Development for
Universal Lifelong Learning and Training (ADULT)

Towards lifelong learning and skills for the future of work: Global lessons from innovative apprenticeships

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Foreword

New technologies, demographic shifts, climate change, globalization and, more recently, crises such as the COVID-19 pandemic are causing major disruptions to the world of work. Against this backdrop, it becomes ever more important to build an agile workforce that is capable of navigating the fast-changing labour market through appropriate and timely skilling, reskilling and upskilling. The use of apprenticeship models or dual training systems can be an effective solution in the context of the future of work, as they can bridge the gap between education and training systems and the world of work.

Although apprenticeship is a centuries-old system to enable young persons to acquire skills related to specific occupations, questions are increasingly being asked about its relevance for reskilling and upskilling in the context of the future of work and lifelong learning. The ILO has therefore launched a research project – Apprenticeship Development for Universal Lifelong Learning and Training (ADULT)– which aims to generate new ideas and policy options to modernize apprenticeship systems. The project is funded by the Government of Flanders. The research aims to explore how apprenticeship systems are being modernized and transformed to promote and enable lifelong learning and decent work for youth, adults and older workers (both employed and unemployed). The research also covers other forms of work-based learning options for students in vocational education and training (VET) institutes.

The main report, *Towards Lifelong Learning and Skills for the Future of Work: Global Lessons from Innovative Apprenticeships*, synthesizes the topics of six individual thematic reports and three additional themes which are only featured in the main report. It explores how apprenticeships can enable people to acquire new skills and update existing skills throughout their working lives to keep pace with the fast-changing labour market demand.

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Ashwani Aggarwal (ILO) managed the research project, led the design and development of the main report, and also reviewed, edited and finalized this publication. The preparation of the report was coordinated and supported by Anita Sharma, Cheryl Chan, Majda Grine and Jenni Jostock (ILO Technical Officers) and Nidhi Gautam (ILO consultant).

Sincere thanks go to Andrew McCoshan and Jörg Markowitsch, who authored the paper. This report utilizes the materials and analyses presented in the six thematic reports to provide an overall synthesis report on some of the most important issues facing apprenticeships today and distils a set of policy messages for the future of apprenticeships from all the material available in the thematic reports. As a rule, the chapters follow these reports, but in some cases approaches and thematic emphases other than those presented in the thematic reports have been chosen. The inputs from background reports are as follows:

- Chapter 2 is based on the thematic report *Promoting Apprenticeships to Meet the Skills Needs of the Digital and Knowledge Economy* by Simon Perryman (Yeandle and Associates Ltd).
- Chapter 5 is based on the thematic report *Unlocking Apprenticeship Potential in Small and Medium Enterprises* by Dr Philipp Grollmann (BIBB) and Dr Wolfgang Wittig (f-bb) and Isabelle Le Mouillour (BIBB).
- Chapter 6 is based on the thematic report *Improving the Attractiveness and Social Perception of Apprenticeships* by Prof. Dr Erica Smith (Federation University Australia).
- Chapter 7 is based on the thematic report *Strengthening Work-based Learning in VET Institutions* by Prof. Dr Erwin Seyfried (Berlin School of Economics and Law).
- Chapter 8 is based on the thematic report *Adapting Apprenticeships for the Reskilling and Upskilling of Adults* by Dr Jörg Markowitsch, Dr Günter Hefler and Mariya Dzhengozova (3s Research Laboratory).
- Chapter 10 is based on the thematic report *The Digital Transformation of Apprenticeships: Emerging Opportunities and Barriers* by Prof. Dr Alberto Cattaneo and Francesca Amenduni (SFUVET).[1]

The analysis presented in Chapter 3 on the green transition, Chapter 4 on informal apprenticeships and Chapter 9 on flexibility and inclusion, which do not have a corresponding thematic report, was prepared by Andrew McCoshan.

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1 For the full reports, see Adapting Apprenticeships for the Reskilling and Upskilling of Adults; Promoting *Apprenticeships to Meet the Skills Needs of the Digital and Knowledge Economy; The Digital Transformation of Apprenticeships: Emerging Opportunities and Barriers; Improving the Attractiveness and Social Perception of Apprenticeships; Strengthening Work-based Learning in VET Institutions*. Unlocking Apprenticeship Potential in Small and Medium Enterprises is forthcoming.

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AI	Artificial Intelligence
AR	Augmented Reality
CBT	Competency-Based Teaching
CoVEs	Centres Of Vocational Excellence
EFQEA	European Framework For Quality And Effective Apprenticeships
GTOs	Group Training Organisations
HICs	High-Income Countries
HRD	Human Resource Development
ICT	Information And Communications Technology
IPCC	International Panel On Climate Change
ISCED	International Standard Classification Of Education
ISCO	International Standard Classification Of Occupations
IT	Information Technology
ITCs	Inter-Company Training Centres
LA	Learning Analytics

LICs	Low-Income Countries
LMS	Learning Management System
MICs	Middle-Income Countries
MOOCs	Massive Open Online Courses
MSMEs	Micro-, Small And Medium-Sized Enterprises
NGOs	Non-Governmental Organizations
OECD	Organisation For Economic Co-Operation And Development
OEPs	Open Educational Practices
OERs	Open Educational Resources
PISA	Programme For International Student Assessment
PPPs	Public–Private Partnerships
RPL	Recognition Of Prior Learning
SMEs	Small And Medium-Sized Enterprises
TAFE	Technical And Further Education
TUC	Trades Union Congress
TVET	Technical And Vocational Education And Training
VET	Vocational Education And Training
VR	Virtual Reality
VTI	Vocational Training Institute
WBL	Work-Based Learning
WISE	World Innovation Summit For Education

List of case studies

Executive Summary

This report highlights the new role of apprenticeship training within lifelong learning systems. The majority of its chapters are based on six individual thematic reports, with three additional themes and one policy chapter completing the extensive overview that this report provides.

In addition to the six chapters which focus on the thematic reports, the main report features three independently compiled chapters on the green transition, informal apprenticeships, and flexibility and inclusion. An overview of all the chapters is provided below.

Chapters 2 and 10 explore the impact of digital technologies on jobs and investigate how digital technology can be used to improve the effectiveness, inclusiveness and efficiency of apprenticeships. They also highlight the ongoing and emerging innovative practices in the use of digital and educational technology in apprenticeship systems.

Chapter 3 outlines why apprenticeships have a central enabling role to play in delivering the skills needed to achieve the green transition due to their unique position, straddling the worlds of business, education and training.

Chapter 4 makes the case for the importance of including informal apprenticeships in skills development policies. Many apprentices in low- and middle-income countries acquire their skills in the informal economy and their circumstances should be analysed and considered, with the aim of enabling them to transition into the formal economy in the long term.

Another topic that the report outlines, in Chapter 5, is the role of small and medium-sized enterprises (SMEs) in apprenticeships. The commitment of SMEs to apprenticeship is discussed as a potential target for policies that aim to support the development and performance of SMEs. The chapter showcases how the enhancement of enterprises' participation in apprenticeship can benefit learners, the state, employers and employees.

Chapter 6 explores reasons why apprenticeships are sometimes regarded as less popular pathways to kickstart careers and presents notable initiatives undertaken by various countries to improve the attractiveness of apprenticeships. These include structural changes and enhancements to apprenticeship programmes, as well as better promotion of apprenticeships to potential apprentices and those who advise them.

Chapter 7 of the report explores initiatives from countries around the world to strengthen work-based learning (WBL) in VET institutions, as well as the role of local industry and social partners. It also discusses the various innovative policy options which can be introduced to support WBL in school-based VET.

Chapter 8 looks at apprenticeships for the reskilling and upskilling of adults, pointing out the fact that quality frameworks and standards for apprenticeships should include adult learning and disadvantaged learners. Lifelong learning can be ensured when national governments are encouraged to consider apprenticeship for adults as an option for upskilling and reskilling in their national strategies.

Chapter 9 on flexibility and inclusion investigates how to distribute the benefits of economic activity in a more equitable and fair manner, which will be key to meeting the challenges of modern production and service delivery.

Finally, Chapter 11 concludes the overview and analyses of the different topics with a chapter on policy messages for the future of apprenticeships, focusing on topics such as the design process, stakeholder engagement, upskilling of trainers, gender and inclusivity, employer's incentives and digital technologies.

1 Introduction

Introduction

We face a tangle of challenges in our economies, societies and the environment and skill requirements have never changed at such a rapid pace. As a result, the need to modernize and transform apprenticeships, as well as other forms of work-based learning, has become a priority. Fortunately, as this report shows, these forms of learning are well placed to be part of the solution to the challenges ahead of us and are already in the vanguard of innovation.

▸ 1.1 Apprenticeships: A complex phenomenon

There is a multitude of reports on apprenticeships available. Many chart their deficiencies and suggest how they can be improved. In contrast, this report shows how modern apprenticeships can be at the forefront of our response to the major skills development challenges of our time.

Apprenticeships are undoubtedly a complex phenomenon and analysing how and why they are changing is not an easy task. As we discuss below, globally apprenticeships are defined in a wide variety of ways and take a variety of forms; and they are also part of a much broader landscape of educational and labour market contexts. With this in mind, the focus of this report is not solely on apprenticeships; instead it considers wider theories or models (such as the "high/low road model" described below) to help frame the thinking behind its conclusions, and also covers work-based learning (WBL). Just as importantly, it situates apprenticeships in the context of current external developments which are reshaping our world, which is where we start.

▸ 1.2 A world of constant and rapid change

The world has recently faced unprecedented challenges. The environmental crisis, the COVID-19 pandemic and, most recently, the threat of global food and energy shortages triggered by the conflict in Ukraine have all highlighted human vulnerabilities to external forces, which are especially severe for people in poorer countries. Apprenticeships sit within a complex web of such contextual factors and trends, which affect the nature of jobs and the types of skills in demand in the labour market, requiring significant transformations in the design and delivery of apprenticeships to match demand. Identifying and evaluating each of these trends is a difficult exercise since they interrelate in complex ways but an outline of the main factors at play helps to provide a framework for the analysis in subsequent chapters.

We live in a globalized world. **Globalization** has a long history – evidence of international trade over thousands of kilometres dates back millennia – but never before have national economies been so

integrated.[1] Since the fall of the Iron Curtain in Europe in 1989, global free trade has grown significantly, thanks to the momentum generated by the removal of trade barriers and the advent of new **digital technologies**, such as the internet, which have enabled an unprecedented degree of integration in supply chains. World trade grew from less than 40 per cent of global GDP in 1990 to around 60 per cent just before the financial crisis of 2007–08. Currently, we are only just beginning to experience the effects of another wave of globalization shaped by the digital economy, big data analytics, crypto-currencies and artificial intelligence (AI).

Globalization has had a profound effect on the **distribution of production and service operations and jobs** (i.e. what is produced, where and by whom). High-income countries (HICs) have often "offshored" the production of goods that require low or medium skills to low- and middle-income countries (LICs and MICs), focusing their attention on higher-skilled activities in the **"knowledge economy"**, especially in sectors such as technology and finance. Most recently, countries that were once providers of offshore services have started to offshore operations themselves; for example, China's investments in production facilities in Africa.[2] High-skilled, high-tech sectors are starting to grow in LICs and MICs, although they often struggle to achieve that growth, held back by a knot of factors including poor skills development systems. LICs and MICs have also benefited from growth in the tourism and hospitality sector, driven by an increase in the number of tourists from wealthier countries.

Alongside these changes have been major **demographic** shifts and large-scale movements of refugees and migrants. The number of international migrants was estimated to stand at almost 272 million globally in 2020, of which nearly two thirds were labour migrants.[3] HICs have rapidly ageing populations with longer life expectancies, which is driving demand for new services in health and social care. Indeed, survey data from several developed countries indicates that employers are currently seeking to fill more entry-level vacancies in health and social care than in the information technology (IT) sector.[4] In some MICs an ageing population poses a challenge to economic growth, adding to the pressure to achieve productivity increases from their existing and shrinking workforces. Elsewhere, populations are more youthful. In many LICs the number of young people entering the labour market is unprecedented and this process often takes place in the context of poor employment prospects in the formal economy. However, in the

1 Peter Vanham, A Brief History of Globalization (World Economic Forum, 2019).

2 Wenjie Chen et al., "Why is China Investing in Africa? Evidence from the Firm Level", World Bank Economic Review 32, No. 3 (2018): 610–632.

3 According to the World Migration Report 2020.

4 ILO, Global Employment Trends for Youth 2020: Technology and the Future of Jobs, 2020, p. 15.

long run, education seems to have the effect of slowing population growth, including in LICs, and a more highly educated workforce makes poverty eradication and economic growth easier to achieve.[5]

Finally, **climate change and environmental damage** caused by humans have now become a defining issue of our times, with the Intergovernmental Panel on Climate Change (IPCC) warning that we are at "code red" level, with very little time to adjust our behaviour before irrevocable climatic shifts take place. Globalization and growth in consumption and population (from around 5 billion in 1990 to nearly 8 billion today) have underpinned the damage done to the environment in terms of CO2 emissions and pollution (with responsibility mainly lying with the 16 per cent of the world's population that consumes 80 per cent of the world's resources[6]). We already see how environmental change is having demographic effects; for example, causing migration to escape drought in the Horn of Africa or rising sea levels in Pacific nations. As the IPCC[7] has also pointed out, we have the means at our disposal to avert environmental disasters, not least through the application of new technologies and global collaboration and by the creation of new products and services focused on adapting to, and mitigating, the effects of environmental change. Some technologies, such as renewable energy, have been in existence for many years but require more widespread uptake.[8]

The **employment effects** of the drivers described above are complex and will be discussed further in the chapters that follow. However, it is evident that while globalization has been a driver of growth in the world economy (at least until the onset of the COVID-19 pandemic, which has been a major setback), **key problems have persisted and new challenges have been thrown up.** For example, for many young people (who are the primary target group for apprenticeships in many countries) the transition from education to work remains problematic. High youth unemployment is a major issue in many countries, with most youth ending up in informal economic activity. In 2016, 75 per cent of young workers worldwide were engaged in informal employment and in sub-Saharan Africa and Southern Asia the figure was close to 96 per cent of employed youth. Worse still, globally since 1999 the number of young people not in education, employment or training (NEET) has increased, with young women being the most severely affected group[9]. Elsewhere, notably in HICs, automation due to advances in digital technologies has been replacing skilled manual jobs for several decades and currently the latest technologies, built around AI and

5 Sarah Murray, How Education Can Moderate Population Growth (World Economic Forum, 2015).

6 World Resources Institute research, 1999, quoted in http://edition.cnn.com/US/9910/12/population.cosumption/.

7 See https://www.ipcc.ch/report/ar6/wg1/.

8 In the European Union, for instance, renewable energy still comprises a minority of energy production. See the European Commission press release at https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3131.

9 ILO, Global Employment Trends for Youth 2020, 2020, pp. 13 and 15.

advanced analytics, are also replacing work that requires cognitive skills. While this development leads to a "hollowing out" of the labour market in HICs, it creates a small but growing sector of "micro-work" in LICs with little opportunity for formal work-based learning.

Finally, it should not be forgotten that, since early 2020, the COVID-19 pandemic has had a major impact on apprenticeship systems and has affected both off-the-job learning and on-the job learning.[10] Apprentice numbers declined considerably in 2020 in many countries, though they are now climbing again due to persistent skills shortages in the wake of the economic recovery. Many governments have adapted existing support schemes and offered subsidies to employers who recruit apprentices, but the long-term impact of these changes has yet to be seen.

1.3 A paradigm shift in the world of work and the role of apprenticeships

The factors and trends outlined above are bringing about a paradigm shift in **how and where we design and produce products and services,** which is in turn reshaping the nature of work and the skills required. The pace of change is rapid. Only a few years ago, the focus was on the Fourth Industrial Revolution, or Industry 4.0, a phrase coined in Germany to describe the blurring of lines between the physical and digital worlds. Now we talk about Industry 5.0, which seeks to strike a balance between humans and machines in order to optimize the benefits, as we try to keep pace with the bewildering rate at which the latest wave of technology is impacting our lives and work. And other factors are in play, too. Population growth requires a corresponding increase in agricultural production and related food industries, which offer new employment prospects in countries situated at an earlier stage in their structural transformation process.

All sectors and jobs have been, and will continue to be, affected to some degree by the factors described above. The digital transition (discussed more fully in Chapter 2) has already impacted the vast majority of jobs in terms of the skills required and has driven the emergence of new occupations, for example software engineers. Skill requirements continue to evolve as new technologies, such as AI, virtual and augmented reality (the "metaverse") and big data analytics come on stream, leading to new occupations, such as machine learning engineering. Although "platform work" currently only affects a minority of workers, it has received extensive news coverage, perhaps because it is not only visible (in the form of companies such as Uber, Deliveroo, etc.) but also emblematic of the type of changes we are seeing in the nature of work. Although the green transition (described in Chapter 3) started later than the digital transition, it has already led to the growth of new careers in fields such as renewable energy, e-mobility and organic agriculture. Skills to support the green transition will need to roll out across more occupations in the labour market in the coming years if we are to successfully tackle rapid environmental change.

Equipping ourselves for these types of shifts in the world of work requires **innovation in our skills development and lifelong learning systems**, and apprenticeships can play an important part in this process because of their position at the intersection between education and training systems and the world of work. As this report shows, **apprenticeships are already undergoing a process of modernization and transformation**; many have already moved away from their traditional "home" among craft and trade occupations to engage with the changing structure of economies and tackle the challenges outlined

10 See, for example, ILO, Skills Development in the Time of COVID-19: Taking Stock of the Initial Responses in Technical and Vocational Education and Training, 2021.

above. Furthermore, the key features of apprenticeships make them well placed to be part of the solution to issues such as youth transitions and the upskilling and reskilling of adults, which are now acute in many countries. Indeed, apprenticeships have valuable lessons to offer to other forms of education and training.

As this report shows, apprenticeships are a source of solutions, and not simply an "alternative pathway" to general education routes. They have the potential to be an effective means of ensuring that formal education and training systems are aligned with labour market needs. School-to-work transitions are smoother in countries where apprenticeship is well-structured, and there is a dynamic relationship between strong apprenticeship schemes and youth unemployment rates, as was evidenced during the global financial crisis of 2007–08.[11] Even in informal contexts, apprenticeships are woven into the socio-economic fabric of communities in many LICs and offer routes into employment, regardless of any disadvantages they may have. Apprenticeships can also help to shape the future, rather than just responding to external forces, helping to create decent work and more inclusive workforces.

But what do we already know about apprenticeships? And what new insight does this report offer?

▶ 1.4 Characterizing apprenticeships

In international research and policy, characteristics of apprenticeship which can be regarded as commonly accepted have been identified. These include a strong WBL component that takes place at the employer's premises, complementary instruction in a vocational education and training (VET) school or another educational institution, a contractual relationship between the learner and the employer (in some cases the educational institution may also be a party to the agreement), and remuneration or other financial compensation for the learner.[12] Apprentices' work also contributes directly to production, the performance and the outputs of the organization employing them during their training. This allows employers to recoup some of the upfront investments that they typically make during the course of the apprenticeships.

The ILO's **Quality Apprenticeships** concept builds on the early definition in its Vocational Training Recommendation, 1962 (No. 117), according to which apprenticeship involves "systematic long-term training for a recognised occupation taking place substantially within an undertaking or under an independent craftsman" and "should be governed by a written contract of apprenticeship and be subject to established standards".[13] Even though the Recommendation itself has been superseded by various Human Resources Development Recommendations, the definition continues to be relevant for the further elaboration of policy frameworks.[14] In the current Quality Apprenticeships concept, the characteristics detailed in box 1 are used for the description of apprenticeship programmes.

11 Klaus F. Zimmermann et al., "Youth Unemployment and Vocational Training", Foundations and Trends® in Microeconomics 9, No. 1–2 (2013): 1–157.

12 See, for example, Anthony Mann and Antonio Ranieri, "Introduction", in Cedefop/OECD, The Next Steps for Apprenticeship, Cedefop Reference Series, No. 118 (Luxembourg: Publications Office), 12–13. These characteristics are also reflected in international guidelines and recommendations, such as the ILO's concept of Quality Apprenticeships (ILO, ILO Toolkit for Quality Apprenticeships – Volume I: Guide for Policy Makers, 2017) or the Council of the European Union's Council Recommendation of 15 March 2018 on a European Framework for Quality and Effective Apprenticeships (EFQEA)), which serves as a common point of reference for the development and implementation of apprenticeship schemes in Europe.

13 Paragraph 46 of the Recommendation.

14 ILO, A Framework for Quality Apprenticeships, Report IV(1) (2019), para. 8.

Box 1 Quality Apprenticeships concept, definition of apprenticeships

Apprenticeships **combine on-the-job training and off-the-job learning** and enable learners to acquire the **knowledge, skills and competencies required to carry out a specific occupation.**

- They are **regulated and financed by laws, collective agreements and policy decisions arising from social dialogue.**
- They require a **written contract** outlining the roles and responsibilities of the apprentice and the employer.
- They provide **remuneration** as well as **standard social protection coverage** for the apprentice.
- Following a **clearly defined and structured period of training** and the successful completion of a **formal assessment**, apprentices obtain a **recognized qualification**.

Source: Based on ILO, 2017, pp. 3–4.

Despite such specific characteristics and common origins, a r**emarkable variety of apprenticeship schemes** has developed worldwide.[15] In some countries, on-the-job and school-based learning alternate within a week; in others, longer periods of full-time school or college are followed by periods in a firm. In some countries, apprentices' pay comes close to 80 per cent of a skilled worker's salary; in others, it is no more than weekly pocket money. In some cases, apprentices are assigned a specific status, in others they are considered employees or simply students. Often, apprenticeship programmes are offered at medium skill levels,[16] but in some countries they range from lower to higher levels. In fact, apprenticeships are increasingly being offered at higher levels, such as graduate and higher apprenticeships. However, they may also be offered as a form of elementary vocational education equivalent to primary or lower secondary education, for instance, targeting early school leavers who have not successfully completed upper secondary education. Hence, apprenticeships exist at practically all levels of education. Occasionally, they are not classified at any particular skills level within a given country's national qualification system because they are not considered to be part of the formal education system.

Even when positioned on the same skills level, programmes may differ greatly. While some programmes might provide access to jobs with above-average wages, others may provide access only to more disadvantaged jobs in low-wage sectors. Apprenticeships in technical occupations (for example, mechatronics) are typically more demanding and offer better job prospects than apprenticeships in retail. Also, the prestige of the company may play a role.

15 Cedefop has attempted to map all the apprenticeship programmes in the European Union Member States plus Iceland, Norway and the United Kingdom. See Cedefop's database on apprenticeship schemes at https://www.cedefop.europa.eu/en/tools/apprenticeship-schemes and also Cedefop, Apprenticeship Schemes in Europe: A Cross-nation Overview, 2018.
For a typology of apprenticeship schemes in Europe, see Jörg Markowitsch and Wolfgang Wittig, "Classifying Apprenticeships in Europe: Towards a New Conceptual Framework for the Changing Notion of Apprenticeship", Journal of Vocational Education & Training (2020).

16 Skill levels can either be defined by occupations, as in the International Standard Classification of Occupations (ISCO), or in terms of the level of education, as in the International Standard Classification of Education (ISCED). In ISCO, there are four skill levels; in ISCED, eight levels of education. Apprenticeships are usually offered at ISCED level 3 and 4 (i.e. upper-secondary and post-secondary non-tertiary education) and prepare apprentices for occupations at ISCO level 2 and 3.

In this context, the "long arm of the occupation", i.e. the continued strong intertwining of apprenticeships and occupations, and the **quality of jobs** must not be forgotten. As Jeanne Gamble shows using a detailed analysis of baking, boat building and film production in South Africa, each domain, in its own way, "values a craft model based on all-round expertise and control of work from start to finish".[17] Her findings show the continued strong identification with "whole" occupations despite the increasing fragmentation, pluralization and precarization of work observable in the digital era, as evidenced, for instance, by the rise of platform-mediated gig work mentioned above. These findings underline the importance of organizing work and workplaces in such a way that expertise and professional identities can be formed. Hence, **decent jobs,**[18] earnings gains and career options are preconditions for quality apprenticeships.

This is, of course, linked to the human resource development (HRD) strategies of firms, as will be shown in more detail later in this report. For apprenticeships to flourish, a **"high-road" labour model** is required, in which work is organized in a flexible manner and goes hand in hand with higher employment security and high wages. In contrast, a vicious circle of low pay, low quality and high labour turnover impedes the establishment of apprenticeships as a solid element in HRD strategies.

Finally, apprenticeships can be particularly **socially just** when compared to other forms of formal education. The costs are shared between learners, companies and the public sector. Instead of taking out a loan for university studies, apprentices earn money while learning both on- and off-the-job. This also makes an apprenticeship affordable for families in financially weaker positions and the contributions by (private) companies make apprenticeships a favourable option from the point of view of the state budget.

▸ 1.5 Quality frameworks for apprenticeships

Exploring the diversity of apprenticeship schemes at international level and fostering peer learning between countries require a common understanding of quality. For instance, the ILO identifies **six "building blocks"** that are considered essential for the sustainable establishment of apprenticeship

17 Jeanne Gamble, "Can 'Occupation' Disrupt the Logic of Qualification Frameworks?", in Studies in Vocational and Continuing Education: Opening and Extending Vocational Education, Vol. 18, ed. Philipp Eigenmann et al. (Bern: Peter Lang, 2021), 256.

18 See the ILO's work on job quality and decent work at https://www.ilo.org/global/topics/decent-work/lang--en/index.html.

systems (box 2), and is **working on a new international labour standard on apprenticeships**, taking into account its previous work on quality apprenticeship and many of the recommendations suggested in this report.[19] The 2022 International Labour Conference has approved Conclusions on quality apprenticeships[20] that will be further discussed and finalized as a new standard during the Conference's next session in 2023.

Box 2 ILO's six "building blocks" of apprenticeship systems

Meaningful social dialogue: Apprenticeship programmes should be based on cooperation and exchange of information between employers and trade unions, as these partners have first-hand knowledge of the skill needs in the industry.

Robust regulatory framework: Regulations are needed to define the conditions for the design and implementation of apprenticeship systems, and to secure the social protection of learners.

Clear roles and responsibilities: Apprenticeships depend on the support and commitment of numerous stakeholders with a clear understanding of their roles and responsibilities as well as a shared understanding of the mission of apprenticeship.

Equitable funding arrangements: Apprenticeships generate costs and benefits for employers, apprentices and society at large. Costs need to be shared by all stakeholders on an equitable basis.

Strong labour market relevance: Apprenticeships aim to equip learners with occupational skills that are needed in the labour market. Employers and apprentices need to know which skills are in demand and how they can be recognized.

Inclusiveness: Apprenticeships are supposed to offer opportunities for all and not just for one specific social group. Appropriate measures to accommodate the diversity of learners should be in place.

Source: Based on ILO, 2017, pp. 21-22.

Besides the ILO's building blocks and its evaluation tool for reviewing a country's apprenticeship policy and system[21] other tools are worth mentioning. For instance, the 2018 European Framework for Quality and Effective Apprenticeships (EFQEA), which was the outcome of an initiative started by the European social partners, and Cedefop's preceding analytical framework for apprenticeships[22] (these are not mutually exclusive alternatives – Cedefop now fully adopts the EFQEA, which has been agreed by all Member States). These frameworks can be used either as a reference guide in designing and reforming apprenticeship systems or for the purpose of assessing a country's apprenticeships system, either by self-assessment

19 Two reports on the discussion concerning the new standard have been published and can be accessed at https://www.ilo.org/ilc/ILCSessions/110/committees/apprenticeships/lang--en/index.htm.

20 ILO, Reports of the Standard-Setting Committee: Apprenticeships, ILC.110/Record No. 5, 2022.

21 Ashwani Aggarwal and Simon Field, ILO Evaluation Tool for the Review of a Country's Apprenticeship Policy and System (ILO, 2021).

22 The main criteria of Cedefop's analytical framework are very close, although not identical, to the criteria stated in the EFQEA, the aim of which is to provide guidelines for designing apprenticeship programmes that benefit both employers and learners. The Recommendation contains a list of 14 criteria for quality and effective apprenticeship training, distinguishing between criteria for learning and working on the one hand and for framework conditions on the other hand. See Cedefop, Cedefop's Analytical Framework for Apprenticeships, 2019 and Cedefop, EFQEA Implementation: A Cedefop Analysis and Main Findings, 2021.

or with the help of international peers.[23] Unsurprisingly, these quality frameworks for apprenticeship training overlap to a large extent, a factor which can be attributed to the fact that they essentially transfer **principles of good governance** to the apprenticeship system.[24]

▶ 1.6 Previous flagship reports and data on apprenticeships

Criteria for quality apprenticeships can also be derived from the various international reports on apprenticeships that have been produced in recent years, a selection of which is shown in table 1. It should be noted, however, that not all of these studies aimed to devise criteria or present them systematically.

Table 1 Selected major international studies on apprenticeships in the past ten years

Authors/year/funded by	Title	Countries covered
OECD/2018	Seven Questions about Apprenticeships: Answers from International Experience	Australia, Canada, Germany, Norway, Switzerland, United Kingdom, United States
ILO/2018	ILO Survey Report on the National Initiatives to Promote Quality Apprenticeships in G20 Countries	Argentina, Australia, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Republic of Korea, Russian Federation, Saudi Arabia, South Africa, Türkiye, United Kingdom, United States
Cedefop/2018	Apprenticeship Schemes in European Countries: A Cross-nation Overview	EU-28 plus Iceland and Norway
Chankseliani et al./ 2017/ WISE Research	People and Policy: A Comparative Study of Apprenticeship across Eight National Contexts	Australia, Denmark, Egypt, Finland, Germany, India, South Africa, United Kingdom
Fazio, Fernández-Coto and Ripani/2016/Inter-American Development Bank	Apprenticeships for the XXI Century: A Model for Latin America and the Caribbean?	Australia, Austria, Brazil, Canada, Chile, Colombia, Costa Rica, France, Germany, India, Lithuania, Malta, Mexico, Peru, Türkiye, United Kingdom, United States
Smith and Brennan Kemmis/2013/ILO and World Bank	Towards a Model Apprenticeship Framework: A Comparative Analysis of National Apprenticeship Systems	Australia, Canada, Egypt, England, France, Germany, India, Indonesia, South Africa, Türkiye, United States
European Commission/2012	Apprenticeship Supply in the Member States of the European Union	EU-27

23 The EFQEA has been used for so-called "Benchlearning self-assessment" for members of the European Alliance of Apprenticeships. It is, essentially, an instrument that allows Member States to conduct a guided self-assessment of their apprenticeship system on a voluntary basis. See https://ec.europa.eu/social/main.jsp?catId=1147&intPageId=5235&langId=en. Cedefop's analytical framework for apprenticeship has been tested in a series of Thematic Country Reviews on Apprenticeships since 2014, through which they have supported volunteering EU Member States in identifying country-specific solutions and offered recommendations on how to improve their apprenticeship systems in view of specific national challenges and opportunities.

24 Markowitsch and Chan (2021) found that core values of international governance of VET (including the Cedefop and EFQEA framework) form part of the seven global values of good governance as identified by Jørgensen and Sørensen (2012, p. 22). These values are legality, transparency, inclusiveness, effectiveness, public interest, impartiality and responsiveness.

The content of each of these reports is summarized below.

- The Organisation for Economic Co-operation and Development report (OECD, 2018) builds upon previous OECD studies on upper secondary VET and six focused country case studies to address seven fundamental questions regarding apprenticeship, such as the duration of an apprenticeship and how much an apprentice should be paid.
- The ILO survey report (ILO, 2018) on national initiatives to promote quality apprenticeships, drafted by Erica Smith and Jacqueline Tuck, analysed a survey based on the G20's ten agreed actions to promote quality apprenticeships using responses from 18 countries.
- Largely based on data collected in 2016, the Cedefop report (Cedefop, 2018) presented a comprehensive mapping of apprenticeship schemes with a stable legal basis in the European Union (EU) Member States, Iceland and Norway. It analysed the different purposes and functions associated with the schemes and investigated whether and how they differ in terms of organization.
- Cedefop's data has also been made accessible in an online database on apprenticeship systems and schemes, which collects and presents structured comparable information on apprenticeship schemes in the EU Member States plus Iceland, Norway and the United Kingdom of Great Britain and Northern Ireland. It presents data updated in 2019–20 for most countries, based on information collected by Cedefop's community of apprenticeship experts.[25]
- Cedefop's database on financing apprenticeship in the EU provides information on how apprenticeship schemes are financed in the EU Member States and the United Kingdom, in terms of overall financing arrangements and specific financing instruments.[26]
- The World Innovation Summit for Education (WISE) report (Chankseliani et al., 2017), drafted by colleagues at Oxford University, presents eight country studies that help to sort out the nuances of context and history of formal apprenticeships. The Summit is held biennially and the 2017 report addresses issues such as gender, ethnicity, age and incentives for employers.
- The study by Fazio et al. (2016), funded by the Inter-American Development Bank, aimed at developing the apprenticeship systems of 11 countries in Latin America and the Caribbean by scrutinizing the transferability of long-standing apprenticeship models (from Austria, Australia, Germany and the United Kingdom, among others).
- The study by Smith and Brennan Kemmis (2013) produced an overall analysis based on 11 case studies written by country experts. The study was carried out to inform the development of the Indian apprenticeship system. It categorizes countries' systems according to a number of factors that help to explain the differences between them, such as the relative size of the apprenticeship, the occupations covered and the employment status of apprentices.
- The European Commission (2012) report provided an overview of apprenticeship and apprenticeship-like schemes in the EU Member States, including a chapter on the impact of the financial crisis of 2007–08 on apprenticeships. The study contains detailed country fiches on all 27 EU Member States at the time.

25 See https://www.cedefop.europa.eu/en/tools/apprenticeship-schemes.

26 See https://www.cedefop.europa.eu/en/tools/financing-apprenticeships.

In addition to these studies, the various international and supranational organizations have developed **guidelines, good practice collections and toolboxes** on apprenticeships and WBL in the past ten years, which are all available via open access.[27]

Previous studies (for example, the WISE report mentioned above, Chankseliani et al., 2017) have frequently highlighted the **lack of international data on apprenticeships.** While national data on apprenticeship is excellent in many countries, major problems are posed for international comparison by the unequal quantity and quality of data. Data availability for apprenticeships internationally is very limited and is less reliable than for primary, (general) secondary and tertiary education. There are also obstacles to comparing national data due to the different definitions and reporting systems in use. Even basic participation data, at the level of both individuals and enterprises (for example, the proportion of enterprises offering apprenticeship places) does not exist and is difficult to produce (see the thematic report *Unlocking Apprenticeship Potential in Small and Medium Enterprises* by Philipp Grollmann et al.). Data on labour outcomes (employment and earnings) of graduates of apprenticeship programmes, is rarely collected systematically at a detailed level (for example, according to occupation and location), but is key to informing the choices of youth and adults and to guide the decisions of policymakers and training providers. Breakdowns on gender, age or size of enterprises are even more challenging to achieve, even for a few countries. Data on informal apprenticeships is yet more difficult to access.[28] Thus, while the international overview of apprenticeship systems and different types of apprenticeships has improved significantly over the past decade, comparable international data is still lacking, posing a major obstacle for research and evidence-based policymaking.

▶ 1.7 How to read this report

The purpose of this report is to shine a light on key areas where apprenticeships are already being innovative to meet the challenges highlighted above and, drawing on this material, it offers pointers for future developments. However, given the global nature of this report, we must emphasize that the degree of innovation depends on the context. What may be considered innovative in one context may be less so in another. The report provides numerous examples of leading policy and practice from around the world – 19 case studies from 14 different countries and almost 70 boxed "snapshot" examples – to inspire further modernization and transformations. The report has been written not just with the global apprenticeship and WBL "community" in mind, but also as a source of inspiration for all sectors of education and training – the wider "lifelong learning community".

The report is a synthesis of analysis and material provided by some of the world's foremost experts in the field through a **set of thematic papers** commissioned by the ILO as freestanding reports. Some chapters follow these reports more closely than others, and some chapters have been written without such prior work – for example, Chapters 3, 4 and 9. The case studies in this report are, with a few exceptions, **summaries of more detailed case studies** provided together with the thematic papers. For any questions which may arise when reading the subsequent chapters, we recommend that these more detailed reports and case studies be consulted first.

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27 Examples include: ILO, ILO Toolkit for Quality Apprenticeships – Volume 2: Guide for Practitioners: Innovations and Strategies in Apprenticeships, 2020; European Commission, High-performance Apprenticeships and Work-based Learning: 20 Guiding Principles, 2015; European Training Foundation, Work-based Learning: A Handbook for Policy Makers and Social Partners in ETF Partner Countries, 2014; Patrick Werquin, VET Toolbox Guiding Note on Informal Apprenticeship (Brussels: VET Toolbox Coordination Hub, 2021); BIBB Apprenticeship Toolbox; https://www.dcdualvet.org/en/.

28 Some data on African countries has been collected in Deon Filmer and Louise Fox, Youth Employment in Sub-Saharan Africa (World Bank, 2014).

The report is structured as follows. Chapter 2 examines how apprenticeship systems need to change in order to prepare people for good quality jobs in **digital and knowledge-based economies**. Chapter 3 shifts the focus to the green transition and the innovative solutions being developed in apprenticeships to meet the challenge of climate change and the degrading of environments. Chapter 4 provides an examination of the key differences across the globe between **apprenticeships and work-based learning in formal and informal economic contexts** and what this means for modernization. Chapter 5 then zooms in on the issue of how to **boost the participation of enterprises**, key to successful expansion in the scale of apprenticeships, especially among small and medium-sized enterprises (SMEs) and in the light of declining numbers of apprentices in those countries with the most well-known examples of apprenticeships. Chapter 6 looks at **how learner participation can be increased**, including how apprenticeships can be used as a vehicle for tackling issues of inclusion in education and training. Chapter 7 examines how **work-based learning can be strengthened in schools and colleges** in the context that all forms of education and training need to increase their relevance to day-to-day life and work. In this sense, this report also goes beyond a narrow focus on apprenticeships and shows how other forms of education can benefit from successful key elements of apprenticeships. Chapter 8 shifts the focus onto adults and how new forms of apprenticeships can respond to the demand for the **upskilling and reskilling of workers** in an environment of rapid and continual skills changes. Chapter 9 draws together the threads of **flexibility and inclusion** that run throughout the report to provide new insights into how these topics can be addressed across all aspects of apprenticeships from design to delivery and how they connect to other forms of education and training. Chapter 10 provides a comprehensive review and assessment of the latest policy and practice relating to the **use of technologies to improve learning efficiency and effectiveness.** Chapter 11 draws the report to a close by synthesizing a set of **policy messages for the future of apprenticeships**, developing the common themes that recur throughout the report.

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Section A

The big picture: Making provision fit for current and future needs

This section provides an examination of three major aspects that frame current considerations of the form and function of apprenticeships: the digital and green transitions and the role of apprenticeships in informal economies. The chapters on digital and green transitions examine the effects of these transitions on employment and skills and the types of responses required of apprenticeships. The chapter on informal apprenticeships examines how apprenticeships in the context of informality might be enhanced, while respecting the important wider roles that informal apprenticeships typically play.

2

Meeting the skills needs of digital and knowledge economies and societies

Meeting the skills needs of digital and knowledge economies and societies

Knowledge and innovation have played major roles in transforming modern economies and societies since the earliest years of the industrial revolution, but the current wave of digitalization is of a different nature and scale. While machines previously replaced human hands in the workplace, the emerging digitalization is also replacing increasing amounts of "brain-work" in key areas of the economy while opening new employment opportunities. Apprenticeships can play a vital role in these developments, thanks to their ability to respond to labour market signals quickly and flexibly and their potential to develop higher-level skills.

▸ 2.1 Introduction: Employment in the digital and knowledge economies

In terms of their impact on economic and social life, the growth of the knowledge and digital economies is unprecedented in scale, speed and form. Several decades ago, advanced economies were beginning to show ever-increasing "dependence on knowledge, information and high skills levels, and [an] increasing need for ready access to all of these by the business and public sectors",[29] to the extent that the term "knowledge economy" was coined.[30] Commercialization of scientific discoveries and research was starting to form a substantial component of advanced economies in particular, although the growing role of knowledge impacted economic activities across the globe, such as through the outsourcing of low-skilled manufacturing production to middle- and low-income countries as advanced economies shifted to service activities and higher-skilled production.

The use of digital technology played a role in these developments, automating production by replacing manual labour with machines, but it has only been relatively recently that we have started to see the emergence of economies based on digital computing technologies and a new wave of developments brought about by the application of the latest digital technologies (for example, machine learning and AI) to a widening range of production and service activities. This emerging digital economy is the economic activity that results from billions of everyday online connections among people, businesses, devices, data and processes.[31] Its effects are potentially enormous, as the internet of things, AI and the growth of sharing and collaboration platforms disrupt business processes. Somewhat in contrast to the knowledge economy, such digitalization of the economy is taking place everywhere, albeit in different ways, but with the potential to radically reshape how products and services are designed, made and delivered in every country and generating new risks, such as cybercrime and threats to cybersecurity, that need to be matched by skills development.

29 OECD, Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data (Third Edition), 2005, para. 71.

30 Indeed, the popularity of the term is often attributed to Peter Drucker's 1969 book, The Age of Discontinuity.

31 See Deloitte, What is Digital Economy? Unicorns, Transformation and the Internet of Things, 2020 and Usman W. Chohan, "Some Precepts of the Digital Economy", Productivity, Innovation & Technology eJournal (2020).

In terms of employment, the effects of these linked trends of digitalization and the increasing dependence of a growing proportion of jobs on intellectual capital are significant. Global estimates vary, and the impact of automation will differ significantly from country to country, but in 2018 the ILO[32] estimated a midpoint value of 15 per cent for the full-time equivalent of work potentially displaced by automation, and also estimated that between 3 and 14 per cent of the global workforce would need to switch occupational categories. In addition to these substantial displacements, automation is also affecting tasks within occupations. A recent report shows that, between 2016 and 2022, 37 per cent of the top skills requested for the average job in the United States of America have changed.[33] It has also been estimated that at least one third of constituent activities could be automated in about 60 per cent of occupations by 2030.[34]

Significantly, the current wave of automation is of a different character to previous waves due to the application of machine learning and AI to more routine cognitive tasks. We can identify a range of phenomena, as detailed below.

- In terms of occupations, **"complementarity"** and "hybridization" have become the norm, with systems replacing the most routine aspects of people's jobs, giving space to enhance non-routine elements, such as problem-solving and communications. But context also has an effect. For example, the role of hotel receptionist has seen the automation of much routine administration but core skills, such as communication skills, are still valued for dealing with customers. However, at the bottom end of the hotel market, receptionists can be bypassed altogether through online booking and check-in systems. Such trends are also leading to the creation of hybrid occupations,[35] such as cybersecurity analysts, who require deep understanding of computer networks as well as high-level communication and management skills to persuade companies to strengthen their security systems.

- **Polarization in the labour market** is taking place, in which the relative share of mid-skilled occupations based on routine tasks tends to be contracting, while there is growth in both the share of high-skilled jobs (including the "new" jobs in the digital and creative sectors) and low-skilled occupations that are "intensive in social and creative skills", such as care and hospitality, which tend to be less vulnerable than routine manual work to automation[36] (see figure 1[37]). Mid-skilled

32 ILO, The Impact of Technology on the Quantity and Quality of Jobs, 2018.

33 See https://www.bcg.com/press/23may2022-top-20-skills-requested-for-average-us-job.

34 McKinsey Global Institute, Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation, 2017.

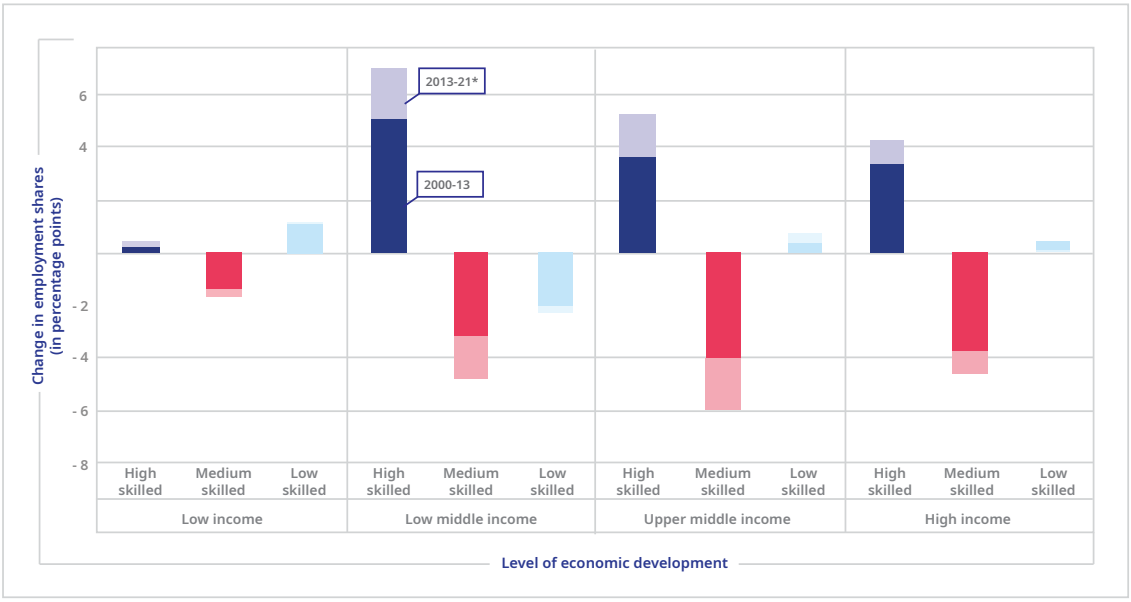
35 This term should not be confused with "hybrid working", which has become commonplace since the COVID-19 pandemic and refers to combining working online/at home with working in a workplace.

36 Carl Benedikt Frey and Michael Osborne, Technology at Work: The Future of Innovation and Employment (Oxford: Citi GPS, Oxford Martin School and University of Oxford, 2015).

37 This figure also shows the differences between countries, notably the fall in the share of low-skilled jobs in lower-middle-income countries.

occupations have traditionally been the heartland of apprenticeships and so polarization poses an important challenge to which apprenticeships are responding. At the same time, it is important to be mindful that in coming years technology may reach into areas that, so far, have been out of reach, such as service occupations and high-skilled work, for example, where AI can replace cognitive tasks.

Figure 1 Global trends in job polarization



Notes: Change in employment shares, in percentage points. Forecasts after 2016.
Source: ILO Trends Econometric Models, November 2016.

▶ **Work based around digital platforms** – "crowd" work or the "gig" economy – is growing, delivering advantages for consumers but posing new challenges for apprenticeships. Platforms such as Uber, Deliveroo, Amazon Mechanical Turk and TaskRabbit outsource work through an open call to a geographically widely dispersed "crowd", and there are also apps that allocate work to individuals in a specific geographical area. These models use IT and the internet to harness the skills of individuals in a very flexible way and at high speed. It is difficult to estimate the scale of the gig economy, and the use of digital platforms varies substantially across sectors and between countries. However, evidence from Europe suggests that between one in ten and one in five people may have done crowd work at some time, often combining it with other types of work, although the share of people earning more than half their income from crowd working is typically less than 5 per cent.[38] Where platform working is fracturing occupations, it poses a challenge to the traditional form of apprenticeships built around well-defined occupations; and other issues associated with the platform-based economy, such as insecure work, casualization of employment, inadequate pay, lack of sick leave, retirement benefits/ superannuation etc., are challenging the role of structured learning and require new flexibilities in learning delivery.

38 Ursula Huws et al., Work in the European Gig Economy: Research Results from the UK, Sweden, Germany, Austria, the Netherlands, Switzerland and Italy (Foundation for European Progressive Studies (FEPS)/Uni Europe/University of Hertfordshire, 2017).

Such trends are likely to have been given a push since early 2020 by the COVID-19 pandemic, which has accelerated the use of digital communications in areas such as online shopping, telemedicine, work based on digital platforms and, more generally, has stimulated greater uptake of remote- and tele-working opportunities. An important consequence of this has been a widening of the "digital divide" (also discussed in Chapters 9 and 10) in relation to access to online services, both within countries and on an international basis, since individuals, social groups and countries with adequate resources have been able to ensure or boost their online capacities and capabilities. It is too early to judge how much and which of the changes that have been witnessed will persist post-pandemic but it is already evident that some changes will be permanent (for example, in online retailing). The World Employment Confederation[39] argues that new forms of more flexible employment may be necessary to achieve the productivity benefits of not having to travel while retaining the social interaction that builds work teams and is the glue of business relationships.

2.2 Changing skills in the labour market

Being successful in the digital and knowledge economy means having not just relevant technical digital skills but also the right core competencies. While the precise mix of technical digital skills in demand in today's labour markets will vary across the spectrum from LICs to HICs, they tend to comprise a number of layers:[40]

- basic digital literacy skills needed by everyone to access technologies, sometimes referred to as "button knowledge" (for example, the ability to use devices to access the internet and to stay safe online);
- digital skills which are required by the general workforce for the meaningful use of technologies in daily life and work (for example, the ability to use software such as Microsoft Office);
- intermediate and advanced digital skills related to occupations that involve transforming existing digital technologies and creating new ones (for example, occupations in software engineering, data coding, machine learning, cybersecurity, etc.).

As noted above, such skills are only part of the story: core competencies are also essential for everyone's success in the workplace. Cyber specialists need negotiation skills to persuade senior managers of the importance of investing in secure systems. Data analysts will be ineffectual unless their work can be communicated effectively.

- While the vital role of core skills has been recognized for many years,[41] it is only comparatively recently that concerted attempts have been made to ensure they are embedded in TVET policy and practice. Definitions of core competencies vary but in 2021 the ILO

Digital skills needs span the entire range of skill levels from basic digital literacy to the most skilled jobs in machine learning and AI

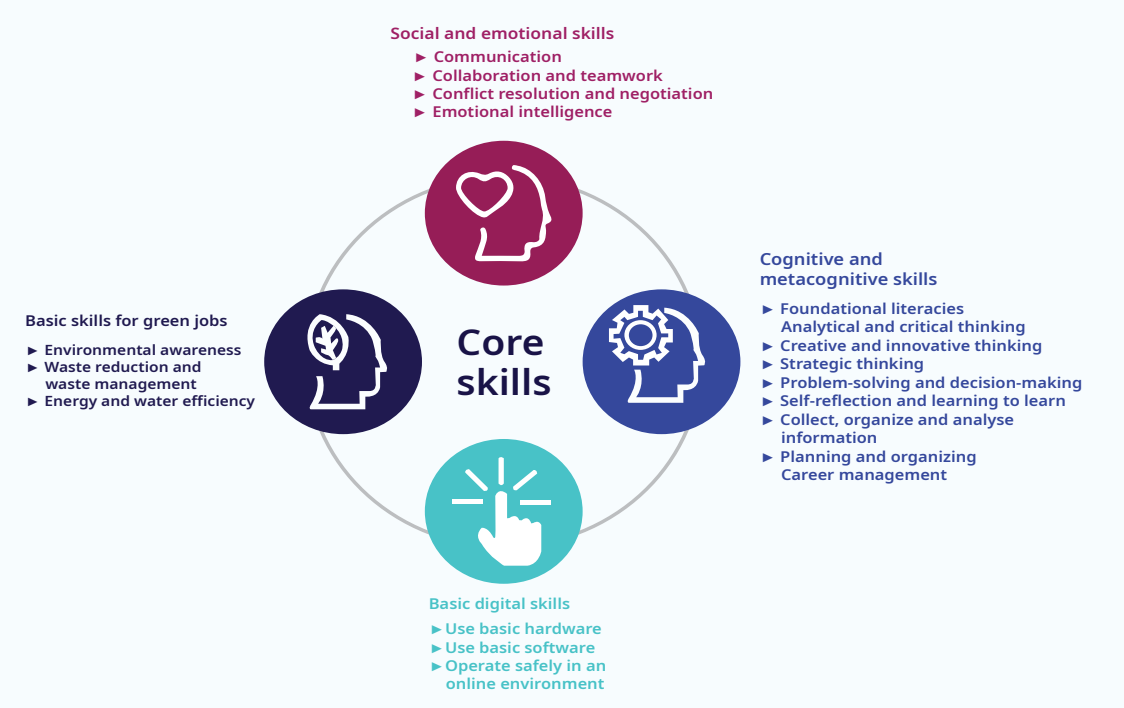
39 See https://wecglobal.org/opinion-piece-post/how-the-covid-19-crisis-is-once-again-reinventing-the-way-we-work/.

40 ILO, Changing Demand for Skills in Digital Economies and Societies: Literature Review and Case Studies from Low- and Middle-income Countries, 2021.

41 For example, at the 2000 International Labour Conference a Resolution concerning human resources training and development was agreed which stated, inter alia: "Individuals are most employable when they have broad-based education and training, basic and portable high-level skills, including teamwork, problem solving, information and communications technology (ICT) and communication and language skills, learning to learn skills and competencies to protect themselves and their colleagues against occupational hazards and diseases. This combination of skills enables them to adapt to changes in the world of work", paragraph 9.

published a framework that captures the key social, emotional and cognitive competencies required, and brings them together with the skills needs of the digital and green transitions, uniting them as a set of "core skills", as shown in figure 2.[42]

Figure 2 Global framework for skills for life and work in the twenty-first century



It is important to recognize that these different types of skills are not mutually exclusive: digital skills tend to overlap with core skills, sometimes having them as a precondition, and sometimes conditioning them; for example, without basic literacy and communication skills people cannot make effective use of technology.[43] Also, what is a core skill in one occupation (for example, communication skills) is a key technical skill for another (for example, TV presenter or broadcaster).

The shifts in employment and skills described above are making a number of new or enhanced demands on education and training systems, including apprenticeships, since they require changes in both apprenticeships for labour market entry and those aimed at upskilling and reskilling people already in the workforce. These shifts are also driving changes in how employment opportunities are distributed globally, with technology opening up new avenues for many countries (see box 3).

Workers in today's labour market need both digital and transversal skills, which must be combined in holistic approaches to skill formation

42 ILO, Global Framework on Core Skills for Life and Work in the 21st Century, 2021.

43 ILO, Changing Demand for Skills in Digital Economies and Societies, 2021.

Box 3 Using apprenticeships to move up the value chain in call centre operations in Jamaica

Jamaica has grown its global services industry by more than 20 per cent per annum as US companies near-source call centre operations. This has been good for the Jamaican economy, but further growth was constrained by challenges in developing supervisory, technical and managerial staff as the industry moved up the value chain from call handling to advising on technical issues. A new industry-led skills council has now developed an apprenticeship programme with over 700 trainees to help tackle this skills shortage. This programme is helping young people in Jamaica to see a more positive future and clearer progression routes in this industry. Lessons from this pilot will be applied to further strengthen the responsiveness of the skills system in other key sectors of the economy.

Source: Simon Perryman, thematic report Promoting Apprenticeships to Meet the Skills Needs of the Digital and Knowledge Economy.

Apprenticeships have great potential to respond to the changes described above and to contribute to the increases in productivity that can flow from digitalization in the economy, not just in technology sectors but across all sectors where technology is a central driver. There are some demands on apprenticeships, and on education and training systems in general, which are key (inclusion aspects are covered in Chapter 9):

- the requirement to ensure that all digital skills needs are addressed, at all levels;
- improving the flexibility and speed of response of apprenticeships so that they can better match the pace of change in manufacturing production, service delivery and new digital industries; and
- providing better opportunities for progression to higher programmes and qualifications.

2.3 Accommodating the full range of digital skills needs

Digital skills are now critical to success in employment and learning programmes need to enable people to acquire skills from basic level through to the highest level of digital skills needed to enter new digital occupations. They also need to be coupled with other essential core skills. Developing such a holistic approach to digital skills development requires concerted efforts across all phases and types of education. It also raises important questions about who pays for the additional investment required and how costs are distributed across beneficiaries – individuals, employers and the state as the embodiment of wider economic and social needs.

Digital skills development needs through-system approaches in which learners are prepared to move from one stage to the next. Initial apprenticeships are "receivers" as well as "suppliers" of skills and apprentices should arrive already equipped with the basic digital skills

The position of digital skills as one component of a wider set of "core skills" has important consequences for how they can be reflected within apprenticeships. First and foremost, it is important that there is a common understanding of the nature of basic digital literacy and that a set of **common generic digital literacy standards** is formulated and integrated into all the occupational/competency profiles that underpin apprenticeships. As indicated above, these need to be part of a wider package of cognitive and social skills in order to be fully beneficial. Such standards should be suitably contextualized within each occupation to ensure their relevance.

At the same time, digital skills development relies on all levels and types of education and training, of course, and not just apprenticeships. Indeed, owing to their position within wider education and training systems, apprenticeships receive learners from earlier education levels and therefore rely on those previous levels to equip apprentices with certain levels of skills. Not only does this suggest that it is important that digital skills policies are treated **holistically** and are clear as to the roles and responsibilities of different types and levels of education, but it also means that apprenticeships may need to provide **remedial support** for apprentices who lack a good foundation of digital skills so that they are able to fulfil their duties with employers. This is an important inclusivity dimension. Digitalization is also opening up opportunities for more inclusive learning, as shown in Chapter 10. It is also important that clear **pathways** are created around WBL and apprenticeships which enable people to understand how they can progress from general literacy skills up to high-level skills at the level of digital professionals, for example, in coding and machine learning.

One approach to digital skills development is to bring together relevant opportunities under a single umbrella or portal (see box 4 and Case Study 2). Such facilities can be populated with the widest range of work-based digital user skills development programmes that support digital literacy, workplace user skills and professional skills development.

Box 4 Offering a comprehensive range of programmes for digital skills development in Singapore

Singapore offers a comprehensive and flexible programme of skills development to support digitalization involving apprenticeships for young people as well as a wide range of other work-based employer and individual digital skills development programmes aimed at adult upskilling and business development. To maximize visibility and access, these programmes are brought together as part of the SkillsFuture portal (which also covers other non-digital skills). The portal acts as a marketplace and content library, where key global providers of content and learning can provide information to attract interest in industry, offer online learning and provide links to more in-depth certificated programmes. Programmes have a strong and growing focus on WBL, and include: one- to two-day taster courses; a modular development programme run by technical training institutions; full-time graduate and higher skills programmes that include internships in tech companies.[44]

Another critical aspect of skills development relates to ensuring that **teachers and in-company trainers** are equipped with the necessary skills to meet the needs of their students in the digital and knowledge economies (box 5). Teachers and in-company trainers need to have opportunities through initial and continuing professional development to acquire digital skills, not just at basic level but to equip them to teach students and apprentices in the latest technologies. Being able to keep up to date is particularly important in the fast-moving digital field (see Chapter 10 where this topic is covered in more detail).

Box 5 Equipping teachers and trainers for the digital transition: Examples from Europe

In **Estonia**, a number of steps have been taken over several years to support teachers' digital skills development. For example, the Digital Focus Programme developed the digital skills of all teachers, including VET teachers, who also received support for using and updating digital resources. There has also been a focus on developing e-assessment tools. These tools have been developed as a way to assess the professional components of VET apprenticeships, in which representatives of selected professions have proposed parts of professional exams to be assessed digitally. Teachers have also received training in the use of e-assessment tools.

44 See https://www.skillsfuture.gov.sg.

In **North Macedonia**, the pilot project Digitalschool.mk helped vocational teachers to use digital instructional tools in their teaching. "Lead teachers" were trained to use Moodle tools and, in turn, they trained and mentored more teachers in their schools, rolling out the programme across the country. Teachers were in charge of all aspects of the programme, including designing websites, materials, training and support processes. In the classroom, teachers were able to use the tools that were most suited to their particular subjects, with quizzes, programmed learning and video being the most popular. In some schools, teachers were challenged by a lack of computers and unreliable internet connectivity.

Source: European Commission, Directorate-General for Employment, Social Affairs and Inclusion, 2019.

2.4 Improving speed of response and flexibility

While the need for greater labour-market responsiveness – and hence agility – has long been on the agenda, the pace of technological advancement demands even greater agility and flexibility. Digital technologies change rapidly, creating challenges in keeping standards and curricula up to date and requiring systems to refresh more quickly and to be agile in adapting to hybridization as the lines between occupations blur and new occupations emerge.

In some ways, the starting point for ensuring that apprenticeships are fit for the digital and knowledge economies is to make sure that they are underpinned by good quality, up-to-date **skills intelligence**. Effective skills forecasting mechanisms are critical for designing apprenticeships that are well tuned to labour market needs. Although many countries have been developing mechanisms to identify and anticipate skill needs over the past decade, there is scope to enhance their capacity to provide comprehensive information related to skills for green jobs. Where such mechanisms are lacking – notably in LICs – identifying green skills demands tends to be done through, for example, one-off studies, which makes it difficult to develop finely tuned skills development responses. Working in a systematic way with stakeholders who have detailed, first-hand knowledge of the specific skills needed is key to success. Successful skills anticipation mechanisms combine quantitative employment forecasting techniques (increasingly making use of "big data" collection and analysis methods, for example, of online job advertisements, see Chapter 10) with qualitative insights from stakeholders in industry. In some ways, digital skills are ideal for the application of such techniques since employers seeking recruits for digitally focused jobs make extensive use of online job advertisements. However, significant issues remain: recent research suggests that there is a need for more granular data at the level of skills and regions to fill a gap between evidence at the level of sectors and occupations on the one hand and global and national levels on the other. Proposed solutions include refining industrial and occupational classifications, improving modelling techniques and making more use of skills surveys and other data sources, such as online job advertisements.[45]

Effective skills forecasting mechanisms are a vital prerequisite for skills development, especially in an era of rapid change

Apprenticeships' engagement with social partners enables them to pick up labour market signals rapidly compared to other types of education and training. Indeed, **private sector leadership and partnerships** can play an important role in meeting digital skills needs by bringing together leading employers from IT, telecommunications and other key sectors affected by digitalization, supported by their sector trade

45 Felix Zaussinger et al., "Labour Market Impacts of the Green Transition: The Need for More Granular Data", in Apprenticeships for Greener Economies and Societies (Cedefop and OECD, 2022).

or skills organizations, to explore skill needs, map key occupations and determine how apprenticeships need to be adapted. Private sector leadership can also be behind the establishment of solutions such as digital skills portals (see Case Study 2).

The speed of change in our digital world requires significant systemic changes in apprenticeship design and delivery

Improving agility also means examining how to use apprenticeships to support **digital user skills updating in the workforce**, including by rethinking the concept of on- and off-the-job training to support more flexible and smaller apprenticeships based on modular standards, using online delivery and mentoring along with traditional methods (also see Chapter 10). At the same time, it will be important to be aware of the challenges of modularization, such as the risk of fragmenting occupational skills, and, where remote self-study is involved, issues of student motivation, weakened relationships with teachers, connectivity challenges and reliance on access to technology. In Australia, for example, some standard digital resources have been created for the electrotechnology sector, which Technical and Further Education (TAFE) institutes use in blended learning environments. This approach helps to maintain the relationship and connectivity between teacher/mentor and student, while also standardizing training and utilizing a modern platform. It is important to ensure that modules are developed as part of an overall occupational framework, in order to avoid uncontrolled fragmentation, with clear progression pathways and the flexibility to move from vocational education and apprenticeships to higher education (see box 6 and also the discussion on modularization in section 9.3).

Box 6 Unbundling programmes into smaller units for greater flexibility in Australia

Australia's Digital Transformation Skills Strategy includes the development of "future focused training products", to be achieved by "strategically reviewing apprenticeship Training Packages through the lens of digital transformation" and making sure that apprenticeships can be completed more quickly based on competence acquisition and not duration of learning. "Training packages" are increasingly being broken down into smaller "Skillsets" that can be customized and used as short courses for skills updating in the workplace. Skillsets developed during 2021 in digital skills include cloud design and implementation, cyber incident response, cybersecurity insider risks and threats, data analysis and support for 5G rollout.[46]

Flexibility in the form of new ways of learning and the opening up of qualification systems to enable modular learning is key to enabling people in work to update their digital skills through high-quality programmes linked to recognized credentials. It is also important that education and training is flexible enough to support people in newly emerging hybrid occupations and those with low levels of skills in the gig economy, where work is precarious and there are few opportunities for formal skills development. It needs to be possible to **combine units flexibly within occupational or competency standards** to accommodate the hybridization of work and the "blurring of lines" between different occupations.

Further, in the globalized tech sector, there is an opportunity for public provision to link with the opportunities afforded by the company training and vendor credentials that tech companies have developed and which are now common currency for entering digital occupations so that both sides benefit (see box 7).

46 Digital Transformation Expert Panel, The Learning Country: Digital Transformation Skills Strategy, 2021.

Box 7 Partnering with large tech firms in India to realize the potential benefits of cooperation

Microsoft has trained 3 million people in India during the COVID-19 pandemic[47] as part of a worldwide initiative to train over 30 million people, including through a partnership with LinkedIn and the platform work-sharing site GitHub. In partnership with Government, the National Skill Development Corporation and NASSCOM, Microsoft has also supported Industrial Training Institute students to gain digital skills and has trained 100,000 disadvantaged young women. It has also created an AI initiative that aims to skill 1 million people. Technology staffing firms, such as TeamLease Digital, are partnering with large tech companies to train new staff in specific skills before they are released onto projects.

Micro-credentials frameworks, like those adopted in the Philippines,[48] Australia[49] and New Zealand,[50] provide a key step forward in determining the relationship of micro-credentials to full qualifications in state-managed systems (box 8).[51]

Box 8 The national micro-credentials framework in Australia

In Australia, a framework was published in late 2021 which:

- sets a national definition for micro-credentials
- agrees on unifying principles for micro-credentials
- establishes critical information requirements
- outlines a minimum standard for micro-credentials that will sit on a Microcredentials Marketplace.

Announced in June 2020 by the Department of Education, Skills and Employment, the Microcredentials Marketplace is intended to be a "user-friendly, nationally-consistent platform that allows learners, employers and providers to compare short courses".[52]

More generally, clear policies and approaches regarding the relationship of publicly funded qualifications and programmes to vendor credentials can play an important role. Such micro-credentials have the potential to fit within apprenticeships (for example, Pearson has integrated the option to gain CompTIA and Cisco certifications alongside their range of IT BTEC qualifications, and see also the example of Ireland in box 50, section 9.3).

Enhancing flexibility and agility also involves recognizing the particular challenges faced by **small companies** (lack of time and resources to engage in skills development) and supporting inter-company collaboration, for example, through Chambers of Commerce and Group Training Organizations, as used in Australia and elsewhere, to coordinate the delivery of digital user skills apprenticeships among smaller

47 See https://news.microsoft.com/en-in/close-to-3-million-people-in-india-acquire-digital-skills-during-covid-19/.

48 TESDA, "Implementing Guidelines on Recognition of Micro-Credentials for Lifelong Learning and Upskilling/Reskilling's of Learners in Technical Vocational Education and Training (TVET)" (TESDA Circular 048-2021), 2021.

49 See https://www.dese.gov.au/national-microcredentials-framework.

50 See https://www.nzqa.govt.nz/providers-partners/approval-accreditation-and-registration/micro-credentials/.

51 Also, in June 2022 the Council of the European Union adopted a Recommendation on a European approach to micro-credentials for lifelong learning and employability: see https://www.consilium.europa.eu/en/press/press-releases/2022/06/16/council-recommends-european-approach-to-micro-credentials/.

52 See https://ilpasiapacific.com/national-micro-credentials-framework-australia/.

companies (see also Chapter 5). At the same time, in Australia it has been found that care needs to be taken to ensure that apprentices get the experience they need across companies to become well-rounded tradespeople, and are not utilized by companies only for the duration of specific projects, thereby limiting their skills development (see the thematic report *Promoting Apprenticeships to Meet the Skills Needs of the Digital and Knowledge Economy* by Simon Perryman).

▶ 2.5 Providing better opportunities to progress to and acquire higher-level technical and professional skills

The development of the knowledge and digital economies entails both increased demand for high-level skills and the loss of jobs and occupations requiring middle-level skills. To meet the demand for higher-level skills, there is an opportunity to develop **apprenticeships at higher (tertiary) levels** that provide alternative pathways to general/academic educational routes for those individuals who flourish in the practical learning environment that apprenticeships deliver. The example in box 9 shows how this can be beneficial in the context of jobs even in a sector like financial services, where entry routes have traditionally been dominated by general education pathways – and which can also use the capabilities of apprenticeships to deal with wider social issues, such as inclusion (discussed further in Chapter 9).

Box 9 Banking apprenticeships in the United Republic of Tanzania: Showing that apprenticeships can also be for high-skilled occupations

The United Republic of Tanzania embarked on a mission to establish formal apprenticeships in 2017 with the support of the ILO, starting with the tourism sector, in response to serious skills shortages, graduates not meeting the needs of the job market and employers incurring high costs in acquiring and training their staff. Success in this sector, with 85 per cent of graduates able to secure full-time employment within three months of graduation and enhanced opportunities for young (mainly Muslim) women, has inspired the adoption of the apprenticeship model of training in banking and finance. This is the first time that apprenticeship has been used in the knowledge sector.

Two different degree-level apprenticeships were designed, a Bachelor's in Insurance and Risk Management and a Bachelor's in Banking. The programmes are ranked as National Technical Awards at levels 7 and 8. The ILO has provided capacity building and financial support to enable the recruitment of 212 apprentices, including 108 women. Implementation of these programmes has challenged the narrative that apprenticeship is only effective for lower-level skills and proved that adopting an apprenticeship path based on extensive consultation and collaboration with employers can be highly successful.

Apprenticeships can also be used to develop alternative high-quality routes into digital professions, such as AI and machine learning. One way to do this is through **public–private partnerships**, which involve employers in the definition of occupational standards to ensure consistency across levels and promote coherence between workplace and university components (see box 10 and Case Study 1). Such partnerships can also be a means of finding solutions to the issue of how development costs should be distributed; for example, through the contributions of tech companies.

Development of higher-level apprenticeships could play a key part in digitalization by opening up alternative pathways to high-skilled jobs

Box 10 Developing higher-level apprenticeships to meet tech sector needs through public–private partnerships

In England, the IT and telecommunications (tech) sector has a strong sector skills organization, called TechSkills, funded and led by the industry, which has created a set of degree-level apprenticeships under the "Tech Industry Gold" banner. This scheme links 35 universities with companies to develop integrated programmes in Digital and Technology Solutions and other tech disciplines at BSc and MSc level. Companies involved include tech firms, such as IBM and Cisco, and those that deploy technology, such as banks, fintech, defence, aerospace and online retail. More than 4,000 individuals have taken part in Tech Industry Gold programmes. Evaluation evidence from one of the leading providers, Manchester Metropolitan University, shows a high level of social and ethnic diversity in their intake and a 50:50 gender balance. Students showed an initial lack of confidence, but 80 per cent of the first cohort achieved a first-class degree and average earnings after one year exceeded those of graduates from the top five universities in the United Kingdom. Challenges have included building the infrastructure to run the programmes, upgrading staff knowledge and skills and learning how to work with industry.[53]

As noted above, along with the development of jobs that need higher-level skills, digitalization is also causing the loss of jobs that require middle-level skills. Both trends require **clearer pathways up the skills ladder** to be put in place and the development of a wider range of options, including higher-level apprenticeships like those described in box 10. Without such supports, displaced people in middle-skilled roles are likely to "bump down" in a more polarized labour market, and the advancement of people with lower skills will be inhibited. Currently, less policy attention appears to have been focused on this issue than on the development of apprenticeships at higher levels.

2.6 Key takeaways for policy

The digital transformation is ushering in a series of profound social and economic changes whose scale and scope make it vital that apprenticeships are appropriately geared up to respond. This is not just a question of meeting current, emerging challenges but also involves trying to make sure that apprenticeship systems are as future-proof as possible. Key systemic changes can include:

- ensuring that **skills anticipation systems** are capable of accurate and timely forecasting and are also able to cope with the speed of change in digital skills by making use of the latest advances in AI, machine learning and big data analysis to capture key data from online sources such as job advertisements;
- making sure that **common digital literacy standards** are adopted and are embedded in the curriculum of all apprenticeships by reviewing **occupational (or competency) standards and learning outcomes** – and that they are made available both to young people entering the labour market and for upskilling and reskilling existing workers;
- related to the preceding point, **reviewing the processes by which apprenticeships are updated** to see how they might be speeded up in order to keep pace with changes in technology;

53 For further details, see TechSkills, Annual Review, 2021, p. 35.

- considering apprenticeships in the context of the wider education and training system with a view to opening up **clear pathways for digital skills** so that people can progress from basic to more advanced levels and into careers at high levels via apprenticeships;
- in light of the last point, reviewing the possibilities for developing the portfolio of **apprenticeships for the digital/tech sector**, which are often under-developed, especially at higher levels;
- considering how apprenticeships should engage with **micro-credentials** (digital badges), which play a key role in entry into employment and career progression in the tech sector and in jobs with a high digital content;
- ensuring that **teachers and in-company trainers** are provided with opportunities to upgrade their digital skills on a regular basis;
- ensuring that there is **no "digital skills divide" in apprenticeships** by making remedial support available, whenever necessary, as part of an apprenticeship, whether for young people or as part of upskilling and reskilling measures.

Case Study 1

Australia's Industry 4.0 Higher Apprenticeships project

Australia has a long and successful history of apprenticeships/traineeships for both trade and non-trade occupations. These are structured around Training Packages designed in collaboration with each industry and with strong use of Group Training Schemes and Apprenticeship Agencies. Skills policy is devolved to State and Territory level with a degree of federal coordination.

Australia faces a major challenge in adapting to the decline of traditional manufacturing and embracing digital technologies, standing as it does "on the cusp of a new industrial revolution"[54]. The Australian Industry Group – the employer body whose members employ over 800,000 people – has expressed the need to "re-tool the nation" and identified that "the only place this technology (AI) exists is in the workplace, so work-based learning is a necessity". The apprenticeship system has been identified as being ideally positioned to meet the need for urgent reskilling because of its place at the "intersection between education and the workplace". Indeed, "the education system should not always have to chase the future; it should be part of it".[55]

Industry is keen to extend the apprenticeship model to higher-level qualifications. Several pilots have been implemented, including an Industry 4.0 pilot between Siemens and Swinburne University, supported by the Australian Industry Group. The pilot developed a new two-year Diploma and Associate Degree in Applied Technologies. Some 20 students joined the pilot, with 17 in the second cohort. This programme has now been extended to Siemens' supply chain, across South Australia and into other States.

In terms of lessons learned, the pilot has shown the importance of close collaboration between companies and universities, and has highlighted a number of important points about the systemic challenges at the interface between the technical and vocational education and training (TVET) and higher education (HE) systems. For instance, problems arose in getting the qualifications accredited as TVET rather than HE and it proved difficult to create a sustainable funding model (to support costs such as equipment upgrading and teacher skills development) because a combination of funds from State and federal levels had to be used.

The full case study can be found in the thematic report Promoting Apprenticeships to Meet the Skills Needs of the Digital and Knowledge Economy by Simon Perryman.

54 Hugh Durrant-Whyte, "Future Skills in Information Technology", in Australia's Future Workforce? (Melbourne: Committee for Economic Development of Australia, 2015), 234–239.

55 Megan Lilly, "What is Required for Australia to Strengthen its Value and Commitment to a Quality Apprenticeship System?", in The Future of Australian Apprenticeships, eds Margo Couldrey and Phil Loveder. Report of the Stakeholder Forum, Canberra, 25 October 2016.

Case Study 2

Private sector leadership and leveraging the value of tech multi-nationals in India

The tech sector is booming in India and skills development is seen as a critical component of success. Around 4–4.5 million people are employed in the sector and in 2018 the Government doubled its budget for its Digital India programme to US$480 million with ambitious targets to grow the digital sector to a US$1 trillion industry. It is claimed that India has now become the third largest tech-based start-up hub in the world, attracting investments totalling US$4 billion.

Skills development in the tech sector is led by NASSCOM,[56] which is one of 38 Sector Skill Councils established by the National Skill Development Corporation. As the main trade body and chamber of commerce of the tech sector, NASSCOM comprises over 3,000 member companies, including both Indian and multinational organizations that have a presence in India. One of its key tasks is to develop Qualification Packs and set Occupational Standards for training and apprenticeship.

NASSCOM recently released a White Paper[57] which argues that India has the potential to become the "talent capital of the world", with millions of young people entering the workforce in the next decade as they graduate from colleges, while the World Bank estimates that about 69 per cent of jobs in India are threatened by automation and the country has a short window in which to bring about skilling reforms,[58] with huge investment needed in lifelong learning, reskilling and upskilling of the digital skills of Indian workers to enable them to keep pace with technological change.

In response, NASSCOM has developed a sophisticated web portal-based programme called FutureSkills Prime (FSP)[59] to attract new talent to tech and support the upskilling of those in the industry. They have identified 155 priority skills across 70 job roles in ten emerging technologies. The aim of FSP is to reskill 2 million professionals, students and potential employees over a period of 5 years. The portal acts as a marketplace and content library, to provide information and attract interest in the industry, offer continual online learning opportunities and provide links to more in-depth certificated programmes. Most of the basic e-training courses are available free of charge.

The full case study can be found in the thematic report Promoting Apprenticeships to Meet the Skills Needs of the Digital and Knowledge Economy by Simon Perryman.

56 See https://www.sscnasscom.com/Home/Purpose.

57 Kirti Seth and Swati Saini, India: The Rising Talent Capital of the World (NASSCOM, 2019).

58 Business Today, "Automation Threatens 69 Per Cent Jobs in India: World Bank", BusinessToday online, 11 October 2017.

59 See https://futureskillsprime.in/.

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3 Enabling the green transition

Enabling the green transition

The world faces unprecedented challenges in the environment with human-made environmental degradation, loss of biodiversity and climate change already affecting how and where people can live and work. The greening of the economy and society is essential, and apprenticeships have a central enabling role to play in delivering the skills needed: being close to business they have their finger on the pulse of change to a greater extent than other elements of the education and training sector, and changes in apprenticeships have more immediate effects on the economy and society.

▸ 3.1 Introduction: Effects of the green agenda on employment and skills[61]

As the IPCC has highlighted, the world is at "code red" level.[62] In response, our economies and societies need to undergo a "green transition" in which products and services become carbon-free and as sustainable as possible. Green economies need to be created that are "low carbon, resource efficient and socially inclusive"[63] with a "just transition for all"[64] and the creation of "green jobs" – decent jobs that contribute to preserving or restoring the environment.[65] Ultimately, we shall need to create circular economies in which production and consumption is "moving away from an extract–manufacture–use–discard model and embracing the recycling, repair, reuse, remanufacture, rental and longer durability of goods".[66] The COVID-19 pandemic has demonstrated humanity's vulnerability to negative environmental impacts and we need to ensure that the recovery from it is as green and inclusive as possible (see box 11).

61 Much of this section is derived from ILO, Skills for a Greener Future: A Global View Based on 32 Country Studies, 2019.

62 IPCC, Climate Change 2021: The Physical Science Basis, 2021.

63 United Nations Environment Programme, "Green Economy", accessed 29 April 2021.

64 ILO, Guidelines for a Just Transition towards Environmentally Sustainable Economies and Societies for All, 2015.

65 ILO, Technical Paper: A Just Transition to Climate-resilient Economies and Societies: Issues and Perspectives for the World of Work, 2016.

66 ILO, World Employment and Social Outlook 2018: Greening with Jobs, 2018, p. 37.

Box 11 How apprenticeships for green jobs can change lives: An apprentice speaks

For Muhammad Taher Muhammad al-Tahri the war in Yemen ended the dreams he had of becoming an electronic engineer. Despite being an outstanding student in high school, there were no opportunities for work once he had left school. Young and unemployed, Muhammad fell into despair.

Then one of his old classmates told him about an apprenticeship in **solar panel installation, repair and maintenance** run by the ILO and the Ghadaq Organization for Development – and his life changed. As Muhammed says: "In the past, I was a young man without any goal in life, but now, thanks to the apprenticeship programme I have goals and an occupation!"

Muhammed found the apprenticeship to be really comprehensive because of the combination of work experience and knowledge gained. He now wants to learn more and set up his own business. The impact has been enormous: "The apprenticeship has changed my life, thanks to God, and in a big way. My living conditions have improved. I am able to support my parents and younger siblings, and I am now on my way to achieving my goals in my personal life."

Source: ILO, 2022a.

The employment effects of transitioning to greener economies are likely to be substantial owing to the huge investment that will be needed to bring about the transition. Some jobs (for example, in coal mining) will be eliminated or disrupted, but this may amount to only 2 per cent of jobs globally (approximately 80 million), while over 100 million jobs may be created, giving net jobs growth of 20 million by 2030 (in the energy sustainability and circular economy scenario). Impacts on individual countries could be significant; for example, 8 million new jobs could be created in sustainable agriculture in Egypt by 2050.[67]

However, there is no guarantee of a smooth transition everywhere. Job creation may take place (without government intervention) in localities that are different to those experiencing jobs losses and may affect various groups in the population differently – hence the need to take steps to ensure a just transition. To show how this can play out in concrete terms, North America's Building Trades Unions (NABTU) have shown that the pay and conditions of workers in skilled construction trades may be degraded in the move from oil and natural gas into the renewable energy sector; and differences in skills needs between the sectors will require significant – and costly – reskilling for tradespeople.[68]

67 ILO, 2019a, p. 87.

68 NABTU, "Construction Job Quality Across the US Energy Industries", 2020.

The most significant effect of the green transition will be to **reshape existing occupations rather than to create new ones**, although some new occupations will be created, especially at higher skill levels (see below). Patterns will vary across sectors.[69] The renewable energy and the environmental goods and services sectors, which includes waste, energy and water management, have been key sources of new green jobs growth to date in most countries. In many sectors, however, the employment effects of the green transition are variable and complex; for example, some parts of manufacturing, such as the automotive sector, are gradually switching to electric vehicles with mainly job substitution taking place, while other parts of manufacturing are producing green products, such as wind turbines. In construction, employment effects reflect the degree to which existing buildings are greened through retro-fitting or whether a new-build solution proves to be the greener option in a given situation. Of particular relevance to LICs is the greening of the agricultural sector, which is prone to significant climate change challenges and is a major employer in most developing countries, and where there seems to be substantial scope to make jobs greener. The potential for green jobs in transportation, tourism and extractive industries is yet to be fully realized, the latter two again being of particular relevance to LICs.

In **existing occupations**, workers need reskilling or upskilling, for example, in the use of new green materials in construction, while all occupations need to develop skills in recycling, waste management, etc. In contrast, **new green occupations** are comparatively rare and these require new sets of skills; they tend to emerge at higher skill levels, such as solar-panel installers or wind-turbine technicians.

Skill effects vary according to the **level of skill:**

- in low-skilled jobs, greening tends to need generic skills (for example, in environmental awareness and simple adaptations to work tasks, such as waste collection);
- in medium-skilled jobs, important technical skills changes are needed in existing occupations, such as construction (for example, energy efficiency skills), along with some new green occupations, for instance wind-turbine operators;
- most new green occupations involve high skill levels (for example, climate-change scientists, agricultural meteorologists) and there are significant demands for new skills in existing jobs, such as engineering.

While skill effects vary according to level, some form of skill change is necessary in every occupation. Indeed, a set of "core" skills for green jobs is needed across the whole labour force, as illustrated in box 12. It might be noted that this list is quite similar to the core skills required for digitalization (Chapter 2), which offers opportunities for synergies within policies and practices.[70]

69 ILO, 2019a, p. 111.

70 Other classifications include the European sustainability competence framework ("GreenComp") developed by the European Commission.

Box 12 Core skills needed for the green transition in all jobs

- Environmental awareness and protection; willingness and capability to learn about sustainable development.
- Adaptability and transferability skills to enable workers to learn and apply the new technologies and processes required to green their jobs.
- Teamwork skills reflecting the need for organizations to work collectively on tackling their environmental footprint.
- Resilience to see through the changes required.
- Communication and negotiation skills to promote required change to colleagues and customers.
- Entrepreneurial skills to seize the opportunities of low-carbon technologies and environmental mitigation and adaptation.
- Occupational safety and health (OSH).

Source: ILO, 2019a, p. 30.

3.2 Towards greener apprenticeships

The scale and complexity of the skills development needs described above mean that action is already under way across the globe for the "greening of apprenticeships". However, although many systems are adjusting to the rise of new "green" products and services, such as renewable energy, through the provision of appropriate apprenticeships and WBL, "most countries [...] have not developed a systematic approach to incorporating skills for green jobs into their TVET systems, and into the development or renewal of their TVET qualifications, since 2011".[71] This is not so much a question of top-down "master planning" for the greening of apprenticeships; rather, it is about making sure that there is sensitivity to the needs of the green transition at all levels within apprenticeship systems and that action is taken accordingly to ensure that every piece of the apprenticeship "jigsaw" undergoes the greening process.

Apprenticeships – of all forms of education and training – are particularly well placed to be part of the response to environmental challenges. First, the strong connection between apprenticeships and employers means that changes that are made in apprenticeship systems (including standards, curricula and teaching methods) can affect workplace activities from the first day that apprentices are with their employers. Second, apprentices experience changes in the economy and in skills demands more directly.

Indeed, many adjustments to TVET provision implemented to take into account the needs of green jobs could be considered to be at the "light green" end of a spectrum that runs from light green to "deep green". **Light green** activities are a relatively passive response – a starting point for introducing green elements into apprenticeships. They tend to focus on those occupations that are most directly impacted by environmental challenges and deal predominantly with technical skills; for example, to meet the needs of new "green" tasks, such as wind turbine installation. **Deep green**, on the other hand, is

71 ILO, 2019a, p. 165.

more systematic and is "intended to raise the green awareness of the students themselves, and have them inculcated as part of the work values later on when they join companies".[72] Deep greening involves innovations and adaptions in all curricula and qualifications, irrespective of the occupation at which an apprenticeship is targeted. Importantly, it means focusing not just on technical skills but also on the type of core skills mentioned above – for example, critical thinking, problem-solving, resilience, adaptability and collaboration – and introducing new ways of teaching and learning to enable apprentices to acquire them in a systematic way. In turn, this requires greening of the professional development of teachers and in-company trainers.

Achieving a full green transformation involves not just minor adaptations but systematic rethinking of the skills people need to develop greener mindsets and the methods to deliver them: a "deep green" approach

What are the lessons from innovations in apprenticeships that will help us to develop systems and practices in this direction? To be most effective, packages of measures should be created that integrate all necessary elements, and which ensure the benefits of the green transition are fairly distributed and contribute to a just transition (box 13). At the heart of apprenticeship lies a mix of work-based and school-based learning and the qualifications, curricula, teachers and in-company trainers associated with them. Surrounding this core is the essential "infrastructure" comprising: national/regional strategies and the associated decision-making structures and processes; skills anticipation measures; and sectoral initiatives. The next sections examine these elements in more detail.

Box 13 Example of a package of measures for greening

In 2020, Zimbabwe's Green enterPRIZE programme launched a set of new TVET curricula focused on key parts of its green economy – climate-smart agriculture and renewable energy.

Working closely with the ILO, the TVET elements were developed between 2017 and 2021, and involved a wide range of stakeholders, including relevant ministries and social partners. The programme involved: research on the supply of and demand for skills for green jobs; assessment of provider capacity; curriculum development and validation; trainer training; and provider action plan development and implementation.

Source: https://www.ilo.org/africa/countries-covered/zimbabwe/WCMS_623951/lang--en/index.htm.

▶ 3.3 Developing greener frameworks

Although most countries now have bodies of environmental legislation and progress has been made with respect to green jobs strategies, comprehensive and coordinated approaches to skills for green jobs are needed. LICs especially suffer from the lack of such approaches. In many countries, stakeholders such as business organizations, civil society groups and regional and local government authorities have been in the forefront of advances, working to develop greener provision from the bottom upwards for individual sectors and localities or regions. But adopting well-developed national approaches to skills development for green jobs – and integrating apprenticeships into national/regional/sectoral skills strategies linked

72 Maria Concepcion E. Sardaña, Chief Technical Adviser to the ILO-SIDA Project on Skills for Trade and Economic Diversification (STED), quoted in "Boosting Cambodian Workers' Competitive Edge with Green and Safety Competencies", 4 June 2018.

to the green agenda – has many advantages: more systematic approaches can be taken; all relevant sectors can be covered; existing apprenticeships can be greened and new apprenticeships, including at higher levels, can be created where needed (for example, engineering for wind turbines); and gaps in provision can be avoided (box 14). This is especially important in sectors which have yet to respond to the green transition.

Green economy strategies should include comprehensive strategies for developing skills for green jobs systematically and based on social dialogue

Box 14 Coordinating environmental, industrial and skills policies and stakeholders in India

In India, the national Government seeks a holistic approach that coordinates activities across ministries and private sector bodies. The Skill Council for Green Jobs was set up in 2015 under the National Skill Development Mission and is promoted by the Ministry of New and Renewable Energy and the Confederation of Indian Industry. The Council is a not-for-profit, autonomous, industry-led society, incorporated under the Societies Registration Act. Its objective is to identify skills needs within the green business sector and to implement nationwide, industry-led, collaborative skills development and entrepreneur development initiatives, which includes highlighting the wider business benefits than can flow from greening. Its governing council includes representatives of Government ministries and employer bodies as well as individual employers. By 2019, the Council had over 500 affiliated training centres across 24 states, and has now certified more than 400,000 training candidates.

Source: ILO, 2019a; Skill Council for Green Jobs website.

Stakeholder involvement

Achieving the green transition in skills development requires commitment from all relevant stakeholders. Spanning the worlds of employment and education, apprenticeships are well placed to build collaborative structures. Through such arrangements, social partners can help to ensure that provision is responding to the need for green skills and improve coordination between environmental and green jobs policies. Employers are typically prominent players in such structures, but trades unions can also play an important role in the workplace in promoting skills development (box 15).

Box 15 How trades unions can take a leading role in green skills development in the United Kingdom

In the United Kingdom, the Trades Union Congress (TUC) supports its member unions in developing green or environmental workplace representatives, and thereby encouraging employers to focus on green issues that can lead to the creation of new green jobs and skills. Through discussion with employers, union representatives are reaching agreements to extend the scope of union activities to cover environmental issues such as energy use, recycling and green travel plans and working with employers to train staff. For example, the Bakers, Food and Allied Workers' Union has worked with a major retail baker to extend the role of workplace safety and health representatives into green issues (becoming safety, health and environmental representatives) and to train staff and raise environmental awareness.

Source: unionlearn, 2020.

For groups not represented through social partners, civil society (and non-governmental organizations (NGOs)) can play a key role in helping to ensure that apprenticeships meet social as well as economic needs, which is especially important in LICs, where there is a large informal economy. Social partnerships on the green economy can also play a key role, like South Africa's Green Economy Accord,[73] which targeted the creation of 300,000 new jobs by 2020.

Skills anticipation mechanisms

As discussed in the preceding chapter, effective skills forecasting mechanisms are essential for making sure apprenticeships are well tuned to labour market needs, and they have therefore been found to be a prerequisite for the (re)design and updating of apprenticeship programmes for the green transition (box 16).

Effective skills forecasting mechanisms are a vital prerequisite for skills development for the green economy

Box 16 Using a wide range of methods for skills forecasting for greening apprenticeships in Costa Rica

In Costa Rica, the National Institute of Apprenticeship (Instituto Nacional de Aprendizaje, INA), which is responsible for designing and implementing training programmes in collaboration with other public and private institutions, identifies skills needs in three ways: direct contact with companies and workers; research studies which it conducts itself; and agreements or other mechanisms established with chambers of commerce, associations of enterprises or government bodies. A constant flow of information and feedback enables a timely response to emerging needs as a result of greening in the labour market.

Source: ILO, 2019a, p. 162.

Private sector leadership

Policies and plans at sectoral or subnational governmental levels can be enhanced when they harness private sector leadership. It is important that sectoral skills development plans incorporate consideration of the skills needed for the green transition. This tends to be most common in those sectors which are affected most directly by climate change and environmental depletion, and hence by government taxes and incentives (such as energy, transport, construction and waste management) but all sectors need to consider how they can contribute to greening (for example, the hotel and catering industry needs to consider the skills necessary to address the principles of the "3Rs" – reduce, reuse, recycle). Private sector leadership can be crucial here, with individual companies or business organizations taking the lead in response to needs within their sectors. Frequently, it is large companies that provide such leadership but it is important to ensure that micro-, small and medium-sized enterprises (MSMEs) are involved in these processes – especially in LICs, where they play a central economic role (box 17). Government support to offset MSMEs' lack of time and resources to engage in these processes is important.

73 See https://www.gov.za/south-africas-green-economy-accord.

Box 17 Harnessing private sector leadership in India

In India, some industry-led sector skills councils, responsible for the development of national occupational standards and qualifications, play a key role in greening. For example, in the construction sector, the Indian Green Building Council (a private sector institution) and the Bureau of Energy Efficiency (BEE) (an agency of the Government of India) conduct training programmes for energy managers and national certification for energy auditors, and the BEE has mandated star labelling for "white goods" (electrical household equipment), which specifies special standards for products' operational efficiency, requiring enterprises to produce more energy-efficient equipment.

Source: ILO, 2019a; Skill Council for Green Jobs website.

3.4 Making qualifications, curricula and teaching fit for a greener future

Qualifications and curricula

It is hard to judge the extent to which a general greening of curricula has taken place to date. For instance, while there has been activity to develop apprenticeships for new green occupations, such as those in the renewable energy sector, for several years now in many HICs,[74] with some LICs now also making progress, the picture for curricula in general is far more patchy. This may be because in some ways the thinking on what needs to happen is running ahead of the actual response – witness both the ILO's core skills framework (see Chapter 2) and the European sustainability competence framework, GreenComp[75] – and also because, outside the sectors that depend on green products and services, demand for new skills may come from a variety of sources and not just industry. In some ways this is an important distinction between the green and digital transitions: digital skills needs flow from what employers and individuals need; the green transition is about how humans can adopt practices that can preserve and sustain planet Earth so that not only is the environment sustained but wider socio-economic goals can be secured.

74 See, for example, Cedefop, Skills for Green Jobs: 2018 Update, 2019.

75 See https://publications.jrc.ec.europa.eu/repository/handle/JRC128040.

Greening apprenticeship qualifications and curricula involves not just equipping new labour market entrants with skills for the green transition but also finding ways to upskill and reskill people already in work through re-engineering apprenticeships and developing new models for WBL. As noted, it also means using a broad approach that incorporates and interweaves both technical and core skills: everyone needs critical thinking and problem-solving skills and to be empowered in the workplace to propose and undertake greener work processes.[76] The topic of how to adapt apprenticeships to upskill and reskill adults is dealt with in detail in Chapter 8, but here it is important to highlight the fact that greening involves both redesigning and upgrading the occupational (or competency) standards and learning outcomes that underpin apprenticeships and, where necessary, investing in new courses and teaching equipment to support changes to curricula.[77] There is also potential for micro-credentials and digital badges to play a role similar to that described in the digital economy (see box 18 and Chapter 2).

Devising and integrating new learning outcomes into qualifications and curricula is key to guaranteeing a green transition in teaching and learning

Box 18 Using short courses and digital badges for greener construction apprenticeships in Ireland

In order to ensure compliance with new Building Regulations, which now include standards for near zero energy buildings, a portfolio of modules and learning units has been developed in Ireland to ensure that the workforce has the requisite skills. Limerick Institute of Technology, along with partners Waterford and Wexford Education and Training Board (WWETB), have developed the portfolio to be suitable both for apprenticeships and for the upskilling of current craftworkers (plasterer, carpenter, electrician, ventilation engineer, plumber, bricklayer and site supervisor). The courses are approved by the Construction Industry Federation and "assured" by the international awards organization, City & Guilds, which provides digital badges under its programme recognition service, which benchmarks programmes against their quality standards.

The courses were developed with inputs from industry partners, government departments, local authorities and third-level (post-secondary) institutions. Course duration ranges from one to four days and delivery is by a combination of online provision and one-day practical workshops.

Source: WWETB, 2021.[78]

Teaching, learning, schools and workplaces

The qualifications and curricula discussed above are concerned with what people learn. Another equally important issue to consider is how people learn: developing greener mindsets and behaviours often requires people to learn in new and innovative ways. Greening should empower people to think critically, to solve problems concerning how to implement the "reuse, repurpose, recycle" approach, and to work collaboratively on green goals and solutions.

Achieving these goals requires **new teaching and learning methodologies and environments** to be made available so that they can be incorporated into the portfolios of teachers and trainers. Systematic evidence of the progress that has already been made in this direction is elusive and it seems likely that less progress has been made in changing teaching and learning methods than in adjusting curricula. The

76 Compare with the ILO core skills framework and the European GreenComp framework.

77 See also ILO, Greening TVET and Skills Development: A Practical Guidance Tool, forthcoming.

78 The situation described is pre-pandemic.

process of changing how things are taught and learned is likely to face greater obstacles than determining what skills are to be acquired: new occupational/competency standards and curricula components can be introduced in many fields without needing to seek out new pedagogies or adult teaching and learning methods (for example, the use of insulation materials in construction).

Apprenticeships are well positioned to embrace new methodologies since they provide a range of environments and learning modalities: they mix experiential and embodied learning[79] and provide learners not just with classroom-based theory but also with opportunities to learn from practical experiences of greening either in workplaces or in school-based simulations.

Examples of new methods that can support greening include: **case-based and project-based learning**, which can provide students with the type of interdisciplinary learning and problem-solving that replicates environmental challenges and which can encompass not just classrooms and workplaces but also community resources (for example, helping employers to tackle real green challenges, including reducing environmental impacts on local communities); and **blending digital learning tools into teaching and learning**, which can expand the range of experiential learning opportunities available, especially through digital simulations like augmented and virtual reality, and which can open up new realms of experience, perhaps with smaller negative environmental impacts than more traditional methods which might, for example, involve energy-intensive equipment.

Holistic learning approaches such as experiential, case-based or project-based learning are better suited to meet the comprehensive challenges of the green transition and lifelong learning

Just as important as the development and use of new methods is the development of the **learning environment** for apprentices; indeed, one cannot proceed effectively without the other. This can be as simple as greening classrooms and workplaces by putting up posters to promote green awareness and actions. But a more thorough approach is to look at the entire environment, the campus of VET schools and the factories or offices of employers, to see how these can be greened. **"Campus greening"** means taking a holistic approach to sustainability and examining how to apply green principles to activities such as waste management and the procurement of goods and services. VET schools can develop sustainability plans to put this into effect, and use tools to, for example, measure their carbon footprint.

The **work-based learning** element of apprenticeships can also support the greening process. It can enable the green "theory" learned in TVET schools to be put into practice; offer opportunities to tap into the latest green developments (for example, where employers are using the latest green technologies which TVET schools might not be able to provide); and, alternatively, offer the opportunity for TVET providers to promote and demonstrate the benefits of greening to employers who have not yet fully engaged with the green agenda (box 19). Of course, workplaces also provide the environment within which existing workers can green their skills, as when construction workers learn how to install new insulation products.

79 Experiential learning is the process of learning by reflecting on experience, which includes, for example, hands-on learning. Embodied learning involves the whole body, for example, teaching mathematics while throwing small bags of sand to each other (see Waag Futurelab for Technology and Society, "What is Embodied Learning?", 2012).

Box 19 Using work-based learning to meet the need for green jobs in construction in Estonia

Estonia is setting up a new internship system for vocational training specialities in construction with a project focusing on energy-efficient construction and smart house solutions. These areas suffer from skills shortages, as identified by the national skills forecasting system, as well as a lack of TVET provision. As a result, learners struggle to find internships in companies to learn the special skills they need. Through the project, construction teachers and partners of the schools involved are improving the way the internships are organized and construction practitioners will be more deeply involved in teaching: ten top specialists from companies belonging to the Estonian Association of Construction Entrepreneurs will give lectures or supervise in-school practical training for at least four hours. The project partners are three TVET schools, the Estonian Employers' Confederation and the Estonian Association of Construction Entrepreneurs. The involvement of the two national employers' organizations is seen as an important benefit.

Source: https://opleht.ee/2021/03/suur-samm-kutsehariduses-ettevotetega-parema-koostoo-poole/.

Professional development of teachers and in-company trainers

It is important that teachers and trainers get appropriate support to develop the skills and knowledge they need to green their curricula and their practical, teaching and learning methods. Teachers and trainers should be supported to develop greener mindsets and to see how environmental awareness might be applied in their teaching.

The experience of apprenticeships shows the benefits of bringing into professional development programmes a wider group of relevant stakeholders than might usually be involved, in light of the wider social and economic issues that need to be considered; and also the role that can be played by programmes for teachers and trainers in green fundamentals that are applicable across the entire range of occupations – as box 20 illustrates.

The professional development of teachers and trainers for the green transition can be enhanced by including experts in the green transition from business, workers' organizations and civil society, as well as the voices of young people and women

Box 20 Trainer training in Malaysia to support green technologies

In order to support the introduction of a new course in "Green Technology Compliance" (developed by the national Ministry of Human Resources) the Malaysian authorities developed a trainer training programme. The aim of the programme was to create a pool of "master trainers" who could support skills development in the fundamentals of green technology, which would then complement any vocational skills training programme related to green technologies.

A five-day (40-hour) programme was developed involving 20 trainees and three trainers over two cycles. Participants included not just TVET trainers/instructors but also green technology practitioners and NGO managers and executives, an approach which enabled the sharing of experience between green technology specialists and trainers.

Source: ILO, 2022b, p. 97.

Inclusion: A just transition for all

The negative effects of environmental crises are not felt equally across society. Depending on the communities and localities concerned, older workers, people with disabilities, indigenous people, women, youth, migrant workers, unemployed people, low-skilled, informal workers and those living in rural areas may well face the greatest challenges (box 21). Nonetheless, it has been found that "[w]hile many countries aim to include disadvantaged and vulnerable groups in their skills development programmes for green jobs, these groups remain largely under-represented".[80]

Box 21 Training women to be solar engineers

Barefoot College International has trained 2,200 rural women across 93 countries as solar engineers, leading to the installation of solar lighting systems in 18,047 households. These women mostly have low levels of literacy and, therefore, training has normally been carried out through WBL and/or informal apprenticeships.

Source: https://www.barefootcollege.org/solution/solar/.

Apprenticeships show how the green transition can provide opportunities to champion alternative, inclusive practical learning modalities that can be attractive to people who, for example, have had negative experiences in "academic" school environments and by opening up pathways into employment in areas from which people might have been excluded in the past. For instance, greening can promote small-scale manufacturing or secretarial roles evolving from new greener businesses, both of which provide more job opportunities for women[81] in the context of current societal structures and processes – although, of course, the green transition also provides the opportunity to tackle issues such as gender stereotyping and de-masculinizing occupations to deliver on decent work goals (box 22).

The greening of apprenticeships has the potential to tackle and address issues of vulnerable groups to ensure that a just transition is achieved and that no one is left behind

Box 22 Supporting women into green jobs through technical and entrepreneurial skills development in Bangladesh

Grameen Shakti is one of the largest rural-based renewable energy companies in the world, and it worked with the ILO to develop training linked to solar panel installation and to target women, the main victims of fuel poverty. The project had an integrated approach: Grameen Technology Centres developed generic training materials, a green jobs knowledge-sharing platform and a job and enterprise creation guide. As well as training local technicians in solar panel installation, the project provided 250 young women with technical and entrepreneurship training to set up and run businesses to maintain, repair and provide accessories for solar panels. In addition, the project included micro-credit facilities to help with business start-ups, community participation and awareness development. The approach of the project was therefore not only holistic but also focused on ensuring the sustainability of the green jobs created by including the repair and maintenance dimension of solar energy.

Source: ILO, 2022b, p. 122.

80 ILO, 2019a, p. 40.

81 See Patrick Werquin, VET Toolbox: Guiding Note on Informal Apprenticeship: Organise without Formalising, 2021.

▶ 3.5 Key takeaways for policy

A characteristic of the green transition in apprenticeships is that there is an opportunity to advance through a combination of action at both national/regional and local levels. Indeed, a combination of top-down and bottom-up efforts is both possible and necessary: apprenticeships have the potential to play a role in tackling localized environmental challenges being faced by employers and communities, but strategies and frameworks need to be set at national/regional levels to ensure coherence and to make sure that every piece of the apprenticeship "jigsaw" is covered. In this sense, there is an opportunity to echo the "think global, act local" concept common in the field of sustainability. Key policy takeaways are therefore focused on areas which involve both setting appropriate conditions at national level and stimulating, supporting and activating action at local level.

It is notable that, in a general sense, some of the takeaways are quite similar to those for the digital transition, which opens up possibilities for greening and "digitalizing" apprenticeships at the same time. But there are also subtle, though important, differences. Perhaps the most significant of these differences is that greening involves the development of fresh mindsets and behaviours in ways that are not the case in digitalization, notwithstanding the need to couple digital with social and cognitive skills. Furthermore, while the need for digital skills in every field of work and in every occupation is fairly well acknowledged, it is not always appreciated that greener mindsets are required right across the workforce – and it is not simply a question of providing people with the technical skills for new green jobs, such as solar panel installation.

As with the digital transition, **skills anticipation systems** need to be made fit for purpose, in this case to better capture the emergence of skills for green jobs. In particular, sources of more granular data need to be developed using the latest data-harvesting and analysis techniques.

Consideration also needs to be given to the redesigning and upgrading of **occupational (or competency) standards and learning outcomes** (again, as with the digital transition) so that all apprenticeships (and not just those in "the green economy", like renewable energy) accurately reflect the impact of the green transition on work tasks and responsibilities. Some green occupations – photovoltaic installers, for instance – have now been around for several years and have well-established apprenticeships but there may still be a need to "green check" the underlying learning outcomes to ensure they capture the need, for example, to adhere to the 3Rs in work environments.

Teachers and in-company trainers need to be equipped with the skills to support apprentices in developing greener mindsets and behaviours, which require new ways of teaching and learning. This involves greening the professional development of teachers and trainers, both in initial training (for entry into the teaching role) and in continuing professional development. Short courses or modules can offer an effective way to deal with the need to upskill current teachers and trainers.

To ensure a **just transition**, initiatives can be put in place to promote green jobs that tackle social stereotyping in labour markets (such as promoting masculinized occupations in the building trades for women and offering appropriate supports and additional subsidies to enterprises) and providing opportunities for people with low educational attainment stemming from various forms of socio-economic disadvantage (again through the provision of appropriate supports).

To encourage **bottom-up developments at the level of VET schools and enterprises**, measures can include investments in new courses and teaching equipment, setting up platforms and networks for the exchange of good practice, supporting VET schools in developing sustainability plans for "whole-school" approaches to greening, and setting up national competitions and prizes for good teaching along with "green ambassador" schemes, which are applicable to teachers, trainers and apprentices alike.

The **private sector** has often played a key role in greening apprenticeships in those parts of the economy most directly affected, such as the energy sector. However, there is a need to make sure that greening takes place in all sectors (for example, to reduce waste, pollution and reliance on fossil fuels) and also to support MSMEs to enable them to play their part in the green transition. The latter is especially important in LICs where informality characterizes large parts of the economy and which, owing to its unregulated nature, is both a major cause and a major victim of pollution and environmental degradation.

Case Study 3

Combining national frameworks and sectoral approaches for greening informal construction workers in the Philippines

In the Philippines, developing skills for green jobs is an established part of TVET reforms and the country's first Green Jobs Act. The Technical Education and Skills Development Authority (TESDA), which manages TVET, has taken a number of steps to support this development. Skills anticipation is one of its key tasks and, in 2018, it published a labour market intelligence report on skills for green jobs. In the same year, it also oversaw the introduction of the Philippine Green Jobs Act, which provides a legal framework for human capital development and the creation of decent jobs that contribute to environmental sustainability.

Within the framework of the Act, TESDA works on greening at sectoral level. For example, in the construction sector, the National Certificate II Training in Masonry has been greened by integrating green masonry concepts. These aim to enable learners to appreciate climate change as a personal and social, as well as industry-wide, issue and to understand how construction practices need to adapt. Competencies to be acquired include:

- understanding the need for proper identification of building materials to protect and conserve the environment (differences between renewable and non-renewable resources);
- knowing the principles of resource efficiency and waste management;
- understanding how to adopt appropriate green practices in the workplace.

The programme has been designed for construction workers in the informal sector and provides a 250-hour course that teaches skills in brickwork, blockwork and plastering, and provides work environment immersion as a post-training activity where learners/trainees get to test their newly acquired skills. It has good potential to be converted into a quality apprenticeship offer.

It is a partnership programme between TESDA, the Department of Labour, the Green Building Council and construction industry companies and associations. Coordinated efforts need to be continued, including at local and sectoral level, to analyse skills needs, adapt skills provision and link TVET to the creation of quality green jobs.

Sources: ILO, 2019b; and, on the construction sector, UNESCO/UNEVOC, 2017 and https://www.courses.com.ph/masonry-nc-ii-tesda-course-philippines/.

Case Study 4

Renewable energy for rural communities in Zimbabwe

Jointly designed and implemented by the ILO and the Netherlands Development Organisation (SNV), this project trained over 370 young people from very disadvantaged areas in solar technologies and business skills. Trainees had previously been working in a variety of jobs in the informal economy, so the training represented an important opportunity to upgrade their skills through formal training and thus improve their life chances.

Training development and implementation comprised a number of elements:

- A training module in basic solar photovoltaic (PV) technology was developed, piloted and implemented. The design of the module was informed by the young peoples' skills gaps, with the aim of equipping them with basic technical skills for carrying out solar system installation and maintenance. Additionally, it sought to give youth an appreciation of the nature of the energy challenges facing rural populations and the role they could play (as advocates) in alleviating the energy crisis while earning a living in the process.
- The project also offered business skills training and set up networking platforms between established solar companies and the trainees. The networking sessions provided a platform for the companies to select trained youth who would be engaged as marketing agents for the companies in rural areas after receiving additional training from the companies.
- Theory as well as initial technical training was provided by a local university, after which youth were linked to private sector companies that provided training on business development, marketing, installation and servicing of solar equipment.
- There was a specific focus on female participation, with 70 per cent of the trainees being female and with the goal of increasing the participation of young women in a sector where they are currently significantly under-represented.

Evaluation of the project revealed the following findings:

- Training in basic solar PV technology had enhanced trainees' knowledge and technical skills in both solar energy and entrepreneurship and business management, and the business linkages between the youth and solar companies had created employment opportunities. Some of the young people were subsequently employed by the solar companies.
- Prior to the project, female participants had viewed dealing with electricity issues as a preserve of their male counterparts but, after the training, they realized that they too could handle electricity and felt empowered in that regard.
- Participants felt that the knowledge they had acquired would contribute to reducing environmental damage due to deforestation in their local communities and that they had been enabled to act as advocates for green energy in their communities as well as being solar entrepreneurs.

Source: ILO and SNV, 2015.

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4 Apprenticeships in formal and informal economies

Apprenticeships in formal and informal economies

A majority of workers in low- and middle-income countries work in the informal economy and have few chances to access formal training. Most of them acquire skills in the informal economy through informal apprenticeships. Therefore, the informal economy deserves to be an integral component of skills development policies.

▸ 4.1 Introduction

The informal economy accounts for over 60 per cent of the global workforce and over 90 per cent of micro- and small enterprises worldwide.[82] Informal employment is an important feature of low-income countries, where it accounts for 35–90 per cent of total employment, and in many countries it continues to grow; for example, in India, where jobs in the informal sector are growing at twice the rate of those in the formal sector.[83] Informality is not confined to developing countries, however: significant minorities of people are in informal employment in Eastern Europe (31.5 per cent), in North America (18.1 per cent) and in Northern, Southern and Western Europe (14.3 per cent).[84]

While informal economies are "typically characterized by a high incidence of poverty and severe decent work deficits",[85] it also provides opportunities for skills development through informal apprenticeships. It should be remembered that the world's most well-developed systems of apprenticeship evolved out of informal arrangements within workplaces between master craftspersons and new recruits.[86] Although, in countries with modern formal apprenticeship systems, informal training arrangements have poor social status, often being seen as "training of last resort" for people with low levels of formal educational attainment, in some parts of the world informal apprenticeships have long-standing and deep socio-economic roots, are well respected and play a key role in skills development and social stratification. It has been estimated that informal apprenticeships account for most of the skills development in Ghana and almost 90 per cent of all training for trades in Benin, Cameroon and Senegal.[87] This chapter focuses on informal apprenticeships.

82 See https://www.ilo.org/employment/units/ emp-invest/informal-economy/lang--en/index.htm.

83 ILO, https://www.ilo.org/wcmsp5/groups/pub lic/---ed_emp/documents/publication/wcms_140951.pdf.

84 ILO, Women and Men in the Informal Economy: A Statistical Picture, 2018 (Geneva).

85 See https://www.ilo.org/global/topics/employment-promotion/informal-economy/lang--en/index.htm.

86 The first laws on apprenticeships came into force only in the 1930s (in Switzerland and Ireland) and the German and Austrian apprenticeships systems only became fully integrated into their national education systems at the end of the 1960s. Also, there are still examples of apprenticeship programmes in formal economies which could be considered informal as they do not lead to nationally recognized qualifications; for example, the apprenticeship scheme Amata māceklis in Latvia. See Cedefop, Apprenticeship Schemes in European Countries: A Cross-nation Overview, 2018.

87 ILO, "Upgrading Informal Apprenticeship Systems", Policy Brief, 2011.

As mentioned in Chapter 1, in a world dominated by informal work, informal apprenticeships provide a first step into work for many young people. More than that, the training and skills acquired through informal apprenticeships have a key role to play in achieving the wider social and economic development goals that can be secured through greater formality in the economy. Improving the quality of apprenticeships in the informal economy can play an important role in this transformation by improving the competencies and employability of the workforce.[88]

Informal apprenticeships are embedded into the social and economic fabric of informal economies and their improvement offers a way to improve living standards

Informal learning should also be mentioned at this point, since a distinction needs to be made between informal apprenticeships and informal learning in general. Informal apprenticeships involve longer periods of learning with the clear aim of learning a trade, craft or a specific job based on an (often verbal) agreement between the learner and the employer. Informal learning, in contrast, may be accidental and without a specific purpose, although it may still have value.

4.2 Key features of apprenticeships in informal economies

In apprenticeships in the informal economy, young apprentices acquire the skills for a trade or craft in a micro- or small enterprise by learning and working alongside experienced practitioners.[89] The agreements between apprentices and master craftspersons that govern such arrangements typically lack the formality of written contracts,[90] being agreed orally (as the ILO's Transition from the Informal to the Formal

88 ILO, 2018, p. 51.

89 See https://www.ilo.org/skills/projects/WCMS_158771/lang--en/index.htm.

90 Although the terms "formal" and "informal" are used in this report, it is important to guard against Westernized perceptions of what constitutes "formal" and "informal". European migrants to North America expropriated the continent from indigenous peoples partly through a self-justificatory narrative based on the argument that they did not hold a formal, written title to land ownership – a concept which made no sense in a context of collective rights and responsibilities.

Economy Recommendation, 2015 (No. 204) indicates, the informal economy covers "all economic activities by workers and economic units that are – in law or in practice – not covered or insufficiently covered by formal arrangements"). However, they have their own formality in the form of long-established social codes and norms which are deeply embedded in their (often local) socio-economic contexts. Through these apprenticeships, young people acquire technical skills and are inducted into a business culture and network. While apprenticeship "graduates" do not obtain a qualification that is recognized within state-managed qualification systems, the skills they have acquired, plus the recognition that comes with the social embeddedness of the system, make it easier for them to find jobs or start businesses, although these are usually in the informal economy. In many countries, they can acquire official qualifications through trade tests or recognition of prior learning (RPL).

Within this general description of informality in apprenticeships, it is important to note the high degree of variation that exists across countries – and even between regions and occupations – in the precise form and function of informal apprenticeships.[91] It is also important to note that, in some countries, a hybrid form of apprenticeship exists that sits somewhere between formality and informality, where informal apprenticeships contain elements more commonly found in formal systems. Examples of such "semi-formal" apprenticeships can be found in West Africa, where, for instance, written agreements between an employer and an apprentice are used and small business associations monitor the quality of training and working conditions, conduct assessments and award certificates. In a way, we can say that some of the informal apprenticeship systems are transiting towards formality.

Informal apprenticeships have a range of **advantages**. From the **apprentice's perspective**, where so much informal employment involves people with low educational levels, apprenticeships have an important role to play in augmenting skills. Indeed, informal apprenticeships offer the opportunity to acquire competencies in contexts where "there are no credible alternatives. For many young people in many countries, it is informal apprenticeship or idleness. Solutions in the formal TVET system are not accessible to them, quite often for reasons of distance, or resources".[92] Where countries have large informal sectors, TVET is frequently not free and hence is beyond the reach of many learners, whereas apprenticeships offer the opportunity to "earn while you learn". Informal apprenticeships can also offer young people who have not completed the compulsory phase of schooling a valuable route to skills acquisition in contexts where admission to formal further education and training is based on previous academic achievement and hence would be impossible to access.

From **the micro- and small enterprise perspective**, informal apprenticeships meet the need to recruit new staff, since they allow enterprises to keep the best apprentices as skilled workers once they have acquired the necessary competencies. They also help to circumvent the difficulties that TVET systems often have in keeping pace with fast-changing skills needs owing to weak skills anticipation mechanisms (see Chapter 2) and lack of funds to make sufficient investments in upgraded training facilities. Moreover, firm-based apprenticeships can respond quickly to changes in production and service techniques, which are immediately felt within informal businesses on the front line of shifting business-to-business exchanges and consumer demand.

From the **perspective of TVET systems**, informal apprenticeships provide a valuable parallel means of meeting skills needs. Many low-income countries lack TVET capacity to meet the needs of entire cohorts of young people, while the SMEs in the informal economy have the potential to impart skills to large numbers of people.[93] Indeed, informal apprenticeships may well be the most cost-effective option for training in countries with under-developed TVET systems and insecure public finances.[94]

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91 See Ashwani Aggarwal, "Lessons Learnt from Informal Apprenticeship Initiatives in Southern and Eastern Africa", 2013; and also Christine Hofmann et al., "How to Strengthen Informal Apprenticeship Systems for a Better Future of Work?: Lessons Learned from Comparative Analysis of Country Cases", ILO Working Paper 49, 2022.

92 Patrick Werquin, VET Toolbox: Guiding Note on Informal Apprenticeship: Organise without Formalising, 2021, p. 73.

93 See also Madhu Singh, "Overview: Education and Training in the Informal Sector", in International Handbook of Education for the Changing World of Work, ed. Rupert Maclean and David Wilson (Dordrecht: Springer, 2009), 235–243.

94 As demonstrated in Burkina Faso: see Savadogo Boubakar and Richard Walther, "Les coûts de formation et d'insertion professionnelles. Les conclusions d'une enquête terrain au Burkina Faso", 2010.

Informal apprenticeships are embedded into the social and economic fabric of informal economies and their improvement offers a way to improve living standards

Informal apprenticeships also have several **disadvantages**. There are no guarantees as to the quality of training received, which depends heavily on the knowledge and skills of the individual craftsperson concerned (unless business associations are closely involved) and apprentices are unlikely to be taught the underpinning knowledge they would receive in formal TVET schools. The lack of formal recognition and certification by a nationally recognized body restricts labour market mobility, and especially access to jobs in the formal economy and further education, constraining economic development as well as the limiting the protection afforded to apprentices. Apprenticeships are often based on an oral agreement rather than a written contract, which makes it hard for both parties to seek redress when grievances arise. Working conditions for informal apprentices are often poor and they lack access to social protection measures. Finally, apprenticeship recruitment reflects long-established gender biases, and women find it difficult to access masculinized occupations.[95]

Another way of looking at these disadvantages is that informal apprenticeships display the same weaknesses and challenges that any worker in the informal economy faces. In summary, it can be said that the greater flexibility in the design of the training and the lower bureaucratic effort involved are offset by a lack of security for the apprentices. This is a tension that is also reflected in the political discussion on the design of formal apprenticeships. The central disadvantage of informal apprenticeships, however, remains the apprentices' strong dependence on the employer. Table 2 summarizes the **differences between these two forms of apprenticeship.**

Table 2 Typical differences between formal and informal apprenticeships

Parameter	Formal apprenticeships	Informal apprenticeships
Tripartite governance	Yes	No
Remuneration provided by employers	Yes	Possibly, including in-kind benefits, such as meals
Training fee	No	Sometimes charged by an employer in the initial years
A written contract between the employer and apprentice	Yes	Usually an oral contract
Social security coverage	Yes	No, but some master craftspersons provide support in case of illness or accident
Legal framework	Yes	No. Social norms, customs, conventions or cultural values pertain
Programme of learning	Yes	No formal programme, but some master craftspersons follow their own training plan
On-the-job training	Yes	Yes
Off-the-job training	Yes	No
Formal assessment	Yes	No
Recognized qualification	Yes	No
Duration	1–4 years	Variable

Sources: Adapted from ILO, 2012a, p. 3; the ILO's e-learning course on informal to quality apprenticeships[96]; and ILO, 2012b.

95 See, for example, ILO, 2012b.

96 See https://www.itcilo.org/sites/default/files/media/course-documents/A9713710_EPAP_E-learning%20course%20quality%20apprenticeships_InfoNote_EN.pdf.

4.3 Improving the quality of informal apprenticeships

In light of the deficiencies described above, attempts have been made in various countries to upgrade the quality of informal apprenticeships in a range of ways.[97] While many of the measures overlap, it is helpful to consider them in terms of how they have specifically supported master craftspersons and apprentices, as well as the wider changes that have been made to strengthen the broader institutional environment.

With regard to master craftspersons, some of the capacity development measures undertaken have focused on building their pedagogic skills and their occupational knowledge and skills, which can then be passed on to apprentices, and enhancing their training skills (box 23).

Box 23 Upgrading the training skills of master craftspersons in Kenya

The National Industrial Training Authority in Kenya has developed a Master Crafts Person Apprenticeship trainer course by bringing together specialists and stakeholders from different trades. The courses assist in developing the knowledge and skills of master craftspersons in delivering training as well as strengthening technical skills in the specific occupation.

Linking the upgrade of informal apprenticeships to business development can offer an attractive package for master craftspersons

Source: ILO's e-learning course on informal to quality apprenticeships.

However, targeting the training aspect alone is unlikely to be sufficient to stimulate the involvement of master craftspersons: it is important to build integrated packages of support for enterprises that focus on the wider business improvement agenda in order to demonstrate the concrete "bottom line" benefits of training for the enterprise. Such packages include better skills development as one component alongside, for example, business development services, occupational safety and health services, the provision of tools and equipment, financial incentives (for instance, subsidies for training or wages) and access to insurance schemes.

As far as support for **apprentices** is concerned, successful interventions can be made across the entire learning "journey", from access, through training content to assessment and certification (as box 24 illustrates). At the point of access, there is an opportunity to promote the inclusion agenda, especially in relation to the participation of women in masculinized occupations, for example, through incentives. Regarding training content, steps can be taken to provide off-the-job training to strengthen the "theoretical" component of occupational knowledge and core skills acquisition, such as by TVET institutes or other organizations. Such provision requires considerable support from master craftspersons, given that apprentices will spend time away from their workplaces to undertake the training; and it is important to align content and pedagogy with tasks and work processes in the enterprises concerned. On completion of their apprenticeships, apprentices can benefit from the provision of processes for RPL, ideally linked to formal awards within national qualifications (discussed further below). Apprentices also stand to benefit from post-training careers guidance relating to potential

Informal apprenticeship upgrades that benefit apprentices can be made across every part of the learning journey

97 See, for example: Hofmann et al., 2022; ILO, 2011; ILO, 2012a; ILO, 2021a; Aggarwal, 2013.

employment and self-employment opportunities, including support in how to set up a business. As with master craftspersons, opportunities to celebrate success, for example, through awards, can help to raise awareness of the benefits of enhancements to informal apprenticeships and motivate other young people to take part (see also Chapter 6).

Box 24 A code of practice for apprenticeships in the informal economy in Bangladesh

The Government of Bangladesh has created a code of practice for apprenticeships in the informal economy in order to:

- set out agreed minimum rates of pay, working conditions and duration;
- ensure a clear and mutually understood contract between the parties involved;
- ensure that apprentices meet the working-age requirements of the Labour Law;
- identify the skills or competencies to be gained;
- utilize a national Skills Logbook to maintain consistency in competencies gained through both the formal and informal training systems, and also between workplaces where training takes place on the job;
- allow for recognition of prior learning to formally assess knowledge and skills gained; and
- allow apprentices to be awarded a nationally recognized certificate.

Source: ILO, 2015.

To be successful, the measures targeted at master craftspersons and apprentices described above should be situated within other measures aimed at strengthening the **wider institutional framework.** Two areas are particularly important here. First, **providing a stronger base of institutional stakeholder support** for informal apprenticeships is vital. Master craftspersons are often members of business/trade associations and building the capacity of these organizations is a key way to enhance informal apprenticeships (see box 25). For example, they have the potential to function as regulators of apprenticeships, registering contracts or agreements between master craftspersons and apprentices, assessing skills and awarding certificates. Where business associations don't exist, master craftspersons can be encouraged to form them. Given the embeddedness of informal apprenticeships in local customs and norms, it is also important to involve community groups/civil society and youth groups, as well as workers' organizations, parents' associations, etc.

Box 25 Strengthening business associations in Niger

Through its Continuous Vocational Training and Apprenticeship Support Programme, the ILO and national partners have strengthened the membership base of the National Crafts Association (Fédération Nationale des Artisans du Niger, FNAN) by, inter alia, reinforcing organizational capacity, developing regional and local branches, and promoting the benefits of organizing. This has helped FNAN to become recognized as an important voice of the crafts sector in Niger, participating in national tripartite political structures and bringing business associations into debates about upgrading informal apprenticeship. FNAN also plays a major role in the monitoring and quality assurance of a pilot project of structured dual apprenticeship.

Source: ILO, 2021a.

The second area in which institutional development is important is in **developing connections between informal apprenticeships and the formal, state-regulated training system**. Measures such as those described above in which business associations play a regulatory role are likely to require the application of quality assurance criteria and mechanisms to provide a guarantee that the minimum standards that apply in formal training and apprenticeships also pertain in the upgraded – now semi-formal or hybrid – sector. Institutional development may also be required to put in place fit-for-purpose processes for RPL – that is, for the recognition of skills acquired through informal apprenticeship – to allow for the fact that within the informal system there is no formal assessment of learning outcomes. Finally, qualification systems may require adaptation; specific qualifications can be introduced (see box 26). More ambitious still, competency-based systems can be developed that are blind to where someone has acquired their skills (see Case Study 16 on Finland).

It is important that measures for improving informal apprenticeship quality sit within wider measures to strengthen the institutional framework

Box 26 Developing national recognition and certification for informal apprenticeships: An example from India

India has developed an outcomes-based RPL framework linked to the national qualifications system. The RPL process includes pre-assessments, skills gap training and final assessments leading to certification. RPL certification is on a par with the certification that pertains in formal skill training in the country.

▶ 4.4 Key takeaways for policy

Informal apprenticeships are functional for the context in which they sit. While they suffer from numerous disadvantages, they also provide a platform on which improvements can be made. Such improvements need a careful balance of top-down and bottom-up planning and activities. In this light, there are several general factors that need to be considered in policy, alongside the more specific practices described above.[98]

First, governments should make the upgrading of informal apprenticeships part of their **skills development policies and strategies** and allocate resources accordingly. Where interventions are time-limited and focused at the micro level, they tend not to achieve lasting systemic shifts, with the result that gains tend to be short-lived. Interventions need to build on a good understanding of local practices within informal apprenticeship systems, recognize their contribution to national skills building, and not distort the mechanisms that sustain their functioning. Capacity building of stakeholders – like business associations – along with adjustments to national training systems are key to achieving lasting change, as is the involvement of organized labour through workers' organizations. Measures to recognize and strengthen the role of master craftspersons, such as through upskilling offers, the introduction of schemes to enable RPL, including for apprentices, supporting quality assurance through skills standards

98 ILO, Upgrading Informal Apprenticeship Systems, 2011.

and the introduction of minimum and maximum durations for apprenticeships should be implemented. In addition, the introduction of support services, such as conflict resolution or insurance schemes, should be considered.

Second, within national strategies, approaches need to be **flexible and capable of adaptation to local and sectoral conditions** at every stage of the design and delivery of high-quality apprenticeships. For example, it is likely that services aimed at master craftspersons are best provided by practitioners and experts who understand local economic and social conditions and can offer bespoke services, working in the context of partnerships between local institutions, social partners and local government authorities.

Finally, interventions are most likely to be successful when they make sense to master craftspersons in terms of **business development**, i.e. their bottom line, while not ignoring the social responsibilities of small businesses in a context where the transmission of skills to the next generation (particularly their own kith and kin) is seen as a common responsibility of tradespeople. The difficulties that SMEs face in participating in training are well known (see Chapter 5) and similar barriers are faced by master craftspersons in terms of time and resources, most probably in more acute ways. As noted at the start of this chapter, skills development has a role to play in helping in the transition to greater formality that is needed in many economies, so it makes sense to integrate strategies and measures to upgrade informal apprenticeships into wider economic development policies, and SME support measures in particular. Through business development packages, master craftspersons can be supported with interventions that benefit them directly, such as skills upgrading courses or accident insurance schemes, developing the basis for their long-term involvement in an upgraded system.

Case Study 5

Artisan Recognition of Prior Learning (ARPL) in South Africa

The apprenticeship system in South Africa has traditionally been closely related to artisan skills development. In the twentieth century apartheid state, apprenticeships were typically associated with "blue collar" or mid-level technical skills supporting the mining and industrial economy and a white-dominated model of learning.[99] In the 1990s, a trend towards "declining appreciation of the value of the artisan"[100] was observed as artisan training was associated with the apartheid system.

99 Andre Kraak, "Incoherence in the South African Labour Market for Intermediate Skills", Journal of Education and Work 21, No. 3 (2008): 197–215; Dean Janse van Rensburg et al., "A Technical Report on Learnership and Apprenticeship Population Databases in South Africa: Patterns and Shifts in Skills Formation", Commissioned by the Department of Labour/Department of Higher Education and Training Research, 2012.

100 ILO and World Bank, Towards a Model Apprenticeship Framework: A Comparative Analysis of National Apprenticeship Systems (2013), p. 118.

A revival in the concept of apprenticeship training was started through the launch of the Joint Initiative on Priority Skills Acquisition (JIPSA) in 2006, which promoted the expansion of intermediate artisan and technical skills as a sine qua non for a growing economy. Following the JIPSA initiative, the 2013 National Development Plan set a target to train 30,000 artisans per year by 2030 as it was recognized that re-establishing a good artisan training system is an urgent priority.[101] Apprenticeships represent one route to artisan training; the Artisan Recognition of Prior Learning (ARPL) is another. In fact, the revision of the ARPL system into a competency-based format "provided the opportunity to gain formal skills accreditation to the large number of people who had been forced to learn artisan skills informally due to the lack of apprenticeship opportunities during the apartheid years".[102] The ARPL process includes the following four stages:

1. Application: Prospective ARPL candidates apply at an accredited Trade Test Centre to undergo an ARPL process. On application, the candidate will be assessed for compliance against the criteria and guidelines for the implementation of ARPL. Candidates who comply will be assisted to compile a portfolio of evidence (PoE).
2. Orientation: After applying for ARPL, the induction process for registered candidates informs them about the purpose and the process of ARPL, the documentation needed and the related legislative framework.
3. Compilation of a PoE: Each ARPL candidate compiles a PoE that includes a curriculum vitae (CV) and any other certified supporting documents of qualifications and current and previous employment, together with trade-related duties performed, supported by photographic evidence, where available.
4. Assessment by the Technical Evaluation Panel: The panel consists of at least two persons, one of whom should be a qualified artisan in the same trade as the applicant. Panel members are approved and registered on a database as assessors and/or moderators. The assessment tests the candidate's ability to carry out their trade; some providers have a registered trade test centre and do the trade testing in-house while others send candidates to the National Government Trade Testing Centre.

In the South African context, formalizing informal experience is very important, not only from a labour market perspective but also from a social justice viewpoint. While the ARPL process is "transparent" in terms of verifying the case through the compiled documentation, which is thoroughly checked by the competent authorities, potential improvements could include lowering the administrative burden of the procedure and speeding up the process. The latter factor is particularly important in the case of older workers, as they have to deal with multiple barriers simultaneously.

The full case study can be found in the thematic report Adapting Apprenticeships for the Reskilling and Upskilling of Adults by Jörg Markowitsch et al.

101 DHET, White Paper for Post-School Education and Training (Pretoria: Department of Higher Education and Training, 2013).

102 PJ Florus Prinsloo, An Overview of the Apprenticeship System in South Africa (The British Council, South Africa, 2020), p. 25.

Case Study 6

Introducing qualifications to improve informal apprenticeships in Benin

In Benin, only 5 per cent of secondary age youth are in formal TVET, totalling around 50,000 young people, owing to the fact that most students fail to finish the second year of secondary school, equivalent to completing nine years of education – a prerequisite for entry to TVET. Most young people (estimated at more than 300,000) instead acquire skills through informal apprenticeship in the informal economy, which allows them to enter the labour market.

Recognizing the important role played by apprenticeship in the informal economy, in 2001, the Government of Benin adopted a policy and guidance document on TVET which prioritizes the modernization of traditional/informal apprenticeship. As part of this move, two types of qualification were introduced to recognize the skills acquired through informal apprenticeship, as a replacement for the release ceremonies that used to be held in the country.

- The trade qualification certificate (CQM) is awarded to apprentices who have completed their apprenticeship in an enterprise (without any obligation to go to a formal training centre) and passed the examination organized by the ministry in charge of TVET. Candidates for the CQM are not obliged to take courses in addition to their apprenticeship in the enterprise. Apprentices must be registered for the certificate by their employer. The CQM involves both practical and oral tests.

- The vocational training certificate (CQP) is awarded to apprentices who have finished primary education, completed a three-year dual apprenticeship in an enterprise and at a training centre, and passed the examination organized by the ministry in charge of TVET. Apprentices preparing for the CQP must take additional theoretical and practical courses at a vocational training centre and be registered for the certificate by the training centre. The CQP involves practical and written tests.

The CQM and CQP examinations are organized by the Examination and Competition Department of the Ministry for Secondary and Technical Education, and Vocational Training. However, it is the professional trade bodies and craftspersons groups that enrol the apprentices in the training system. Craftspersons in Benin are represented at national level by the National Confederation of Artisans in Benin (CNAB), which has divisions (groups) at the level of department and municipality. In addition, there is the Benin Union of Interdepartmental Chambers of Trade at national level, and the departmental chambers of trade at departmental level. Professional trade bodies, groups or CNAB contribute to raising awareness, developing curricula, delivering training in enterprises and at training centres (as local trainers), monitoring apprentices in enterprises and at training centres, and sit on examination boards. They are responsible for managing disputes between apprentices, their employers and the training centres.

Notwithstanding these developments, challenges remain to be addressed, including: increasing the number of trades covered by the CQP and CQM (e.g. by training people in the qualification design methodology); introducing methods to recognize and validate employers' skills to allay their fears that their apprentices will become better skilled than they are themselves, which inhibits take-up of the qualifications; improving the financing mechanisms to support an expansion in the CQP and CQM; improving the attractiveness of the CQP, which is less popular than the CQM owing to its more demanding requirements; and carrying out evaluations to assess how far the two qualifications have improved training quality and employability.

Source: ILO, 2021b.

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Section B

Increasing participation in apprenticeships

The following chapters focus on the need to boost participation in apprenticeship among both small and medium-sized enterprises and individuals. Despite the clear benefits of apprenticeships, both these groups face significant obstacles to participation that must be tackled if apprenticeships are to thrive in the coming years.

5 Boosting participation by small and medium-sized enterprises

Boosting participation by small and medium-sized enterprises

Small and medium-sized enterprises (SMEs) are the backbone of a successful system of apprenticeship. In most countries, they provide the biggest share of apprenticeship places. However, the level of involvement of SMEs remains a challenge, particularly for microenterprises, and their potential as providers of apprenticeship opportunities is not being fully realized. Proper policy interventions and targeted support are needed. But how can the training decisions of enterprises be influenced, and which interventions work best?

▸ 5.1 Introduction: SMEs as key players in apprenticeship

Compared to other forms of formal education, apprenticeship training seems particularly socially just. The costs are shared between learners, companies and the public sector. In fact, no other type of education succeeds in raising private funds to the same extent. This makes an apprenticeship affordable even for financially weaker families (see also Chapter 8). Universities, on the other hand, often charge high fees and rely on donations from large companies. The secret of apprenticeship's success, however, is not the contributions from a few big players, but the benefits that the many smaller companies recognize in state-supported[1] apprenticeship contracts.

SMEs[2] are key players when it comes to the provision of apprenticeship opportunities. They can be particularly rich venues of learning, since they can provide exposure to every stage of the business process, from order, production and delivery to service. The importance of SMEs for generating and sustaining employment in general is well known. According to current ILO data, the employment share of SMEs varies from 52 per cent in developing countries, to 34 per cent in emerging economies and 41 per cent in developed countries.

Any policy that aims to increase the number of apprenticeships on a larger level needs to address SMEs since they are the major providers of apprenticeships in most countries

In countries that have a strong apprenticeship-based vocational education and training (VET) system, SMEs provide the biggest share of apprenticeship places. For example, in Austria, 60 per cent of all apprenticeships are provided in SMEs (up to 250 employees), in Germany 70 per cent and in France almost 80 per cent.[3] Also, in Australia, 80 per cent of all apprentices are trained in enterprises with up to 500

1 Support can be either financial or in the form of institutions and services.

2 The European Union defines medium-sized enterprises as enterprises that employ fewer than 250 persons and either have an annual turnover that does not exceed €50 million or an annual balance sheet not exceeding €43 million. Small enterprises are defined as enterprises that employ fewer than 50 persons and whose annual turnover or annual balance sheet total does not exceed €10 million and microenterprises are defined as enterprises that employ fewer than ten persons and whose annual turnover or annual balance sheet total does not exceed €2 million. European Union, "SME Definition: User Guide 2020".

3 BIBB, Datenreport zum Berufsbildungsbericht 2021, 2021; Ministère du Travail, de l'Emploi et de l'Insertion, 2022; Helmut Dornmayr, "Lehrlingsausbildung im Überblick 2021", 2021.

employees.[4] Still, SMEs and particularly microenterprises (i.e. enterprises that employ fewer than ten persons) face challenges when it comes to turning their commitment to apprenticeship into reality, and their potential as providers of apprenticeship opportunities remains partly unrealized.[5]

Microenterprises deserve special attention, because they are particularly sensitive to changing conditions for employing apprentices and have shown declining participation in some countries recently

Policy interventions are needed to stimulate enterprise participation. These must start by targeting the training decisions of enterprises. Research identifies four groups of factors that influence the training behaviour of enterprises:

- costs and benefits
- skills needs and recruitment
- work organization and industrial relations
- public support and partnerships.

We will discuss each of these areas in detail before suggesting a new interventions model that systematically addresses these issues at the end of the chapter. Despite the focus on SMEs, it should be noted that interventions presented in this chapter for SMEs can also be applied to large enterprises, and even partly to other educational areas that aim to increase corporate funding, such as professional higher education.

5.2 Costs and benefits of apprenticeships

In terms of the benefits of apprenticeships, apprentices not only contribute to production and build up the human capital stock of enterprises, they can also be tested, selected and finally recruited as skilled

4 NCVER, 2022.

5 While smaller companies often offer more apprenticeship opportunities than larger ones, relative to their size, in Austria and Germany, for example, the willingness of smaller companies to train has declined significantly in recent years. See Marcus Eckelt et al., Rückgang der betrieblichen Ausbildungsbeteiligung: Gründe und Unterstützungsmaßnahmen mit Fokus auf Kleinstbetriebe, 2020.

workers. Accordingly, economists distinguish between three motives that enterprises have for taking on trainees or apprentices:

- production motives[6]
- investment motives[7] and
- recruitment motives.[8]

Economies, sectors, occupations and enterprises differ in the extent to which these motives are prevalent, and in the cost-benefit ratio they can claim. Also, these motives may vary with the size of enterprise.

For instance, if labour markets are relatively flexible and the mobility of employees is high, the production motive tends to take precedence, i.e. enterprises will hire apprentices if they can employ them for productive work and train them at low costs. Accordingly, a flexible labour market would have to be accompanied by relatively low remuneration of apprentices in order to give enterprises an incentive to train. Conversely, higher financial undertakings on the part of the enterprises in terms of higher wages for apprentices and higher expenditure on training would have to be backed by stronger market regulation that reduces the risk of apprentice "poaching" and safeguards the long-term investments of employers.

German research shows that the costs of training are particularly high in industrial occupations and that an investment motive prevails in these occupations, whereas in craft trades and small enterprises the production motive dominates.[9] Research has also demonstrated differences between allegedly similar apprenticeship systems. For instance, German enterprises tend to be investment oriented whereas most Swiss firms provide apprenticeships based on the production motive. Remuneration in Switzerland is relatively lower and apprentices are exposed to productive work assignments to a larger extent.[10] Despite relatively small institutional and organizational differences between the apprenticeship systems of these two countries, considerable differences in the motivation to offer apprenticeships may exist, which can largely be attributed to certain labour market characteristics, such as the degree of regulation or flexibility. Swiss companies need to train more cost-effectively because the flexibility of the Swiss labour market implies that apprentices are more likely to leave the company after training and therefore the costs incurred cannot be recouped.[11]

Similar apprenticeship systems might produce different outcomes due to different labour market contexts. An important lever to stimulate apprenticeships is a system of tailored wages that acknowledges regional and sectoral markets and differences between occupations

Obviously, regulations on the remuneration and social security of apprentices and corporate taxes influence enterprises' cost-benefit ratio. Granting tax relief specifically to enterprises that train apprentices and imposing additional taxes on enterprises that do not are common practices. A variant of this type of intervention is the training levy (see also Chapter 8 and Case Study 14 on England). In this model, the funds collected from enterprises that do not train are used as subsidies to support enterprises that do offer training.

Institutional reforms and policies directly targeting companies (for example, by offering funding or imposing quotas) can have a considerable effect on the number of apprentices

6 Robert Lindley, "The Demand for Apprentice Recruits by the Engineering Industry, 1951–71", Scottish Journal of Political Economy 22, No. 1 (1975): 1–24.
7 Margaret Stevens, "An Investment Model for the Supply of Training by Employers", The Economic Journal 104, No. 424 (1994): 556–570.
8 Margaret Stevens, "A Theoretical Model of On-the-job Training with Imperfect Competition", Oxford Economic Papers 46, No. 4 (1994): 537–562.
9 Schönfeld et al., Kosten und Nutzen der dualen Ausbildung aus Sicht der Betriebe: Ergebnisse der fünften BIBB-Kosten-Nutzen-Erhebung, 2016.
10 Regina Dionisius et al., "Ausbildung aus Produktions- oder Investitionsinteresse? Einschätzungen von Betrieben in Deutschland und der Schweiz", Zeitschrift für Berufs- und Wirtschaftspädagogik 105, No. 2 (2009): 267–284.
11 Samuel Mühlemann et al., "The Financing of Apprenticeship Training in the Light of Labor Market Regulations", Labour Economics 17, No. 5 (2010): 799–809.

In some countries, these funds can be used to pay for apprenticeship training. An example of such a redistribution scheme, which has resulted in an increase in the number of apprenticeship places, is presented below in Case Study 7.

5.3 Skills needs, recruitment of enterprises and the role of intermediary organizations

Case studies from Australia, Germany and the United Kingdom reveal major differences in the way that apprenticeship training is implemented by companies; for instance, with regard to the length of training periods, the rules on remuneration or the role of external training providers.[12] When enterprises were asked about the reasons for reducing their training activities and hiring fewer apprentices than in earlier years, or even discontinuing training altogether, three answers stood out:[13]

- insufficient opportunities to involve apprentices in productive work;
- insufficient capacity to take care of apprentices properly;
- the impossibility of covering all elements of the curriculum.

All these factors reveal a possible mismatch between the needs of the training process and the business processes of the employer. Some enterprises may overcome such mismatches by restructuring their production and by reorganizing their training; others may need more direct support.

One way in which such challenges can be addressed is by a specific form of intermediary organizations[14] that also provide training, such as inter-company training centres (ITCs) or training alliances. There is no official definition for ITCs, but they can be considered to offer a form of cooperation between companies that complements the companies' individual capacities and resources to facilitate their ability to provide apprenticeship opportunities. The support they offer can be particularly beneficial for SMEs.

Many of the obstacles that affect individual SMEs can best be addressed by publicly supported intermediary organizations and training provision

SMEs are not always able to deliver the full package of apprenticeship training required by national apprenticeship training regulations for a variety of reasons, including the specific nature of their business processes, a lack of equipment, a lack of resources, weak human resource development (HRD) capabilities, etc. ITCs can help to tackle this problem by enabling apprentices to rotate between two or more companies; or by supporting companies (or business associations) in setting up joint training

12 Philipp Grollmann and Erica Smith, "International Perspectives on Apprenticeship", Education & Training (Special Edition) 49, No. 3 (2007).

13 Sabine Mohr et al., "Rückzug von Betrieben aus der beruflichen Ausbildung: Gründe und Muster", BIBB Report 4/2015.

14 There is no single model of intermediary organizations and a variety of institutional arrangements and functions exist: Intermediary organisations can generally be understood as bodies that are located "between" the main parties of an apprenticeship programme, i.e. learners and employers, and that act on behalf of or mediate between these main actors. Intermediaries typically fulfil one or more than one of the following key functions: (1) employing apprentices as a third-party employer, (2) providing training to apprentices as part of arrangements with groups of employers and (3) providing other support activities for apprentices on behalf of employers (ILO, 2019, Intermediary Organizations in Apprenticeship Systems, p. 2). In many countries, chambers of craft and/or trade and professional organizations act as intermediaries.

arrangements. Training alliances in Austria,[15] Group Training Associations and Apprenticeship Training Agencies in England, Group Training Organisations (GTOs) in Australia[16] or ITCs in Germany are examples of arrangements that compensate for the learning restrictions within smaller companies.

In Germany, ITCs are also referred to as the third learning venue[17] – operating alongside the company and the VET school (see also Case Study 17). Here, the ITCs are often large training centres to which companies send their apprentices to learn specific skills or innovative methods that are not provided by the company. But ITCs are increasingly taking on functions usually provided by other intermediaries, such as the matchmaking between apprentices and firms or promoting and marketing apprenticeships. In India, Third Party Aggregators take on this function (see box 27).

Box 27 Intermediary organizations in India

Apprenticeship training in India dates back to the 1960s. However, the willingness of companies to engage in apprenticeship training has declined over the decades. Therefore, various initiatives to promote apprenticeships have been implemented recently. The concept of intermediaries, called Third-Party Aggregators (TPAs), was introduced in 2016. In October 2019, the Ministry of Skill Development and Entrepreneurship launched a pilot project to provide financial support per registered apprentice to so-called Third Party Aggregators (TPAs) to boost the number of signed apprenticeship contracts being awarded by enterprises.[18] TPAs are organizations that take over many functions on the operational level in order to support companies in apprenticeships; for example, they match apprentices with enterprises, support the identification of basic training providers and help companies to navigate through the registration and financial compensation systems. On the systemic level, Sector Skill Councils (SSCs) are responsible for designing occupational standards, training trainers, analysing skills needs and setting up examination structures. Currently, there are 36 such councils.[19] The six-month pilot, which ended in March 2020, provided inspiring results – two thirds of the year's total number of apprenticeship contracts were registered during this period and two thirds of the year's total active establishments were registered on the apprenticeship portal during this period. Both TPAs and SSCs have played an important role in promoting apprenticeship training and the project led to an increase in the number of training contracts.

Source: Ministry of Skill Development and Entrepreneurship, India.

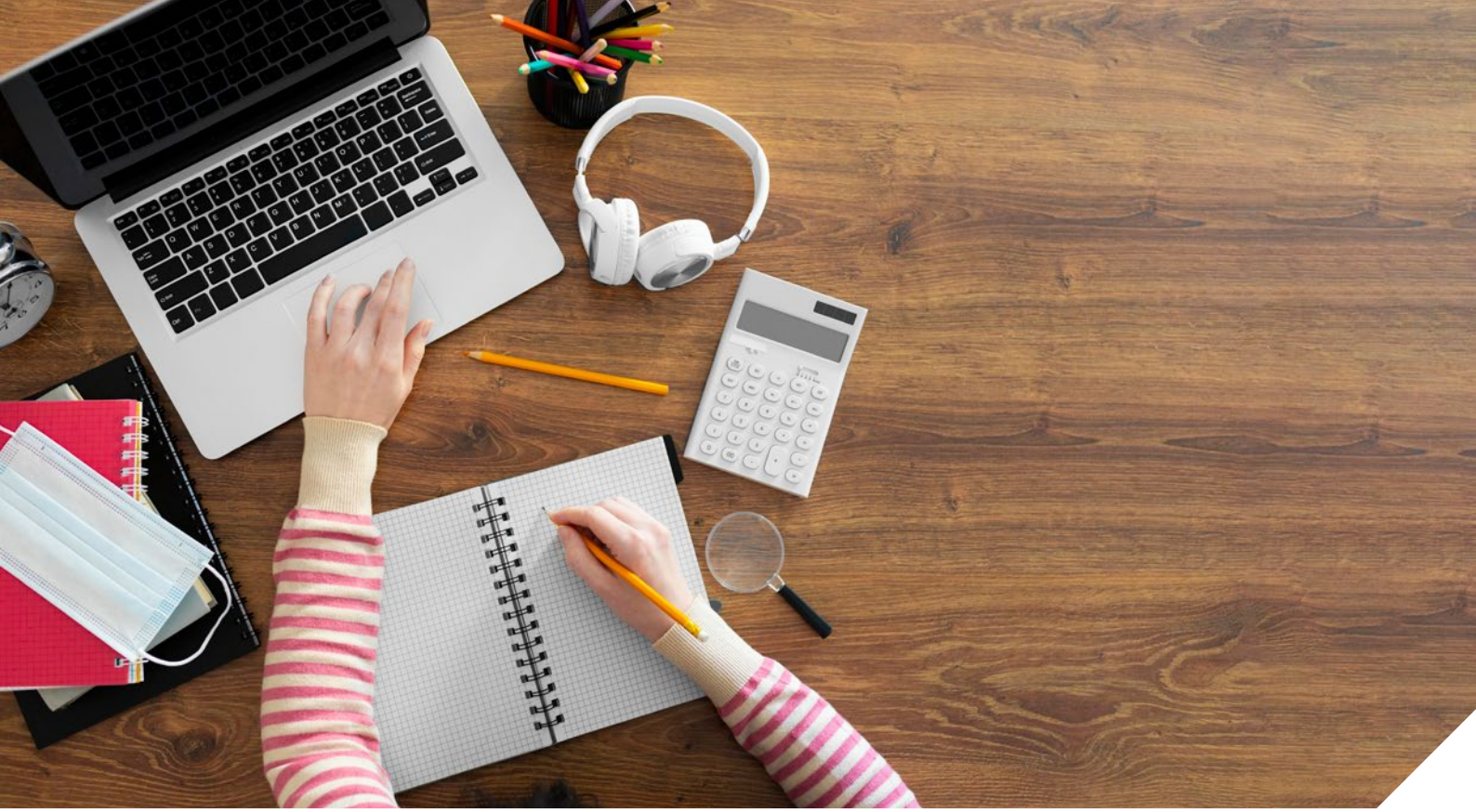
15 training alliances in Austria is that they are usually local or regional networks responding to local and regional skills needs. Essentially, there are two main forms of training alliance: (1) obligatory training alliances, which are intended to enable apprentices to be trained in those companies in which the skills specified in the training regulations cannot be fully provided (for example, due to missing equipment, infrastructure, etc.); (2) voluntary training alliances, in situations where training companies aim to impart special skills to apprentices, possibly going beyond the occupational profile (for example, involving special IT programmes or machinery, foreign language skills, etc.). Obligatory training alliances are supervised by the Apprenticeship Offices appointed by the Economic Chambers. The Chambers also help training companies to find partners in both voluntary and obligatory training alliance situations. See, https://www.wko.at/service/t/bildung-lehre/Ausbildungsverbuende.html for further details.

16 Roughly 10 per cent of all apprentices in Australia are trained in GTOs and the completion rates in GTOs are higher than those of SMEs that employ apprentices directly (see Lisel O'Dwyer and Patrick Korbel, 2019, Completion Rates for Group Training Organisations and Direct Employers: How Do They Compare?; AEN, 2020, Improving Apprenticeship and Youth Employment through the Victorian GTO Network: Response to the Victorian Government Macklin VET Review.

17 In German, "Überbetriebliche Ausbildungszentren". Also, in Switzerland, apprenticeships involve a third learning venue, at least for some professions, the so-called inter-company training courses. However, in contrast to Germany, these are compulsory preparatory or introduction courses.

18 See MSDE-01/01/2018-AP(PMU), letter from the Ministry of Skill Development and Entrepreneurship dated 3 October 2019. https://rdsdechhattisgarh.dgt.gov.in/sites/default/files/SSCs%20and%20TPAs%20for%20promotion.pdf?current=/node.

19 ``See https://msde.gov.in/en/organizations/ssc.



With regard to skills needs and recruitment, Centres of Vocational Excellence (CoVEs) have also been identified as a type of training institution that merits special attention.[20] Again, there is no universally accepted definition of the term, but CoVEs are commonly understood to be upgraded schools or training centres that aim to make the provision of skills more responsive to the needs of the industry, to improve the overall performance of the VET system and to support innovation (see also Case Study 7). By delivering excellence in training, CoVEs are expected to improve the reputation of VET and to make it more attractive for learners and employers alike, but they are also in a position to provide specific additional services to other organizations. This potential could be exploited to address the capacity problems that SMEs in particular face when it comes to the organization of training processes.

SME support for apprentices may best be organized as networking between different companies and rotation of apprentices or processes of organizational consultancy, such as through ICTs, CoVEs and training alliances

In addition to the reasons for reducing training activity set out above, enterprises often complain about the **young people's lack of preparedness to start an apprenticeship.** While SMEs do not have the capacity to make up for shortcomings in applicants' prior education, public provision of vocational preparation schemes to improve the trainability of young people can help to alleviate the situation (see also box 28).

Box 28 Examples of national-scale interventions from South Africa and Uganda

One example of an intervention at national scale to improve young people's state of preparedness for apprenticeships and to create greater incentives for enterprises to hire them as apprentices is the Generic Trade Preparation Programme (GTPP) in South Africa.[21] The programme was set up by the Department of Higher Education and Training in 2013 in cooperation with several industry associations in response to concerns expressed in the automotive retail sector about inadequate basic skills among young people who wished to enter training. The GTPP measures focus on fundamental skills, such as English and mathematics, as well as work readiness. This preparation facilitates the acceptance of learners into apprenticeship or on-the-job training.

The effectiveness of pre-labour market vocational training has been studied in Uganda.[22] In a field experiment involving about 1,700 individuals and 1,500 SMEs, the researchers either randomly

20 See, for example, ETF, Centres of Vocational Excellence: An Engine for Vocational Education and Training Development, 2020.

21 See http://nadsc.dhet.gov.za/site/Artisan%20Development.aspx.

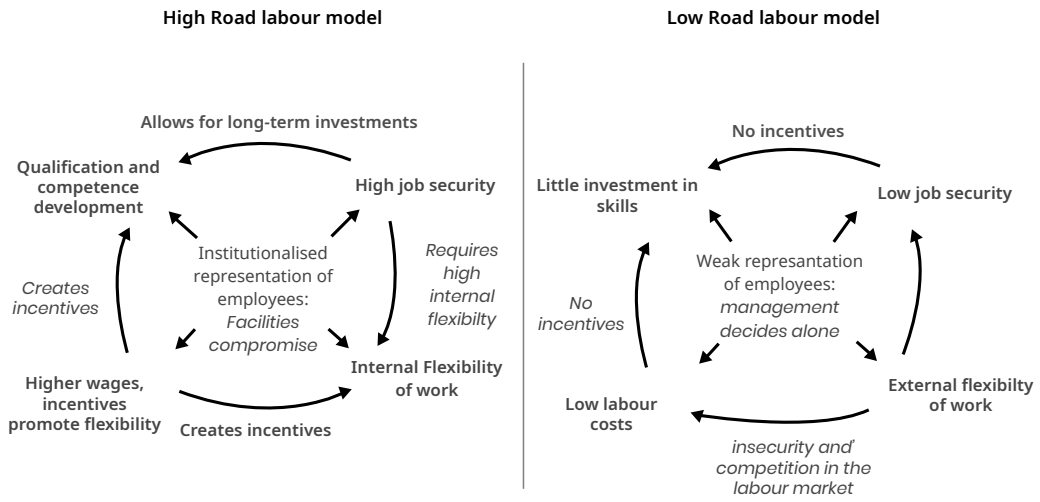
22 Livia Alfonsi et al., "Tackling Youth Unemployment: Evidence from a Labor Market Experiment in Uganda", Econometrica 88, No. 6 (2020): 2369–2414.

assigned participants to a six-month period of subsidized training in a vocational training institute (VTI), matched them with SMEs for immediate employment or subsidized in-company training, or assigned them to a control group that received no treatment at all. Likewise, enterprises were either matched with VTI-trained workers, assigned untrained workers for immediate employment, assigned untrained workers for in-company training, or they were assigned to a control group. The results show that both types of subsidized training have a positive effect on the employment and earnings of young people, but the effects of subsidized VTI-based training are stronger than those of subsidized in-company training. The explanation given by the authors is that VTI-trained learners benefit from the certifiability of their skills, and firm-based training is an advantage mainly for higher-ability learners while learners in general benefit from the systematic learning and the certification of their skills at VTIs.

▶ 5.4 Work organization and industrial relations

Whether companies decide to hire apprentices is not just an issue of their immediate skills needs: it is also influenced by their organizational structures and the characteristics of industrial relations. Investment in in-company training and human resource development is a decisive factor within the so-called **high-road labour model.**[23] In this model (figure 3), work is organized comparatively flexibly within the company and this goes hand in hand with higher employment security and high wages. This scenario creates incentives for qualification and competence development and allows time for long-term staff investments. This training-intensive work model contrasts with the so-called **low-road labour model,** in which there is little incentive for investing in training and skills as profits are built on low wages and low labour costs and the resulting high employee turnover is accepted. In the latter model, a weak representation of worker interests is beneficial, while stronger, institutionalized employee representation is an important stabilizing mechanism in the former.

Figure 3. High-road and low-road labour models



Source: Jürgens and Krzywdzinski, 2009, p. 38, translated from German into English by the authors.

23 Ulrich Jürgens and Martin Krzywdzinski, 2009, "Verlagerung nach Mittelosteuropa und Wandel der Arbeitsmodelle in der Automobilindustrie"; Ulrich Jürgens et al., New Worlds of Work: Varieties of Work in Car Factories in the BRIC Countries (Oxford: Oxford University Press, 2016); P. Loire et al., 2008, "Umfassende Analyse der Entwicklung der Europäischen Automobilindustrie".

Apprenticeships need to cover broad occupational profiles including attractive remuneration and career and income perspectives

In this regard, interesting differences between British and German firms have been found in recruitment and HRD strategies.[24] British and German engineering companies have integrated apprenticeships based on broad occupational profiles into their long-term recruitment and HRD strategies, using them to fill middle-management positions. The same pattern could be identified for the retail sector in Germany, but not for the retail sector in the United Kingdom. There, a strict separation between more narrowly defined operative selling and middle management level positions prevails, limiting options for apprenticeships and career promotions. A vicious circle of low pay, low quality and high labour turnover impedes the establishment of apprenticeships as a solid mechanism in HRD among British retail companies.[25]

Although these interrelations have essentially been studied for larger enterprises, some of the findings are likely to be transferable to SMEs. Moreover, SMEs can benefit from the high-road strategies of their large company neighbours, for instance if large enterprises make their training infrastructure available within the framework of networks or supplier relationships that can be observed, for example, in Slovakia or Spain. [26]

Policy measures should develop and promote training structures along "high-road" employment strategies of companies and cooperative management practices

Evidence from companies in Germany confirms that **works councils**, which are assigned several consultative and supervisory functions in the delivery of training, can fulfil a stabilizing function for commitment to apprenticeships as predicted by the high-road labour model.[27] With regard to apprenticeship, the role of works councils consists of campaigning for the continuous availability of apprenticeship places in the enterprise and safeguarding compliance with the company's training standards. Works councils also have a positive effect on the output quality of training in terms of fewer terminations of training contracts and higher graduation rates.[28] In the United States, where works councils are less prevalent, evidence from the construction sector shows that cooperative programmes ("joint programmes") between employers and employees also result in better apprenticeship quality.[29] Of course, the roles of works councils and

24 Paul Ryan et al., Financial Aspects of Apprenticeship Training in Germany, Great Britain and Switzerland, 2011.

25 Another interesting finding from research on general company characteristics is that firms that are in private or mixed ownership have a higher tendency to participate in training than publicly listed firms. This finding further supports the significance of SMEs for apprenticeships.

26 Anika Jansen and Pilar Pineda-Herrero, "Dual Apprenticeships in Spain – Catalonia: The Firms' Perspective". Vocations and Learning 12, No. 1 (2019): 129–154; Philipp Grollmann et al., 2016, Duale Ausbildung als betriebliche Strategie der Fachkräftesicherung. Fallstudien zu Motivation und Organisation im internationalen Vergleich. Zwischenbericht.

27 See Klaus Berger et al., "Ausbildungsqualität in Betrieben: Welchen Beitrag leistet die betriebliche Mitbestimmung?", Working Paper Forschungsförderung, No. 130, 2019.

28 Klaus Berger et al., 2019, p. 52. The positive effects of works councils on enterprises' training behaviour have also been shown to apply to continuing training (Jens Stegmaier, "Effects of Works Councils on Firm□Provided Further Training in Germany". British Journal of Industrial Relations 50, No. 4 (2012): 667–689).

29 Cihan Bilginsoy, "The Hazards of Training: Attrition and Retention in Construction Industry Apprenticeship Programs", Industrial and Labor Relations Review 57, No. 1 (2003): 54–67. However, especially in the US context, it was repeatedly pointed out that in many cases of strong firm-based unions, apprenticeships were used as a form of "closed shop" recruitment policy in order to strengthen unions' position (Wolfgang Streeck, 2011, "Skills and Politics: General and Specific", Max-Planck-Institut für Gesellschaftsforschung Discussion Paper 11/1).

trade unions in different labour market traditions vary and, particularly in smaller SMEs, formal bodies of co-determination tend not to be well developed or widespread.

▶ 5.5 Public support and partnerships

The capacity and commitment of enterprises to provide apprenticeship opportunities also depends on the support or cooperation they might benefit from or initiate themselves. This becomes obvious when one looks at the public support measures for apprenticeships during the COVID-19 pandemic or the way that public authorities tried to mitigate sky-rocketing youth unemployment in the aftermath of the global economic crisis of 2007–08.[30]

At the inter-organizational level, organizational support for VET can take the shape of multilateral networks in which training is organized on the basis of cooperation between several firms and other types of actors. These networks between employers and schools with the support of public authorities can be classified according to the breadth and depth of cooperation, i.e. the number of enterprises involved and the commitments undertaken by the enterprises, educational institutions and government bodies involved. A "broad" cooperation is characterized by a high degree of coordination across enterprises with regard to the content of training programmes, and a "deep" cooperation involves a relatively high level of investment by the parties involved. Plotting these two dimensions against each other leads to a typology in the form of a two-by-two matrix (see table 3).

Table 3. Types of public–private partnerships for apprenticeship

		Breadth (degree of coordination across enterprises)	
		Low	High
Depth (commitment of the parties involved)	**High**	**Parental model:** cooperation between one dominant employer and local education and training providers **Examples:** P-TECH partnership between IBM and City University of New York; cooperation between Volkswagen plants in the United States or China with local VET colleges	**"Solidaristic" model:** involvement of many enterprises, strong coordination and standardization on the basis of collective bargaining **Examples:** dual VET systems in Austria, Germany, Liechtenstein, Netherlands, Norway and Switzerland but partly also in Australia, Japan and South Africa
	Low	**Liberal model:** little cooperation between enterprises and schools, little coordination of training content across employers, VET institutions or community colleges as main providers of training **Examples:** China, Russian Federation, United States	**"Consortial" model:** cooperation between VET institutions and local groups of employers, agreement on training standards, provision of internships **Examples:** Massachusetts Advanced Manufacturing Collaborative (United States), Greenville Technical College, South Carolina (United States)

Source: Based on Remington, 2018.

30 Stephanie Allais and Carmel Marock, "Educating for Work in the Time of Covid-19: Moving beyond Simplistic Ideas of Supply and Demand", South African Review of Education 26, No. 1 (2020): 62–79.

The consortial and parental models of public–private partnerships (PPPs) are of particular interest in the context of SMEs where the representation of employees' interests tends to be less formally organized. The consortial model features a large number of employers making relatively modest investments in training as higher levels of investment are prevented by the risk of trained apprentices being "poached" by other companies, whereas the parental model is characterized by one large firm that dominates the local or regional labour market finding itself in a position to determine the content of training programmes in cooperation with local schools or colleges. Neither of these two types of partnership involves social partnership between employers and trade unions at sectoral or national level, as commonly associated with apprenticeship training. Instead, each of them is based on an inter-institutional consensus within local industries that may also involve work councils. One example of a parental partnership between one large employer and several public training providers is presented in the snapshot on South Africa in box 29.

Public–private partnerships are key for developing apprenticeships and strong social partnership is beneficial, but not an unconditional necessity

Box 29 "Parental" public–private partnership in South Africa

A good example of how collaboration between one large employer and TVET colleges can regenerate apprenticeships is offered by the case of South Africa.[31] The example concerns the Clicks Group and the South African TVET colleges, which formed a partnership in 2019 to tackle the problem of falling work-based learning (WBL) opportunities. This decline had effectively left the programmes without their practical component. The structure of training involved between 18 and 24 months of WBL on top of the 18 months of theoretical instruction at the college. Through a process of collaboration, the Clicks Group and the South African TVET colleges have provided structured 18-month work placements for students. The learning opportunities are customized so as to enable students to fulfil the diploma requirements for their respective programmes. More than 900 students had entered the programme by 2021, and about 50 per cent of these have already completed their training. The collaboration can be regarded as an example of a PPP that served to revive the principle of dual or alternating training within existing TVET programmes.

To sum up, the state has a special role in ensuring that the various players in vocational education and training each take on the tasks that they can best fulfil. However, the state's room to manoeuvre also depends on the traditions and cultures of specific PPPs. In principle, a distinction can be made between models based on strong and less strong commitment on the part of the actors and those based on more complex or simpler coordination. State influence can be based on the provision of a service (for example, vocational and general education in schools), financial contributions and incentives (see the example from India in box 27), and legal regulations and the commissioning of further services from third parties. From

31 See http://nadsc.dhet.gov.za/site/Artisan%20Development.aspx.

the specific point of view of SMEs, it should be noted that the different forms of PPPs can ultimately also influence the cost-benefit balance of the companies.

▶ 5.6 Key takeaways for policy: A new model for policy interventions to enhance enterprise participation

The various examples of measures to support enterprises in general, and SMEs in particular, to offer apprenticeship places can be structured into three types or levels:[32]

1. policies for institutional conditions (macro level);
2. policies for enterprise or "entrepreneurial"[33] ecosystems (meso level); and
3. programmes targeted directly at enterprises (micro level).

By combining factors to be addressed and the level or scope of intervention, a matrix of intervention can be created which can guide policymakers and practitioners in designing and selecting policy measures (see table 4).

Table 4 Enhancing enterprise participation in apprenticeships: Breadth and scope of measures

Factors to be addressed (breadth of intervention: low to high)	Possible interventions (scope of intervention: micro to macro)		
	Programmes targeted directly at enterprises (micro level)	Policies for entrepreneurial ecosystems (meso level)	Policies for institutional conditions (macro level)
Costs, benefits and entrepreneurial commitment to apprenticeship	Direct financial support, for example wage subsidies, apprenticeship quotas, etc.	Intermediary organizations that take over core functions of training (recruitment, administration); PPPs	Labour market legislation (wages, social security, employment protection);
Skills needs and recruitment	Increasing the flexibility of regulation in regard to individual companies' needs; counselling for employers on skills development, supporting them in assessing their skills needs and in organizing training	Intermediary organizations;training networks (for example, organizing rotation of trainees between firms)	Regulations on VET qualifications and curricula

32 Compare also OECD, International Compendium of Entrepreneurship Policies, 2020.

33 The term "entrepreneurial" is used here to indicate that the issues and interventions are approached from the enterprises' perspective, i.e. interventions designed to promote the development and success of enterprises (see the thematic report Unlocking Apprenticeship Potential in Small and Medium Enterprises by Philipp Grollmann et al. for more details).

Factors to be addressed (breadth of intervention: low to high)	Possible interventions (scope of intervention: micro to macro)		
	Programmes targeted directly at enterprises (micro level)	Policies for entrepreneurial ecosystems (meso level)	Policies for institutional conditions (macro level)
Labour policy, industrial relations and social dialogue	Advice and counselling for organizational development (high-road labour model)	Set-up of local/regional apprenticeship committees	Legislation on the representation of employees' interests; involvement of employers' and employee organizations at a high policy level
Public support and partnerships	Matching individual learners with enterprises (for example, by teachers or guidance staff); awareness-raising campaigns and information on apprenticeships	Intermediary organizations; training networks; PPPs; well-trained teachers at vocational schools and colleges; networks for vocational preparation	Delegating administrative functions to intermediary organizations; curricular or legal provisions for vocational preparation to improve learners' competencies

Source: Philipp Grollmann et al., thematic report Unlocking Apprenticeship Potential in Small and Medium Enterprises.

The first dimension of policy intervention concerns the macro level and is about setting the appropriate legal, administrative and fiscal conditions under which enterprises operate in general. This includes policy areas such as taxation, competition and innovation policies, business regulations and also measures to enhance entrepreneurial culture. The high-road model of work organization described above suggests that strong labour unions within the enterprise can contribute to achieving a state of equilibrium between the management and the employees that supports job security and quality, high wages and investments in skills development.

The second dimension consists of policies for entrepreneurial or enterprises' ecosystems[34] and relates to the meso level in the sense of the resources and supportive networks available in the local environment of the enterprise. External support from intermediary organizations, the fostering of organizational networks such as cooperative apprenticeship, training networks and local apprenticeship committees can all be regarded as policies for ecosystems in this sense.

The third dimension of the model is the micro level of the single enterprise. Such measures aim at improving the capacity and performance of enterprises by a variety of instruments, such as advice and counselling, training for trainers or direct financial support. For instance, a company's cost structure may be altered by direct financial support, improving its ability to hire apprentices. In particular, wage subsidies

34 Entrepreneurial ecosystems can be defined as "set[s] of interconnected entrepreneurial actors, organisations, institutions and entrepreneurial processes, which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment" (Claudia Shwetzer et al., "Entrepreneurial Ecosystems: A Holistic and Dynamic Approach", Journal of Industry–University Collaboration 1, No. 2 (2019), p. 79). It must be pointed out that the key term "entrepreneurial" (or "entrepreneurship") lacks a commonly accepted definition and is interpreted in different ways throughout the relevant literature. While some authors adopt a narrow definition, according to which entrepreneurial activity consists of the creation of new ventures, others use the term to include the activities of established organizations, such as banks, firms and venture capitalists as well (see Sabrina Fredin and Alina Lidén, "Entrepreneurial Ecosystems: Towards a Systemic Approach to Entrepreneurship?", Geografisk Tidsskrift–Danish Journal of Geography 120, No. 2 (2020), p. 88).

for apprentices may be used to this end. Also, mandatory training quotas, as in the case of Colombia (see Case Study 7), would fall into this category.

Even though there is a converging understanding of apprenticeship at the global level, there is still a considerable lack of information on the interplay between the training behaviour of firms and differences in national or regional environments. Further research is needed to understand the motivations of firms to invest in apprentices in different contexts. Future policy interventions would benefit from knowing as much as possible about the motivations and skills needs of companies in the targeted sectors and markets. Also, it would be worthwhile to study motivations beyond economic incentives, such as corporate social responsibility, employee retention and employer branding.

Case Study 7

Mandatory apprenticeship quotas and their effects in Colombia

Colombia has a strong vocational training sector that dates back to the 1950s. The national apprenticeship service, SENA, was established at that time as a joint initiative of organized workers, entrepreneurs and the Colombian Catholic church with the support of the ILO. Over the past 20 years, publicly provided VET has expanded significantly.

In 2003, the situation pertaining to apprenticeship training in Colombia changed significantly due to new legislation (Law 789 of 2002).[35] The legal status of apprentices changed from employee to designated apprenticeship status, the maximum duration of a training course was set at two years and payments were reorganized and specified in relation to the minimum wage: 50 per cent during school instruction, 75 per cent during on-the-job learning and 100% for university students. Additionally, 100 per cent of the legal minimum wage must be paid during on-the-job learning when the national unemployment rate is less than 10 per cent.

Most importantly, mandatory training quotas have been set depending on the size of the company, in contrast to a generalized quota independent of company size. All private companies (except those in the construction sector) with more than 15 employees are obliged to train apprentices. For instance, companies with between 15 and 29 employees must have at least one apprentice, those with 30–49 employees two apprentices, those with 50–69 employees three apprentices, and so on. In the event that companies fail to comply with the respective training quota, they must pay a fee that equals the minimum wage of the apprentices not hired. This option is called monetization of the apprenticeship fee and is essentially an apprenticeship levy.

Two rigorous econometric studies have scrutinized the effects of these reforms.[36] The results showed positive effects on output per worker and an increase in productivity, but the productivity gains were not passed on to workers through higher wages. The costs for companies were reduced due to the lower remuneration during the instruction period and the reduction of non-wage labour costs. On the other hand, the opportunity costs of not training increased due to the mandatory fees for such cases. There has been no substitution of unskilled labour and the reform was highly successful in increasing the overall number of trained apprentices by more than 15 times compared to previous levels. Among other issues, the research recommended that consideration be given to sector-specific

35 There have been other important changes in vocational education and training in Colombia since 2003 related to WBL that are described in the full version of the case study in the thematic report Unlocking Apprenticeship Potential in Small and Medium Enterprises by Philipp Grollmann et al.

36 Santiago Caicedo et al., Unwilling to Train? Firm Responses to the Colombian Apprenticeship Regulation, Barcelona Graduate School of Economics Working Paper No. 1204, 2020; Carlos Ospino, "The Effects of Being Subject to the Colombian Apprenticeship Contract on Manufacturing Firm Performance", Universidad Nacional de La Plata, Centro de Estudios Distributivos, Laborales y Sociales (CEDLAS), Working Paper No. 230, 2018.

minimum wages for apprentices and to reducing the minimum wage in high-skill sectors, where firms face higher training costs.

The example illustrates the economic effects of a strong institutional regulation of apprenticeships through a combination of mandatory quotas, legal minimum wages and other financial instruments as well as mechanisms to manage and support the take-up of apprenticeships through companies. The use of apprenticeships by companies has increased significantly as a result of the reform, but the research has also given indications of where the policy can be improved.

The full case study can be found in the thematic report Unlocking Apprenticeship Potential in Small and Medium Enterprises by Philipp Grollmann et al.

Case Study 8

VET college as an enabler for apprenticeship in Vietnamese VET

Addressing economic competitiveness and the shortage of skilled labour are important drivers in modernizing VET in Viet Nam. For instance, the Vietnamese National Green Growth Strategy for the period 2011–20, with a vision for 2050, endorses the specific role of TVET in supporting the development of green jobs. However, VET in Viet Nam remains strongly school-based and theoretical. The low level of involvement of enterprises and employer organizations[37] is a persistent problem. To overcome this challenge, a Law on Vocational Education and Training (Law No. 74/2014/QH13) was passed in 2014, which set up a new framework for cooperation between VET institutes, enterprises and apprentices. It extends the rights and obligations of enterprises and "encourages employers to cooperate with VET institutes in providing elementary, intermediate, college and other vocational training programmes".[38] Furthermore, the 2019 Labour Code, which came into force in January 2021, reset the relationship between employers and apprentices and strengthened the role of employers' and workers' organizations.[39] The VET law, the Labour Code and the National Green Growth Strategy

37 Michael Schwarz et al., Assessment of the Implementation of the Vietnamese Vocational Training Strategy 2011–2020 and Recommendations for the Vietnamese Vocational Training Strategy 2021–2030. Report by the Federal Institute for Vocational Education and Training (BIBB) to GIZ GmbH, 2020.

38 Schwarz et al., 2020, p. 12.

39 National Assembly of Socialist Republic of Vietnam, Labor Code No. 45/2019/QH14, 2019.

have set the scene for the further development of cooperation between educational institutions and enterprises with a clear objective of improving the quality of apprenticeship offers.

The Vocational College of Machinery and Irrigation (VCMI) is one of the colleges that acts as an initiator and mediator for the involvement of enterprises in VET within this setting. A project which is part of the Vietnamese–German Reform Programme of TVET (2015–24) aims to develop and establish VCMI as a competence centre for Green TVET[40] that will also act as an initiator and mediator for the involvement of enterprises in VET. In addition to the delivery of initial and further training programmes, the project includes their development and piloting in cooperation with enterprises. An important instrument is the establishment of Industry Advisory Boards to ensure ownership of the qualifications by the business sector and prompt the development of a cooperative training model. Industry Advisory Boards for two occupations (Electronics Technician for Energy and Building Technology and Mechanics Technician for Sanitary, Heating and Climate Technology) have been established with seven participating companies. These companies have made a commitment to participate in the in-company training phase of the cooperative training programmes with VCMI.

This case study highlights the relevance of setting a regulatory framework which relates to labour market as well as VET issues while keeping a focus on the role of enterprises. The involvement of enterprises is envisaged at different levels, since they are invited to engage in the development of qualification standards as well as offering apprenticeship placements. A first evaluation underlines the fact that the initiative is potentially a role model for further developments in other economic fields as well as for countries in the same geographical area.[41] As such, the college could become a future regional hub for green TVET for Cambodia, Lao People's Democratic Republic, Myanmar and Viet Nam.[42]

The full case study can be found in the thematic report Unlocking Apprenticeship Potential in Small and Medium Enterprises by Philipp Grollmann et al.

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41 Michael Schwarz et al., Assessment of the Implementation of the Vietnamese Vocational Training Strategy 2011–2020 and Recommendations for the Vietnamese Vocational Training Strategy 2021–2030, 2020.

42 M.T. Nguyen, "Development of Training Programmes for 'Green' occupations in Vietnam". Internal paper for the UNEVOC BILT Project, 2021.

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6 Boosting learner participation in apprenticeships

Boosting learner participation in apprenticeships

In many metropolises around the world, aspiring chefs are queuing up to get a place in the most prestigious restaurants. An apprenticeship as a Formula 1 mechanic at the National College for Motorsport, Silverstone, England, is probably one of the most sought-after practical training options in Europe. Nevertheless, apprenticeships are often seen as inferior to university studies. Hardly any other type of training has a more varied reputation than apprenticeships. Why is that so? What determines the attractiveness of apprenticeships? And how can it be improved?

▸ 6.1 Introduction: Availability, awareness, access and affordability

Industries that were once very important are becoming less so, with apprenticeships not always managing to catch up with new industries and occupations (see also Chapter 2). The access of populations to higher education has increased greatly since the middle of the twentieth century in most countries, reducing the potential pool of apprentices, at least in high-income countries. Furthermore, vocational education and training (VET) itself is generally viewed as having low status,[1] as are, often, the apprenticed occupations. Finally, since 2020, the COVID-19 pandemic has severely affected apprenticeship systems, as detailed below. So apprenticeship is not necessarily seen as a valued or modern choice for many people. Moreover, those thinking about an apprenticeship are unlikely to have access to complete or unbiased information. Those who advise young people about careers, in schools or at home, are often advocating a university pathway, partly because they are unlikely to have experienced an apprenticeship themselves.[2] Despite the implementation of a range of counter-measures, apprenticeships seem to have been on the downward slope in many countries since the 1980s.

From a business perspective, one might assume that the apprenticeship model has reached the final stage of its life cycle. Certainly, apprenticeship is not a product, but for analytical purposes it can be helpful to

1 Cedefop, Cedefop European Public Opinion Survey on Vocational Education and Training (Luxembourg: Publications Office of the European Union, 2017).

2 Erica Smith and Annette Foley, "Choosing VET as a Post-school Activity: What Are Some Influences on Non-Metropolitan Students?", Recover, Rethink and Rebuild: All Eyes on VET, Annual Conference of Australian Vocational Education and Training Research Association, online, 19–23 April 2021.

view it as such. For a product, for instance a vaccine, to be successful, some basic conditions must be in place, which has also become known as the 4A framework.[3]

First, the product must exist and must be on the market **(availability**). The idea that a vaccine could exist, and perhaps does exist in some laboratories, is of little help. It must also be tested, approved and available. Only a little over half of the world's countries offer formal apprenticeships.[4] Even if a country offers apprenticeships, it may not do so for certain occupations or in certain sectors, and hence the standards and programmes must first be created (although not all apprenticeships have official "standards" – see also Chapter 4).

Second, the product must be known **(awareness).** A vaccination centre full of vaccine doses is of little help if the target group does not know that such a centre exists or has recently opened, and neither are apprenticeship programmes or vacancies that no one is aware of.

Third, the product must be accessible **(access and inclusiveness).** A vaccination centre that is not within easy reach or is not wheelchair accessible is of little use to people who live remotely or have a disability. This applies equally to apprenticeship places that are too far away or unsuitable for someone with disabilities.

Fourth, there must be a need for the product, it must be of good quality compared to others and affordable **(advantage and affordability).** If someone is not convinced by a product, it is hard to force them to use it, even if it is free of charge, as the debate surrounding compulsory COVID-19 vaccination has shown. But,

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3 By using the example of the development of the biomass stove for the rural poor in India, C.K. Prahalad (2012) suggests that managers can create an exciting environment for innovation by focusing on creating awareness, access, affordability and availability (4As). However, there are variations of this framework and often a fifth or sixth "A" is added, such as "advantage" in the context of development finance or "adaptability" and "acceptability" in the context of the human right-to-education initiative. In the latter context, availability examines whether education is generally available; accessibility focuses on the various obstacles to accessing education; acceptability evaluates the various aspects of the content and adaptability examines whether education is adapted to the needs of various different categories of persons. See Bain & Company and Acumen, Growing Prosperity: Developing Repeatable Models to Scale the Adoption of Agricultural Innovations, 2014; Gauthier de Beco, "Right to Education Indicator Based on the 4A Framework", Concept Paper for the Right to Education Project, 2009; Jagdish Sheth and Rajendra Sisodia, The 4 A's of Marketing: Creating Value for Customer, Company and Society (Routledge, 2012).

4 Maia Chankseliani et al., People and Policy: A Comparative Study of Apprenticeship across Eight National Contexts (WISE and University of Oxford, 2017), p. 91.

5 Jill Rubery and Damian Grimshaw, The Organisation of Employment: An International Perspective (London: Bloomsbury Publishing, 2020).

even if one is convinced, the question remains which vaccine to choose and whether one is better than another.

These basic elements are certainly related and can only be developed reciprocally. The best awareness campaign will be useless and will fail if the product is out of reach or of poor quality. These aspects will be examined one by one in relation to approaches to boost participation in apprenticeship training, following a discussion of key constraints for expanding apprenticeships in the next section.

▶ 6.2 Key constraints and challenges to the attractiveness of apprenticeships

Economies are constantly changing their structure – think of tertiarization – but apprenticeships have not always changed with the economy. Indeed, the concept of an occupation itself is also now more fluid, with organizational and industry labour markets becoming as important as occupational labour markets. Moreover, access to higher education has increased greatly in most countries since the middle of the twentieth century with, for example, over 50 per cent of young people in the United Kingdom proceeding from school to university.[6] Apprenticeship is not necessarily seen as a first choice for many young people, even in countries like Germany and Austria where the system has traditionally been very strong and is firmly embedded in secondary school education.[7] Since early 2020, the COVID-19 pandemic has had a major impact on apprenticeship systems and has affected both off-the-job learning[8] and on-the job learning,[9] as both were forced to shift to online delivery during lockdowns. Apprentice numbers declined considerably in 2020 in many countries.[10] Although Governments have expanded existing support schemes, networks and subsidies to employers who recruit apprentices[11] the long-term impact of such measures on the attractiveness of apprenticeships has yet to be seen.

The COVID-19 pandemic has had a major impact on apprenticeship systems and apprentice numbers have declined considerably

One perennial concern is t**he low status of apprenticeships,** including the low status of VET itself compared to the academic pathways in schools and universities. Apprenticeship is usually seen as part

6 Simon Marginson, "The Worldwide Trend to High Participation Higher Education: Dynamics of Social Stratification in Inclusive Systems", Higher Education 72 No. 4 (2021): 413–434; O. Newton, "Degree Model Apprenticeships". New Zealand Vocational Education and Training Research Forum, online, 8–9 September 2021.

7 See, for example, Thomas Deissinger, "VET and Universities in the German Context: Substitutes or Complements? A Problem Analysis", Modern Apprenticeships: Widening Their Scope, Sustaining Their Quality, 7th INAP Conference, Washington DC, October 2017; "Dual Universities and Dual Study Programs in German Higher Education: Will They Replace Apprenticeships in Some Occupational Sectors?" Contemporary Apprenticeship Reforms and Reconfigurations, 8th INAP Conference, Konstanz, March 2019.

8 See, for example, OECD, VET in a Time of Crisis: Building Foundations for Resilient Vocational Education and Training Systems, 2020.

9 See, for example, Richard Marsh, "Is Digital Apprenticeship Possible?" ILO webinar, Jakarta, 15 July 2021, Quality Apprenticeship in Industries series. See https://www.ilo.org/jakarta/info/public/pr/WCMS_815536/lang--en/index.htm.

10 For example, by 11 per cent in Germany, where there was a considerable impact on small businesses (Thomas Deissinger, "Apprenticeship Resilience in Germany", The State of Apprenticeship during the COVID-19 Pandemic: Reports from Seven Countries, online virtual forum of INAP, 26 May 2021).

11 See, for example, Deissinger, 2021; Bonnie Watt, "The State of Canadian Apprenticeship: Decentralization or National Direction?", The State of Apprenticeship during the COVID-19 Pandemic: Reports from Seven Countries, online virtual forum of INAP 2021; Erica Smith, "The Expansion and Contraction of the Apprenticeship System in Australia, 1985–2020", Journal of Vocational Education and Training 73, No. 2 (2021): 336–365.

of the vocational education system.[12] The perception of VET's low status compared to academic tracks is likely to be a major factor affecting the attractiveness of apprenticeships.

A study carried out by Cedefop,[13] involving over 35,000 citizens across the European Union, looked at several issues including awareness of VET and its attractiveness. When comparing VET with other choices at upper secondary level, three quarters of respondents agreed that, in their country, general education had a more positive image than vocational education, and the same proportion agreed that "students with low grades are directed towards VET". Of those who had chosen general education in upper secondary school, 25 per cent said that they had been specifically advised against VET, with proportions reaching around 50 per cent in some countries.

From an employer's point of view, the more attractive apprenticeships in general appear, the more likely they are to attract the high-quality candidates that employers are seeking. Or, as the Organisation for Economic Co-operation and Development (OECD) puts it: "Attractive apprenticeships attract attractive apprentices".[14] Employers in Australia, for example, often complain about the **"low quality" of applicants,** citing the lack of sufficient basic skills or numeracy.[15]

The low status of apprenticeships is rooted in the lower status of the occupations they serve

The low status of apprenticeships may also be rooted in the **lower status of the occupations** served by apprenticeships. The occupations which offer apprenticeships are often manual jobs that are not well paid in comparison with jobs that require university education. While it is often argued that "skill" is socially constructed, i.e. it is not objective and measurable,[16] apprenticed occupations are often viewed as less highly skilled than occupations which require higher education to enter.

There are therefore several interlinked issues involved: the educational achievements of apprenticeship applicants, the status of apprenticeship due to its historical and cultural history and its traditional participants, and the relative prestige of the occupations for which apprenticeship prepares people. An important political task here is to reverse possible downward spirals and break vicious circles (low status feeds inadequate provision and underfunding, which in turn leads to poor quality, which leads to low status).

People advising on apprenticeships often have limited knowledge of apprenticeships and rarely have any first-hand experience

There is a **lack of awareness** of the many career pathways accessible via apprenticeship, both within organizations and within industries. Young people, in particular, learn about potential careers from a fairly restricted range of sources: careers advisers at school, family and friends.[17] These people may themselves have limited knowledge of apprenticeship

12 Apprenticeship may operate outside formal VET systems (if a formal qualification is not gained, as in, for example, Indonesia), and VET frequently operates outside apprenticeship (for example, in Australia, only around one quarter of government-funded VET enrolments have been in apprenticeships) (Erica Smith and Jack Keating, From Training Reform to Training Packages (Tuggerah, New South Wales: Social Science Press, 2003), pp. 5, 93). For more recent data see https://www.ncver.edu.au/research-and-statistics/data/databuilder.

13 Cedefop, 2017. See also Cedefop, More Perceptions: Opinion Survey on Adult Learning and Continuing Vocational Education and Training in Europe. Volume 2: Views of Adults in Europe, Cedefop Reference Series, No. 119, 2021.

14 OECD, Seven Questions about Apprenticeships: Answers from International Experience, 2018, p. 128.

15 See, for example, AiGroup, An Apprenticeship Model for the Modern Economy, 2020. It should be noted that there are also huge differences between employers.

16 See, for example, Alexis Esposto, "Skill: An Elusive and Ambiguous Concept in Labour Market Studies", Australian Bulletin of Labour 34 No. 1 (2008): 100–124.

17 Erica Smith and Annette Foley, 2019.

and may not be able to provide impartial information. Consequently, adults as well as young people may be labouring under misconceptions; thinking, for example, that apprenticeships are only available in a **narrow range of occupations** which may appear unattractive, dirty or heavy, or exclusively for men. Moreover, apprenticeships are often seen as linked to entry-level occupations rather than to onward career paths. For individuals without family members or family friends who have been apprentices, information is often hard to access or biased.[18]

Gender issues are also at play. In countries where apprenticeships are predominantly in masculinized occupations (for example, the United States and Canada), women and girls may not be able to undertake an apprenticeship because they are not available in jobs which they prefer or simply because they would not have access to adequate amenities at certain workplaces. The introduction of apprenticeships in more feminized occupations is important for gender balance, but these occupations – for example, retail assistants – are often not well respected due to cultural, sociological or historical factors.[19]

Other deterrents vary from country to country and depend on how apprenticeships are structured. Potential recruits could be deterred by the time commitment (often several years), the structure of the programme, the hours of work, the comparatively low level of qualification attained (if any) compared with attending university, the low rate of pay or stipend compared with other choices, and so on. They may also be deterred by negative stereotyping, by fears of low-quality work, exploitation and low-quality curriculum content at the training provider. On the other hand, factors which may deter some candidates may be attractive to others. Table 5 summarizes key aspects that may make apprenticeship attractive or unattractive to individuals, utilizing commonly accepted features of apprenticeships.

The subsequent sections provide ideas on how to boost learner participation by increasing availability, awareness, access and affordability related to apprenticeships.

Table 5 Features of apprenticeship: How they can both attract and deter potential applicants

Features of apprenticeships	Potential attractiveness to individuals	Potential unattractiveness to individuals
1. Stipulated period of time	Provides a clear future plan for a reasonable length of time (generally a year or more)	The stipulated time (sometimes three or four years) may appear daunting
2. Relationship with employer	Apprentices are generally paid or receive a stipend which compares well with other learning pathways. Relationships with employers may lead to permanent post-apprenticeship work and close ties with mentors	Apprentices may be tied to employers in order to complete the apprenticeships, regardless of working conditions or rate of pay
3. A majority of "hands on" learning in the workplace	Learning on the job is attractive to those who are not comfortable with, or have had poor experiences of, classroom learning	Some candidates may be deterred by a lengthy on-the-job learning period, preferring classroom learning and finding workplace conditions unattractive

19 For example, an Australian study of post-school transitions in rural areas (Erica Smith and Annette Foley, "Young Futures: Education, Training and Employment Decision-making in Non-metropolitan Areas". Report submitted to the Department of Education and Training, Victoria, 2019) found that sporting clubs were an informal transmission source for apprenticeship information and job vacancies, but girls and boys who did not play sport were disadvantaged.

20 See, for example, Erica Smith, "The Expansion and Contraction of the Apprenticeship System in Australia, 1985-2020", Journal of Vocational Education and Training 73, No. 2 (2021): 336–365; Chankseliani et al., 2017; Kerstin Duemmler and Isabelle Caprani, "Identity Strategies in Light of a Low Prestige Occupation: The Case of Retail Apprentices", Journal of Education and Work 30, No. 4 (2017): 339–352.

Features of apprenticeships	Potential attractiveness to individuals	Potential unattractiveness to individuals
4. Relationship with training provider	Involvement of a training or education institution provides extra assistance, reassurance that apprenticeships are legitimate and broader educational development	The prospect of attending a school or training provider may be unattractive for those with poor experiences of education
5. Achievement of a qualification or certification	A formal certificate is a tangible benefit in the labour market as well as certifying individual achievement	For candidates from disadvantaged backgrounds, the requirement to pass a qualification, exam or test may seem daunting
6. "Licence to practise" an occupation	Apprenticeship is sometimes the only way to enter an occupation, making it a necessary pathway for those occupations	While unlikely to be a deterrent per se, this feature of apprenticeships may seem narrow to potential applicants
7. Potential for self-employment after completion	A well-rounded curriculum may mean that relatively young persons can confidently start up their own company in the industry area	This potential for self-employment may deter people who prefer to pursue a career within a large organization, unless the possibilities offered by self-employment are made clear
8. A list of approved occupations	The list generally includes "in demand" occupations and those which are widely recognized	The occupations on the list may be unattractive or outdated and/or may favour a particular gender (usually males)
9. Stakeholder group involvement	While this is a "behind the scenes" activity from the point of view of potential apprentices, they may be aware of the role of stakeholders in protecting their interests and working to promote quality in apprenticeships	Where the interests of one group prevail over another, there may be barriers to apprenticeships, but this also takes place "behind the scenes"

Source: Erica Smith, thematic report Improving the Attractiveness and Social Perception of Apprenticeships.

6.3 Expanding the availability and types of apprenticeships

According to Chankseliani and colleagues, 81 countries around the world – that is a little over half of all countries – do not offer formal apprenticeships.[20] In some countries, apprenticeships are primarily for young people, in others they are primarily for adults (see Chapter 8). In most countries, apprenticeships are limited to certain sectors or occupations, and/or to particular skill levels. A key strategy for increasing attractiveness is to expand the range of apprenticeships and programmes. This does not simply mean offering more of the same things (although this can also be a strategy) but diversifying and improving the quality of the offer. And, indeed, this is what we observe in countries that have been successful in

People advising on apprenticeships often have limited knowledge of apprenticeships and rarely have any first-hand experience

20 Chankseliani et al., 2017, p. 91.

expanding or maintaining stable apprenticeship numbers.[21] This approach could include expanding to higher (or lower) levels, new industries and occupations or developing new forms of programmes.

For this purpose, it is advisable to have clear national goals for the expansion of apprenticeships, as was suggested at the G20 Labour and Employment Ministers' meeting in Beijing in 2016. Among the ten action points they agreed on to promote quality apprenticeships, which were endorsed at the G20 leaders' summit in Hangzhou later that year, was the establishment of national **goals to expand and improve apprenticeships.** A corresponding survey by the ILO covering 18 countries found that all countries used national targets or goals, both quantitative and/or qualitative, to promote quality apprenticeships.[22] For instance, the French Government set a target of 500,000 apprentices for the years 2012–17, including the opening of apprenticeship to the State Public Service (with a target of 10,000 apprentices in 2016).[23] The majority of the countries also planned to expand apprenticeships to higher education levels, or had done so already.

Establishing national goals to expand and improve apprenticeships helps to increase apprenticeship numbers

The same ILO survey also found that the occupational coverage of apprenticeships varied significantly. Apprenticeship training was generally available for a wide range of occupations, but some occupational groups had a higher level of participation in apprenticeships than others. Some 60 per cent of government respondents envisaged expanding the coverage. Some governments were also strategically using apprenticeships to embrace new technologies and "Industry 4.0". **Promoting apprenticeship programmes in a broad range of occupations and sectors**, particularly emerging sectors, such as the digital economy service sector, and in occupations that are attractive to the next generation, was therefore one of the ten action points of the G20 leaders' summit.

Higher-level apprenticeships are being introduced in many countries to expand both the provision and the quality of apprenticeships, sometimes embedding university degrees within the apprenticeships as one way of achieving this, and also to extend the benefits of apprenticeship to other occupations.[24] Initiatives from China, Germany, Ireland and the United Kingdom have been documented[25] (see box 30; also box 9 on banking apprenticeships in the United Republic of Tanzania). However, they have not been widely taken up. For example, in the United Kingdom, an early adopter of higher-level apprenticeships, while the number of degree apprentices has grown over their five years of operation, they still only constitute 4.2 per cent of apprentice commencements.[26] Nevertheless, an important issue for apprenticeship, as with VET in general, is to

Both pathways to higher education and higher-level apprenticeships are being introduced in many countries to expand the provision of apprenticeships

21 Philipp Eigenmann et al., Opening and Extending Vocational Education, Studies in Vocational and Continuing Education, Vol. 18 (Bern: Peter Lang, 2021).

22 The survey, which was sent to the main representatives of each of the social partners (Government, employer peak bodies, union peak bodies), achieved responses from 18 countries, namely: Argentina, Australia, Canada, China, Germany, France, India, Indonesia, Italy, Japan, Mexico, Republic of Korea, Russian Federation, Saudi Arabia, South Africa, Türkiye, United Kingdom and United States (ILO, ILO Survey Report on the National Initiatives to Promote Quality Apprenticeships in G20 Countries, 2018a).

23 ILO, 2018a, p. 13.

24 See, for example, AiGroup, 2020.

25 Zheng Li, "An Investigation on the Implementation of Modern Apprenticeship Between Higher Vocational Colleges and Enterprises in China", 7th INAP Conference, Washington DC, October 2017; Deissinger, 2019; Michael Barrett et al., "Lessons Learned from the Implementation of Ireland's First Degree Level Apprenticeships Using the BA (Honours) in Insurance Practice", 7th INAP Conference, Washington DC, October 2017; Bill Esmond, "Higher/Degree Apprenticeships and the Diversification of Transitions in England", Contemporary Apprenticeship Reforms and Reconfigurations, 8th INAP Conference, Konstanz, Germany, March 2019.

26 Olly Newton, "Degree Model Apprenticeships". New Zealand Vocational Education and Training Research Forum, online, 8–9 September 2021.

provide pathways to further or higher education, so that taking an apprenticeship pathway in secondary school (or later) does not close off other pathways, i.e. it is a not a "dead end".

Box 30 A Medical Doctor Degree Apprenticeship in the United Kingdom

From September 2023, it will be possible for people who want to train as a doctor in the United Kingdom to do so by an apprenticeship route. The Medical Doctor Degree Apprenticeship involves the same training to the same standards as traditional educational routes. Apprentices will complete all elements of medical education, academic and practical, including a medical degree, and will be able to earn a wage while they study. The aim is to recruit students from varying backgrounds, who may have struggled to pursue a traditional medical degree education, so that future generations of students, and health professionals, more closely reflect the populations they serve. The route may also appeal to people who already have experience in other clinical roles and wish to become doctors.

Source: Institute for Apprenticeships & Technical Education, 2022.

6.4 Increasing awareness

The ILO survey cited above also found that most governments played an active role in **raising awareness of apprenticeships** among enterprises, jobseekers, career counsellors and the general population.[27] Publicity campaigns utilized traditional media, websites and social media. Most countries had web portals to provide information relating to apprenticeships and access to application/recruitment processes. Governments were conscious of the negative perception surrounding apprenticeships and they targeted influencers, such as teachers and parents, to address this challenge. Career guidance in schools

27 ILO, 2018a, p. xiii.

provided an opportunity to disseminate information about apprenticeships to youth, but it could be expanded further.

For instance, the UK Government's National Apprenticeship Service developed a media campaign via the Career Development Institute and communications to all schools, colleges and apprenticeship representative bodies to ensure that career professionals were well-informed and that schools welcomed apprenticeship providers to talk to young people (see box 31). It provides a good example of a broad range of marketing activities for different target groups and levels: the micro-level (the potential apprentice), the meso-level (careers counsellors) and the macro-level (general public).[28]

Awareness-raising activities should address the "three spheres" influencing an individual's decision to start an apprenticeship:

(1) family and peers,

(2) school, community and career advisers, and

(3) society and media

Box 31 Three examples of awareness-raising and marketing with clear target audiences in the United Kingdom

For potential apprentices: A campaign known as "Get in, go far" to attract young people. A "Find an Apprenticeship" website; webinar sessions working with Jobcentre staff to help the latter assist unemployed people into apprenticeships; a National Apprenticeship Service Help Desk for enquiries.

For careers counsellors: A media campaign via the national Career Development Institute; communications to all schools, colleges and apprenticeship bodies to provide careers staff with up-to-date information. The Technical and Further Education Act 2017 requires schools to allow training providers to talk directly to students about apprenticeships and other TVET courses.

For the general public: An "Amazing Apprenticeships" website to promote apprenticeships as a valued destination; resources for schools to educate young people about apprenticeships.

Source: Erica Smith and Jacqueline Tuck, 2018.

See also Case Study 10 on the "Decade of the Artisan" in South Africa as an example of a comprehensive awareness-raising campaign with the aim of boosting apprenticeship participation. Apprenticeships can also provide opportunities for people with disabilities – see section 10.8.

Also, **social partners** are very active in this respect. A total of 80 per cent of the workers' and employers' organizations that responded to the ILO survey were actively involved in raising awareness of apprenticeships among their members and the general public, including young people and their parents. For instance, the Trades Union Congress (TUC) in the **United Kingdom** organizes visits to schools to encourage young people to become apprentices and is involved in skills exhibitions attended by parents and young people (for example, the "Skills Show" and "Big Bang"). Furthermore, the TUC has produced a range of printed guides and online resources for individual apprentices, setting out their employment and training rights. The Mouvement des Enterprises de France (MEDEF) in **France** organized a campaign on apprenticeship, together with its member organizations, to change the image of apprenticeships, which were described as "often considered as being a sign of failure".[29] There are also numerous examples of how **individual employers** promote their apprenticeship training (see box 32).

28 These levels (micro, meso, macro) correspond to three sets of influences (families/peers, schools/advisers and the media/society) in the ecological systems theory proposed by Bronfenbrenner in his theory of child development (Urie Bronfenbrenner, The Ecology of Human Development: Experiments by Nature and Design (Cambridge, MA: Harvard University Press, 1979). See also Paul Downes, Access to Education in Europe: A Framework and Agenda for System Change (Dordrecht: Springer, 2014).

29 Smith & Tuck, 2018.

Box 32 Examples of a marketing campaign by an individual employer

In **India**, the Dalmia Cement company conducts marketing campaigns in the communities around its plants to try to attract local people into apprenticeships. Company staff run stalls at local job fairs and visit training providers. In the **Netherlands**, Friesland Campina dairy cooperative needs 50 apprentices a year and undertakes a number of promotional activities. Representatives attend events run by college student associations and universities, sometimes taking existing apprentices with them. The company has a Facebook page for recruitment but finds the face-to-face method more effective.

Source: ILO, 2018.

Access to **accurate information from trusted sources** is very important. In relation to young people, the OECD states:

There is an onus on schools to take a proactive and strategic approach to career guidance which begins young, broadens ambitions, and ensures that regular encounters with independent and well-trained career guidance professionals are the norm. Essential to effective guidance is giving young people the chance to find out for themselves, through activities such as career talks and job shadowing, what it is like to follow different occupational and learning pathways, including apprenticeships.[30]

Online information may be a useful source of advice, although there are, of course, issues of internet access for some people and difficulties in finding the right information. Prospective candidates for apprenticeships may therefore need assistance in selecting appropriate government websites and accessing other reputable sources of information and agencies.

Access to accurate information about apprenticeships from trusted sources is very important for young people, as are tasters such as trial apprenticeships and job-shadowing programmes

Providing advance information through online platforms, printed material, careers fairs, vocational counsellors in schools and the like is one side of the coin; the other is providing first-hand experiences. Once customers have shown interest, product trials are a common way of convincing them. People usually test perfumes before buying them; who would buy a car without having taken it for a test drive? Likewise, **trial apprenticeships** and job-shadowing programmes may be useful for high-quality apprenticeship systems as they support both the recruitment process of employers and the career choice of apprentices. Trial apprenticeships can take many forms, from a few days spent in a company to a course lasting several weeks. In Australia, one company has had positive experiences with organizing trial apprenticeships as a boot camp, as detailed in box 33.

30 OECD, 2018, p. 134.

Box 33 A one-week apprenticeship boot camp by Gason engineering company in Australia

Gason is a metal manufacturing company in a small town in a rural area in **Australia**, which makes large agricultural equipment and metal wood-heaters. As the labour pool in the town is small, there is a need to recruit staff and nurture them. The pool of applicants for welding apprenticeships had not been high quality, and welding was not seen as a desirable trade, and so a one-week apprenticeship boot camp was introduced for people who think they might want to become an apprentice at Gason. Each year the company selects up to eight people to undertake the boot camp, on a no-committal basis on both sides. The camp is held in December, after the end of the school year. At the end of the camp, the company selects a number of the participants to whom it offers apprenticeships, which commence in February. The boot camp involves two days at the company and three days at a technical and further education (TAFE) college. The human resources manager travels each day with the participants to the TAFE campus, which is over an hour's drive away. It is described as "almost like a week-long interview", as the participants are observed learning, working and during casual interactions. At the TAFE college, participants are introduced to different welding techniques, and the training incorporates virtual reality technology. Back at the company, on day 5, the participants are given group and individual skill challenges. They are placed with skilled workers in the company for these challenges, and there is time allotted for the would-be apprentices to talk to different skilled workers about what the job involves. The week ends with a general group discussion about what they learned and individual job interviews, in which the TAFE teachers are involved.

Source: Own research by Erica Smith.

Different from trial apprenticeships are **pre-apprenticeships**, which actually prepare people for an apprenticeship by making sure they have the minimum levels of skills required (for example, in literacy and numeracy). For instance, in **South Africa,** a training provider, Blulever Education, offers an eight-week "readiness" programme called Leadership Base Camp to address employability skills. This involves four weeks on a residential camp for life and work skills, followed by four weeks studying on campus and shadowing a qualified plumber.[31] Participants may then decide to apply for an apprenticeship. In **Kenya**, to address employability skills and encourage young people to enter apprenticeships, the Base Titanium mining company offers a one-month programme in secondary school. The programme focuses on life skills and career guidance. Young people can then enter the company's technical trades apprenticeship programme, currently offering apprenticeships in over ten occupations.[32]

Finally, two initiatives stand out when it comes to raising awareness and at the same time improving the image of apprenticeships: skills competitions and ambassador programmes. Evidence from some countries (for example, Finland) suggests that **skills competitions**, which have become increasingly popular, have helped to raise enrolment rates in apprenticeships.[33] Competitions provide a "showcase" for skills and are designed to inspire young people to aim for

Apprenticeships ambassadors programmes and skills competitions not only raise awareness, they also have the potential to improve the image of apprenticeships

31 See https://www.edge.co.uk/research/practice-library/Apprenticeship-Training-at-BluLever-Education-South-Africa/.

32 Own research by Erica Smith, conducted for the thematic report Improving the Attractiveness and Social Perception of Apprenticeships.

33 Compare also EuroSkills and WorldSkills.

excellence and encourage entrepreneurship.[34] **Apprenticeships ambassadors programmes** are able to promote apprenticeships and improve their image by providing role models for potential apprentices, as in, for instance, the Australian Apprenticeships Ambassador programme launched in 2012 (see Case Study 9) or the more recently established Apprenticeship Ambassador Initiative in the United States. However, in order to be effective, both ambassador programmes and skills competitions need to be linked to other policies that are part of a broader strategy.

▶ 6.5 Increasing access and inclusiveness

People of all genders and ages, high achievers as well as disabled, migrants and refugees, should be welcomed into apprenticeships and targeted support should be provided where needed

Awareness of the provision of apprenticeships is certainly key as, without this, potential candidates would not even notice them. But once they are interested, candidates also must be provided with low-threshold **access, so that they are not immediately deterred. In this respect, improving access to quality** apprenticeship for disadvantaged groups should be emphasized. The scope of disadvantaged groups differs across countries, but it typically includes indigenous people, the unemployed, people with disabilities and women in particular occupations. Some countries include migrants and rural residents in the disadvantaged category. [36]

Workers' organizations in particular have a strong focus on attracting disadvantaged people to apprenticeship. For instance, the Canadian Labour Congress has different initiatives to encourage participation by different target groups, such as indigenous people, at-risk youth and women (see box 34).

Box 34 Initiatives to encourage participation by indigenous people, women and at-risk youth implemented by the Canadian Labour Congress

Trade Winds to Success Training Society: Initiative implemented by nine construction unions in Alberta that have recruited indigenous adult learners for pre-apprenticeship training.

Hammer Heads: Initiative by construction unions in Ontario to recruit young women and men from disadvantaged communities and under-represented groups for apprenticeships.

Blade Runners: This programme helped at-risk youth to gain the training and job skills needed to work in construction. It also offered "wrap-around services" and ongoing support to at-risk youth. The programme had a 66 per cent indigenous people participation rate.

Source: Erica Smith and Jacqueline Tuck, 2018.

34 European Commission, High-performance Apprenticeships and Work-based Learning: 20 Guiding Principles (Luxembourg: Publications Office of the European Union, 2017), p. 53. For instance, Finland's national skills competition, Taitaja, showcases the abilities of VET students to almost 100,000 visitors and is broadcast on TV. TaitajaPLUS is designed for competitors with disabilities and Taitaja9 is for younger students to demonstrate how they are embracing vocational skills at an early age. See also https://worldskills.org/media/news/vocational-skills-celebrated-finland/ and https://www.skillsfinland.fi/eng.

35 See https://www.apprenticeship.gov/apprenticeship-ambassador-initiative.

36 Smith & Tuck 2018.

In Australia, the National Apprentice Employment Network, the peak body for Group Training Organisations (GTOs), works with a select number of GTOs to manage a programme directed at indigenous people (see box 35). GTOs are intermediary organizations (see also section 5.3 in Chapter 5).

Box 35 Apprenticeship programmes for indigenous people in Australia

Group Training Organizations are a form of "labour hire" company, usually operating on a not-for-profit basis, which employ apprentices and trainees and "lease" them to host employers. (Traineeships are a form of shorter apprenticeship in Australia.) Examples of advertised vacancies in mid-2021 were for (a) two apprentice electricians to work for a company that installed security equipment in towns in North Queensland; (b) a civil construction trainer in the town of Litchfield in the Northern Territory; and (c) a trainee bank teller in a small town in Tasmania. The first two opportunities were in towns with significant indigenous populations.[37]

There are also indigenous apprentice and trainee programmes in the Australian Government public service for clerical work. These are available across Australia, including in remote locations where there are indigenous communities.[38]

Evidence from the Programme for International Student Assessment (PISA) database has shown how career aspirations are shaped by gender, socio-economic status and migrant background. For instance, young people from families that enjoy higher socio-economic status are significantly more likely to want to work as professionals, and young people from families that experience lower status are significantly more likely to want to be technicians.[39] It is important to ensure that **women** are given every encouragement to enter traditionally male occupational areas – and to ensure that workplaces are changed to make sure that male cultures and practices no longer make it difficult, or even impossible, for women to sustain their employment in those sectors.[40] However, what is considered to be a male occupational area can differ between countries and cultures. An interesting programme has been developed by the ILO in the United Republic of Tanzania, which also tried to tackle the cultural bias against young Muslim women working in the hospitality sector (see box 36).

Box 36 Quality apprenticeship programme in hospitality for the disadvantaged in the United Republic of Tanzania

In the **United Republic of Tanzania**, an ILO pilot programme offered apprenticeships in hospitality, in 25 selected hotels and resorts, to young people from low-income backgrounds. The first year involved learning across departments, and in the second year the apprentices focused on a specific department. The programme was developed jointly by an employer association and a training college. The ILO funded 80 per cent of the college fees. In the United Republic of Tanzania, many people miss out on training opportunities because of enrolment criteria restrictions, inadequate infrastructure and the lack of fees to participate. Young women in rural areas, urban poor, people

37 See https://naen.com.au/indigenous-apprentice-employment-projects/.

38 See https://www.indigenouscareers.gov.au/recruitment-pathways/traineeships-apprenticeships.

39 OECD, Seven Questions about Apprenticeships: Answers from International Experience (Paris, 2018), p. 125.

40 Linda Simon and Kira Clarke, "Apprenticeships Should Work for Women Too: Supporting Meaningful Exploration of 'Non-traditional Careers' For Young Women". Architectures for Apprenticeship: Achieving Economic and Social Goals, 6th INAP Conference, Federation University Australia, Ballarat, September 2015.

with a disability and other marginalized groups are those most severely affected. Apprentices were given the skills to navigate the difficult school-to-work transition period so that they were not limited to informal, low-income activities. Three quarters of the graduates from the programme were able to secure full-time employment within three months of graduating. The programme set out to be inclusive of women and of people with disabilities. It played a role in breaking down the cultural bias against young Muslim women working in the hospitality sector.

Source: ILO, "Implementing and Strengthening Quality Apprenticeship in Tanzania".

Pre-apprenticeship programmes are effective in supporting disadvantaged groups to engage in apprenticeships

The most common type of support for disadvantaged groups is **pre-apprenticeship programmes**, which introduce apprentices to the occupation and provide targeted skills training and support to enhance the likelihood of completion of the apprenticeship.[41] Additionally, financial support, mentoring services and social services support for disadvantaged groups may attract more people to apprenticeships. For instance, since 2012 the German public employment service has offered **career entry support by mentoring** *(Berufseinstiegsbegleitung)*[42] on a regular basis. This scheme offers individual assistance for young people who are identified as likely to have difficulties in completing secondary school and coping with the transition to vocational training.

37 See https://naen.com.au/indigenous-apprentice-employment-projects/.

38 See https://www.indigenouscareers.gov.au/recruitment-pathways/traineeships-apprenticeships.

39 OECD, Seven Questions about Apprenticeships: Answers from International Experience (Paris, 2018), p. 125.

40 Linda Simon and Kira Clarke, "Apprenticeships Should Work for Women Too: Supporting Meaningful Exploration of 'Non-traditional Careers' For Young Women". Architectures for Apprenticeship: Achieving Economic and Social Goals, 6th INAP Conference, Federation University Australia, Ballarat, September 2015.

41 Smith & Tuck 2018.

42 Smith & Tuck 2018.

The support starts two years before the young person leaves school and can continue for up to two years after they commence an apprenticeship.[43]

There are many more good examples for different types of disadvantaged groups. For instance, in the United Kingdom, there is a special toolkit designed for employers who want to develop a more inclusive and accessible apprenticeship offer. The toolkit provides practical information, sources of support and inspirational case studies of employers who have benefited from hiring and supporting apprentices from diverse backgrounds, including persons with a disability.[44]

6.6 Increasing affordability and quality

Improving access to quality apprenticeship for certain groups has various dimensions. It is as much an issue of adapting provision to the needs of various categories of persons as it is an issue of **affordability**. Potential apprentices certainly do consider opportunity costs, as the example of financial incentives in Mexico in box 37 shows.

Box 37 Government scholarship for apprenticeships in Mexico

In Mexico, apprenticeships are primarily undertaken as part of upper secondary studies and the workplace component is generally unpaid. In an ongoing study in two states, it was found that apprenticeship programme operators play a major role in advertising and informing young people about the potential advantages of joining. In one State (Coahuila), apprentices receive a Government scholarship for the workplace component, of 2,700 pesos per month (US$135). This economic incentive was reported by participants in the study to be an important reason for choosing an apprenticeship. In the State of Mexico, apprentices do not get a Government scholarship, but some companies choose to provide financial support. The amount of support found in the study varied from 300 to 1,000 pesos per month (US$15 to US$50). Moreover, in Mexico, apprenticeships can provide a pathway into higher education, access to which is otherwise very limited.

Source: Hernández-Fernández et al., 2021.

However, affordability is not just solved by making cheaper products or increasing household incomes; it comprises different market forces, including the quality of the product in question and competing products by other providers. Hence, there are external factors, extending beyond the **quality of the apprenticeship** itself, which also affect the attractiveness of apprenticeships, such as alternative learning and career pathways. A traineeship programme at the Ballarat Health Services in Australia illustrates how mature people with family responsibilities are enabled to take up a profession that they would otherwise not be able to enter because they could not manage without an income while training (see box 38). In Australia, traineeships are a form of apprenticeship, though generally of shorter duration.

43 In some countries, for example, the United States, pre-apprenticeships are short and often do not guarantee entrance into a full apprenticeship.

44 NIACE, Employer Toolkit: Supporting Accessible and Inclusive Apprenticeships, 2014.

Box 38 Paying full wages to trainees in order to tackle staff shortages in nursing in Australia

A traineeship programme in nursing was developed at the Ballarat Health Services (BHS) in **Australia**, which includes one major hospital and many other sites. The Diploma of Nursing, providing access to an "enrolled nurse" occupation, is normally taught as a full-time, off-the-job course, with placements, but in the mid-2010s, BHS decided to start a traineeship programme to address issues of staff shortage and training quality. In Australia, traineeships are a subset of the apprenticeship system. The trainees are paid a full wage from the commencement of the apprenticeship, even though for the first half of the 18 months they are "supernumerary", i.e. BHS still employs the same number of regular staff. This provision was required by the nurses' trade union. The trainee nurses are involved in activities which do not require a Diploma qualification to perform. Many nurses work in the aged care areas within BHS. All of the first 115 trainees who completed the programme gained permanent employment at the health authority; and the benefit to BHS is that their previous problems with staff shortages have disappeared. The programme enables older people with family responsibilities to go into nursing without giving up an income.

Source: Own research by Erica Smith.

The two examples in boxes 37 and 38 provide practical illustrations of how apprenticeships can be made more attractive, by focusing on affordability and by taking into account the local "market setting". As a matter of course, the "market for apprenticeships" differs between high , middle- and low-income countries, and it also differs regionally, locally and between sectors and occupations. Consequently, there is no standard solution to increasing the attractiveness of apprenticeships. However, apart from securing basic quality elements, such as social protection and security, it may help to keep thinking more systematically in A-words when it comes to attractiveness: availability, awareness, accessibility, adaptability, affordability, advantage, acceptance, etc.

▶ 6.7 Key takeaways for policy

Temporarily taking a product-marketing view on education is a methodological trick for better understanding its attractiveness, but there are limits to this approach. **Education, such as apprenticeship training, is not a commodity** but a fundamental right. In fact, the commodification and privatization of education must be challenged, as it potentially undermines education's function of social development and social inclusion.

Vocational education and training, and in particular apprenticeship training, can contribute substantially when it comes to integrating weaker learners or disadvantaged people into education, training and/or the labour market. However, instead of receiving the appropriate social recognition for this, apprenticeship training is punished with a bad reputation and low status. Since the solution to improving the attractiveness of apprenticeships cannot be to exclude the disadvantaged and "low-achievers", there are

Promoting centres of VET excellence will improve the image and attractiveness of apprenticeship in the long run. However, its role in integrating the disadvantaged into education and the labour market must not be neglected

basically only two strategies left. First, to demand better recognition for the service that apprenticeship systems provide to society; and, second, to create additional centres of VET excellence[45] (see also Chapter 5) and to ensure that this image of high-performance apprenticeship prevails.

Several recommendations to boost participation in apprenticeships flow from the above discussion of current and past practices and policies. For the sake of simplicity, these are presented in two distinct groups below.

1. Recommendations for improving the availability and affordability of apprenticeships, i.e. improving provision:
   - Offer apprenticeships with a broader range of occupations and qualification levels, including degree apprenticeships, and regularize pathways into higher education from lower-level apprenticeships, via qualification development systems.
   - Provide "bite-size" chunks of apprenticeship (as with pre-apprenticeships) – while not compromising quality – to attract those anxious about the time commitment and those with low self-efficacy or less-developed skills.
   - Provide good pay and conditions with proper monitoring and mediation systems, taking into account different "market settings" and differences between regions, countries, industries and occupations.
   - Provide structured fallback options for a situation where an apprentice has to leave a company, so that undertaking an apprenticeship does not appear so dependent on the viability or working environment of a single company.
2. Recommendations for improving the awareness and accessibility of apprenticeships, i.e. improving marketing:
   - Make clear and impartial information directly available and accessible in a range of media to young people and to mature adults who might be contemplating apprenticeships.
   - Make it clear what onward pathways are available: into an occupation, a career path, self-employment, further learning/education; and promulgate success stories across the full range of these options by using ambassadors (e.g. former apprentices).
   - Provide tasters in the form of trial apprenticeships and job-shadowing programmes integrated into awareness programmes.
   - Focus on addressing the "low status" perception, and the problem of low-status occupations within apprenticeships, for instance by creating and promoting centres of vocational excellence and skills competitions.

Regarding further research, it is recommended that an international survey on the reasons for undertaking an apprenticeship should be conducted, for both young people and adults. Such information, which is currently only available for a few countries and is not comparable, would be needed to capture attractiveness features in different country contexts.

45 Compare the activities that the European Commission and the European Training Foundation have set up recently: see "The European Commission and the ETF Sign an Agreement to Promote the International Dimension of CoVEs", EFT Factsheet, March 2022.

Case Study 9

The Australian Apprenticeships Ambassador Programme

A report for the Australian Government in 2011 recommended strategies to raise the status of apprenticeships and traineeships,[46] noting that employers often complained about the difficulty of attracting good candidates for apprenticeship vacancies. The Australian Apprenticeships Ambassador Programme (AAAP) was one of the responses. Launched in 2012, the AAAP set out to increase the attractiveness of apprenticeships, primarily by providing speakers to talk about their experiences.

Speakers were either public personalities (such as sports stars) who had been apprentices or were connected with apprenticeships or "ordinary people" who were former apprentices and trainees, some drawn from finalists in the Australian heats for the international WorldSkills competition. These speakers could be booked to appear at events attended by young people (such as Careers Expos), training providers and universities, and at business functions and other public events. The main target group comprised young people aged 15 to 25 years old and those who influence them. Small businesses were especially targeted.

By 2017, there were 200 Ambassadors who could be "booked" for events. The Australian Department of Education and Training found that, by that year, almost 6 million people had been reached by the programme in one way or another.

The AAAP is now subsumed within the VET Alumni programme, which covers graduates of all VET pathways, such as full-time TVET programmes at TAFE institutes (the public provider) and other training providers. From 2017, all finalists at the Australian Training Awards, not just apprentices and trainees, automatically become VET Alumni with their profile on the VET alumni website. Alumni can also be representatives of businesses and training providers that have won training awards, and winners of the building industry's training awards. People who wish to book a speaker can choose someone from any of these categories and can specify an industry area. Requests can also be made on a State-by-State basis. There are video promotions and media training is provided to some VET Alumni.

In mid-April 2021, the TVET Alumni programme had 537 active members, 348 of whom were Apprenticeship Ambassadors (AAs). There has been a conscious effort to increase female participation; of the 348 AAs, 141 were female and 191 males (16 undisclosed), with an even mix of apprentices and trainees.

One strength of the programme was its very specific focus on apprenticeships. Another was the use of "real" people who had been apprentices and who could talk honestly to potential apprentices and their families and influencers about what it was like to do an apprenticeship. However, the programme has two weaknesses. One is gender representation and the other is the merging of the apprentice-only programme with the bigger TVET-awareness programme. While the programme, from its inception, also covered traineeships, which are much more likely to involve women, the title did not reflect the fact that both were included, and so the public perception could have been that it was primarily for males. Also, depictions of ambassadors tended to prioritize (white) men. The change of the programme name to VET Alumni also has advantages and disadvantages. While the VET Alumni programme, as reconstituted, is more likely to correct the strongly masculine flavour of the original AAAP, it has moved the focus away from apprenticeships and traineeships onto the TVET system more generally.

The full case study can be found in the thematic report Improving the Attractiveness and Social Perception of Apprenticeships by Erica Smith.

46 Commonwealth of Australia, A Shared Responsibility: Apprenticeships for the 21st Century: Final Report of the Expert Panel (Canberra, 2011).

Case Study 10

Decade of the Artisan in South Africa

The Decade of the Artisan scheme is managed by the South African Department of Higher Education and Training and was launched in 2014. "Artisan" is the South African term for skilled trade worker, with around 150 occupations declared as listed trades. These trades require practitioners to have an artisan qualification, and if these are gained via an apprenticeship, they are expected to involve structured learning and external assessment, and normally to last for three years.

South Africa has many underlying economic problems and inequalities that affect its population, some of which were exacerbated during the COVID-19 pandemic (unemployment was 63 per cent among youth aged 15–24 years old).[47] Apprenticeship cannot be analysed without an understanding of apartheid.[48] Non-white people were excluded from apprenticeship opportunities until 1981. Despite the fact that since that date the large majority of apprentices (70–80 per cent) are non-white, compared to the population as a whole there are still disproportionately more white apprentices.[49]

The Decade of the Artisan programme focused on raising the status of apprenticeships:

Artisan training and other forms of workplace-based training are a central part of our strategy to expand education and training opportunities for our people, especially the youth. Closely associated with the expansion of education and training opportunities is the question of raising the status of vocational training. The idea that trades and other vocational programmes are only for those who can't get into university is deeply ingrained in our society and has a detrimental effect on our ability to develop the skills required by our labour market, not to mention the status of those who make a very important contribution to our economy and society. With the launch of "2013: The Year of the Artisan", we are actively changing this misconception, and working towards making FET Colleges, and the artisan and other career-based training programmes that they offer, the option of choice for the majority of our youth – and other out of school adults – who take this route.[50]

The country's National Development Plan stated the need for 30,000 "artisans" a year, particularly to assist with strategic infrastructure projects and to avoid importing skilled labour. The three major strategies were to:

1. "Make TVET colleges fashionable", referring to new TVET colleges which were state-of-the-art. A catch phrase of the campaign is "It's cool to be an artisan".
2. Hold public events at TVET colleges every three months.
3. Encourage sector education training authorities (SETAs) to become involved in facilitating partnerships between colleges and employers.

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47 See https://www.worldbank.org/en/country/southafrica/overview.

48 Volker Wedekind, "Rearranging the Furniture? Shifting Discourses on Skills Development and Apprenticeship in South Africa", in Apprenticeship in a Globalised World: Premises, Promises and Pitfalls, edited by Salim Akoojee, Philipp Gonon, Ursel Hauschildt and Christine Hofmann (Münster: LIT Verlag, 2013): 37–46; Salim Akojee, "South Africa", in Towards a Model Apprenticeship Framework: A Comparative

Analysis of National Apprenticeship Systems, edited by Erica Smith and Ros Brennan Kemmis (New Delhi:

ILO, 2013), 116–126.

49 MerSETA, Evaluation of MerSETA Artisan Pathways (Johannesburg: MerSETA, 2020).

50 Blade Nzimande, "Declaration of the Year of the Artisan (2013)", in Apprenticeship in a Globalised

World: Premises, Promises and Pitfalls, edited by Salim Akoojee, Philipp Gonon, Ursel Hauschildt and Christine Hofmann (Münster: LIT Verlag, 2013).

The Plan's main strengths are that a very clear strategy was set out from the beginning, and the campaign has been maintained so far over the decade, with visits taking place as planned to different provinces. The events are held at technical colleges so that young people can see the environment in which off-the-job training takes place. The events also include training sessions for those who advise young people; these advisers are highly influential in young people's choices, as the literature shows.

The main weaknesses are that young people who may be biased against artisan training may not attend the events. The occupations that are eligible for apprenticeships are heavily weighted towards certain sectors of the economy and occupations which are of low status and are not viewed as major occupations in the economy.[51] There has not been a formal evaluation of the campaign, but there does not seem to be a sustained increase in apprentice commencements.

The full case study can be found in the thematic report *Improving the Attractiveness and Social Perception of Apprenticeships* by Erica Smith.

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51 Wedekind, 2013; David Balwanz and Siphelo Unathi Ngcwangu, "Seven Problems with the Scarce Skills Discourse", South African Journal of Higher Education, 30, No. 2 (2016): 31–52.

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Section C

New emerging approaches to boost work-based learning

The next two chapters examine how work-based learning and apprenticeships can be boosted both for young people in schools and for adults in need of upskilling and reskilling. Work-based learning can enhance students' employment prospects, while opening up work-based learning and apprenticeships for adults is critical to support the digital and green transitions.

7 Strengthening work-based learning in VET institutions

Strengthening work-based learning in VET institutions

The role of work-based learning (WBL) is not restricted to apprenticeship training. Education systems worldwide, including higher education, have realized that, if integrated wisely, the workplace becomes a powerful learning environment. How workplace experiences can be strengthened in vocational schools and colleges by fostering cooperation with the business sector is the subject of this chapter. As we will see, effective implementation of WBL is able both to support students in starting successful professional careers and to strengthen the reputation of the schools and companies involved, as well as that of the VET system in general.

▸ 7.1 Introduction

The workplace is a powerful learning environment which allows the acquisition of technical as well as core skills (such as problem-solving) that are indispensable to successful participation in working life. Numerous studies across different countries are providing evidence of the benefits of WBL.[1] Empirical data suggests that participation in WBL is facilitating entry into the labour market and improving employment prospects when compared with purely school-based VET.[2]

WBL has therefore recently been receiving growing attention, beyond that given to the traditional forms of dual learning, such as apprenticeships. Despite the benefits offered by apprenticeships, it is still the case that more young people participate in school-based VET than in apprenticeships and therefore enhancing school-based VET through good-quality WBL that is relevant to the needs of the labour market has the potential to make a significant contribution to improving student outcomes in terms of employment. In many countries, however, the proportion of VET students who are able to participate in WBL remains low (see Case Study 11 on Mexico).

At higher levels, the rise of universities of applied sciences since the 1960s and the more recent development of graduate apprenticeships have made the vocational drift in higher education more obvious. However, traditional professions, such as teachers, doctors and lawyers, have always incorporated longer periods of WBL into their education and training programmes.

For schools and colleges, developments are less clear. Some authors assert that an academization of upper-secondary curricula is under way, attributed to educational expansion, the universalization of secondary education and a world culture of schooling.[3] Others qualify this view by pointing out that academic drift

1 For an overview see, for instance, ETF (European Training Foundation), Work-based Learning: Benefits and Obstacles. A Literature Review for Policy Makers and Social Partners in ETF Partner Countries, 2013.

2 Pauline Musset, "Improving Work-based Learning in Schools", OECD Social, Employment and Migration Working Papers, No. 233, 2019.

3 Aaron Benavot, "The Diversification of Secondary Education: School Curricula in Comparative Perspective", IBE Working Papers on Curriculum Issues, No. 6, 2006. David Baker and Gerald LeTendre, National Differences, Global Similarities: World Culture and the Future of Schooling (Stanford University Press, 2005).

and vocational drift take place simultaneously and that substantial differences exist between countries.[4] Clearly, shorter, more practically-oriented vocational programmes have lost ground to higher-level, theory-oriented programmes, due both to the decline in demand for manual labour and the general trend towards higher education.[5] However, at the same time, various forms of WBL (such as traineeships and internships) and other pedagogical elements which are able to bring education closer to work and real-life issues (such as excursions, project work or case-based learning) have begun to permeate all areas of education. Whether outdoor education, project days at school, "taster days" or proper traineeships, they all adopt elements from the successful apprenticeship training model.

A lack of training places, supporting infrastructure and incentives for school–company cooperation can be serious obstacles to schools and colleges' ability to achieve the potential of WBL, in particular in low- and middle-income countries. In this chapter, we show how these obstacles can be overcome and how WBL periods in school-based VET can be developed and strengthened.

We will focus on forms of WBL in which VET students systematically participate in guided and monitored on-the-job learning periods, which allow them to develop useful skills and connect to employers, such as internships, work placements, traineeships or other periods of practical project work that are incorporated into curricula as a compulsory or optional element.

7.2 Benefits of WBL in school-based VET

WBL can be a promising pathway towards better employment prospects, especially for young people, by enabling smoother transitions into the labour market.[6] Studies show that, in Europe, graduates from school-based VET programmes which included WBL are less likely to be unemployed than those who did

4 UNESCO, Strategy for Technical and Vocational Education and Training (TVET) (2016–2021), 2016. Cedefop, Vocational Education and Training in Europe, 1995–2035: Scenarios for European Vocational Education and Training in the 21st Century, 2020.

5 Jörg Markowitsch and Günter Hefler, "Future Developments in Vocational Education and Training in Europe: Report on Reskilling and Upskilling through Formal and Vocational Education Training", JRC Working Papers Series on Labour, Education and Technology No. 2019/07, 2019.

6 Glenda Quintini et al., "The Changing Nature of the School-to-Work Transition Process in OECD Countries", IZA Discussion Paper No. 2582, 2007.

not receive WBL or who worked independently in a job unrelated to their training programme.[7] In the United States, students who had undertaken a work placement while in secondary school had better labour market outcomes than those who had not – especially women.[8]

WBL supports VET students in starting successful professional careers, strengthens the reputation of the associated VET schools and companies, and of the VET system in general, with the latter effect being particularly important in low- and middle-income countries

Furthermore, workplace learning makes learning more attractive and is able to engage and empower learners in ways that cannot be replicated by learning in the classroom. A range of literature on WBL for young adults highlights the impact of work exposure providing a particularly effective environment in which to acquire transferable skills,[9] and allowing learners to build up their competencies step by step.[10]

Finally, companies that offer WBL opportunities to VET students facilitate future recruitment and lower their costs, just as with apprenticeships. The better matching of labour market demands with the education system has positive impacts on the overall reputation of the VET system (table 6).

Table 6 Benefits of WBL in school-based VET

Stakeholder	Benefits
Learner	Gaining competencies required at workplaces/in companies
	Acquisition of transferable skills
	Increased motivation
	Building relationship with employer (better chance of getting a job)
Company	Simplified staff recruitment
	Reduced turnover of labour force
	Innovative impulses and knowledge input from VET school and learners
VET school	Better matching of VET delivery with industry needs
	Improved reputation of VET school
	Motivated students
	Increased demand from learners
Society/national economy	Improved reputation of the VET system
	Better qualified workforce
	Coordination of labour market and education system resulting in less unemployment

Source: Erwin Seyfried, thematic report Strengthening Work-based Learning in VET Institutions.

7 Eurostat, "LFS ad hoc Modules: Young People on the Labour Market", Eurostat database, 2016, based on data from the European Labour Force Survey.

8 Musset, 2019, p. 23, with reference to Richard Arum and Sandra Way, "School–Community Relationships and the Early Labor Market Outcomes of Sub-baccalaureate Students", in After the Bell: Family Background, Public Policy and Educational Success, (Routledge, 2004), 267–299. See also David Neumark and Donna Rothstein, "Do School-To-Work Programs Help the 'Forgotten Half'"? NBER Working Paper No. 11636, 2005.

9 See, for example, Jennifer Symonds and Carmel O'Sullivan, "Educating Young Adults to be Work-ready in Ireland and the United Kingdom: A Review of Programmes and Outcomes", Review of Education 5 No. 3 (2017): 229–263.

10 Richard Sweet, "Work-based Learning: Why? How?", in Revisiting Global Trends in TVET: Reflections on Theory and Practice (UNESCO-UNEVOC: Bonn, 2013), 164–203.

11 Musset, 2019, p. 25, with reference to Nils Karlson and Kristine Persson, "Effects of Work-based Learning on Companies Involved in VET Education", Ratio Working Paper No. 258, 2014.

7.3 Securing effective policy and governance frameworks

With regard to apprenticeship training, a clearly articulated policy and governance framework is essential to overcome constraints in establishing an effective WBL approach for school-based VET (compare also the ILO's six building blocks).[12] For students during WBL periods, entitlements that should be provided include a written traineeship agreement, appropriate remuneration, limits on working hours, holidays, strict observance of health and safety regulations, coverage for illness, and work-related injuries or accidents.

Many countries take these issues for granted, but in countries with poorly developed VET systems and weak social partnerships, policies and strategies for TVET may lack strong coherence and responsibilities may be split between government departments.[13] Furthermore, in such contexts, the effectiveness and sustainability of donor-funded projects and other ad hoc initiatives might be jeopardized since the systems are not set up to sustain them in the longer term.[14]

Many countries have governmental plans to develop their school-based VET systems towards increased promotion of WBL by forming stronger cooperative ties with the private sector; for example, Botswana, Egypt, Jordan, Kenya, Liberia, South Africa, United Republic of Tanzania and Zambia.[15] **Azerbaijan** recently adopted a national legal framework and standards for the promotion of WBL and cooperation between VET schools and employers, including a standardized contract form for completion of WBL.[16] In **Moldova**, internships of two to three months, which are normally unpaid, became an integral part of all upper secondary VET programmes. Newly established contracts between specific vocational schools and employers make it easier for students to find places.[17] In **Ukraine**, an ambitious goal to increase the number of VET students was set recently, to be achieved primarily through decentralization, and a corresponding law including provisions concerning WBL was adopted.[18]

A clearly articulated policy and governance framework is essential to establish an effective WBL approach for school-based VET

Securing effective policy and governance frameworks is a government's central task, besides providing financial and non-financial incentives to promote WBL in a school-based VET system and ensure its quality. VET schools may need help with managerial and administrative tasks; teachers and trainers may need incentives to adapt curricula and interlink learning processes at the workplace and at school; students and employers may need subsidies to cover expenses. Any strategy to strengthen WBL in vocational schools and colleges should clearly aim to complement, not substitute, apprenticeship programmes that may exist in parallel.

12 See https://www.ilo.org/global/topics/apprenticeships/publications/toolkit/system-and-policy-level/lang--en/index.htm.

13 Moustafa Whaba, Technical and Vocational Education and Training (TVET) Challenges and Priorities in Developing Countries, 2012; Ahmed El-Ashmawi, Reviewing Work-Based Learning (WBL) Programmes for Young People in Egypt (UNESCO, 2018).

14 OECD, "Quality Apprenticeship and Work-based Training Programmes for Youth in Southern and Eastern Africa: Pathways to Youth Employment – Apprenticeships and Work-Based Training", Conference Issues Paper, Johannesburg, 6–7 April 2017.

15 Whaba, 2012.

16 ETF, "Flash Report", Annual Eastern Partnership Regional Forum on WBL in VET: Engaging Small Companies in Work-based Learning, 22–24 October 2019, Lviv, Ukraine, 2019.

17 ETF, 2017, p. 9

18 ETF, 2019. The process has been brought to a standstill by the events of the war.

7.4 Modularization, individualization and flexibility of VET programmes

A robust and clear policy and governance framework guarantees stakeholders security in their planning, and when putting those plans into action; however, it also needs to allow enough flexibility to incorporate changing demands of labour markets, employers and individuals. In a number of countries, rigid curriculum requirements of TVET courses and programmes still frequently limit the ability of VET providers to strengthen WBL, foster cooperation with employers and adapt the design and delivery of programmes to the needs of local industry.[19]

Flexibility, modularization and individualization are proven strategies for promoting WBL in school-based VET. However, achieving a balance between standardization and flexibility is key

Flexibility, in terms of modularization and individualization, and the adaptation of VET to the needs of companies and learners is key to modernizing school-based VET from a dual education perspective. However, flexibility alone is not the universal solution for strengthening WBL in school-based VET; it is, rather, a matter of maintaining a **balance between standardization and flexibility.** In **Finland**, this balance is achieved partly through having a quality framework which sets standards for VET that are widely recognized and accepted by all stakeholders but which also permits a large degree of flexibility in terms of how VET and WBL are provided "on the ground", such as through having a certain proportion of the curriculum locally determined, according to labour market needs (see Case Study 16). In addition, there are solid, trust-based cooperative relationships between VET schools and employers.[20]

It is important to develop solutions for WBL that are adapted to the context. Creating appropriate prerequisites to involve small and micro-enterprises in WBL is often a challenge, particularly in low- and middle-income countries, but it does pay off – as **India's** dual system of training (DST) demonstrates. There, VET schools are allowed to adapt curricula according to employer-specific and regional requirements. The mode and duration of WBL periods can also be designed flexibly, aligning with requirements at the workplace and in agreement between companies and the VET school. In the DST scheme, the far-reaching flexibility of companies and VET schools in organizing WBL periods has created stronger contacts and trusting relationships between the partners (see Case Study 13).

19 Moustafa Whaba, Technical and Vocational Education and Training (TVET) Challenges and Priorities in Developing Countries, 2012.

20 Nevertheless, there are indications that the extensive autonomy of VET providers and companies could lead to unequal practices. "As there is less regulation and standards, the certification process may become less comparable and transparent" (Heta Rintala, "Country-Level Report: Apprenticeships for Adults and Older Workers in Finland", ILO, Forthcoming [Second Draft], p. 23).

7.5 Strengthening cooperation with local industry and intermediary organizations

The experience of many countries developing WBL in school-based VET systems demonstrates that basically strong, regional and/or sector-based employers' associations and workers' associations are needed to create a functioning system for WBL. A number of countries are trying to overcome structurally weak partnerships between the VET system and industry through the creation of tripartite sector councils and by extending the responsibilities of the private sector for WBL in VET.

The success of any kind of WBL is essentially based on fruitful collaboration between VET providers and companies at local level, and targeted coordination between the education system and the economic sector

In some countries, including post-Soviet countries and countries with "liberal market" regimes, like the United Kingdom, a more prominent role is given to sector councils in developing curricula, modules and standards for the assessment of WBL, including independent sectoral certification of graduates. For instance, **Georgia** supports the implementation of sectoral skills organizations, has strengthened the responsibilities of the private sector for WBL, and institutionalized the final examination of graduating VET students via the private sector. In **Belarus**, the mechanisms for interaction between public authorities, VET schools and employers have been redefined and a stronger role has been given to tripartite sector councils in developing curricula and setting standards for the assessment of WBL. In **Kazakhstan**, regulations on WBL have been designed and adopted that include the establishment of a system of independent sectoral certification.[21]

Functioning networks at governance level, comprising representatives of employers and employees, educational institutions, employment agencies and ministerial departments, are important elements to support more WBL in schools, but even more significant is the fruitful cooperation of schools with local companies, in particular SMEs (see also the example of Jordan in box 39).

Box 39 Local networking of TVET providers, universities and companies

A pilot project is currently being implemented in Jordan, aimed at companies, TVET institutions and two universities with a technical focus in order to promote their cooperation in educating young people. Many people, especially youth, work in the informal sector, which accounts for 44 per cent of employment in Jordan. At the same time, companies are looking for qualified professionals, but universities and education institutions in the TVET sector are considered to be theory-heavy and remote from industry needs. Involving companies and social partner organizations in the TVET and higher education system aims to promote both structural integration of theory and practice through extensive WBL periods and employment opportunities for students.[22]

21 ETF, 2019.

22 GIZ, "Supporting the Jordanian Educational Institutions in Offering Labour Market Oriented Vocational Training". https://www.giz.de/en/worldwide/76784.html.

To change systems and develop dual training structures within school-based systems, a large number of partners working together on the national, regional and local levels are necessary, as the example of the **Mexican Sistema de Educatión Dual** (SED) demonstrates. The SED shows how a school-based VET system can be expanded and supplemented by a dual branch, created inside and next to the school system, offering the option for students to enrol in the fully school-based branch or in the dual branch. Establishing an effective dual branch in school-based VET is associated with the establishment of multiple communication channels and platforms of cooperation, bringing together the main players from education and industry at all levels (compare Case Study 11).

In a number of countries, **intermediary bodies** have been established in order to provide support to VET schools in introducing or strengthening WBL. Intermediary organizations may also support SMEs in delivering the full range of training content by liaising with other employers and allowing joint implementation of WBL components (see also Chapter 5).[23]

▶ 7.6 Modernizing the content, structure and provision of VET

The key components for effective WBL are appropriate strategies for relating school-based learning to demands at the workplace and allowing learning to take place in a real production process

There are various reasons why employers may be reluctant to train VET students, some of which are mutually reinforcing: poor quality of training provision; VET students lacking relevant vocational skills and/or basic work ethics, such as reliability, discipline and punctuality; weaker students being directed to VET; negative public attitudes towards VET; weak social partnerships, etc. In this way, a vicious circle is created because poor quality training reduces the possibilities of expanding WBL, which could potentially improve the quality of training. Hence, any measures that modernize the content, structure and provision of VET also offer new options to expand WBL. In particular, effective mechanisms for monitoring the quality of training at the workplace are needed and new digital tools are promising in this respect (see also Chapter 10).

An essential step to improve the quality of WBL is practising **competency-based teaching and learning (CBT),** which is a structured training and assessment system that allows individuals to acquire skills and knowledge to perform work activities to a specified standard, as expected in a real-life workplace environment (see box 40). CBT could also serve as a useful approach to ensure the labour market relevance of training in the absence of robust WBL opportunities. Empirical data suggests that the readiness of local companies to facilitate WBL increases if VET students demonstrate relevant professional skills and appropriate work virtues. The less effort and fewer costs involved for companies through their participation in WBL, the more they regard their involvement as an investment with significant returns over time.

23 ETF, Work-based Learning: A Handbook for Policy Makers and Social Partners in ETF Partner Countries (Torino, 2017).

Box 40 CBT as a prerequisite for strengthening WBL: ITEC Asyut in Egypt

Ahmed and Sayed[24] report on the difficulties and challenges of implementing CBT in Integrated Technical Education Cluster (ITEC) Asyut in **Egypt**. Students were used to academic-style up-front teaching, many of them lacking basic scientific and mathematical knowledge; teachers lacked practical experience with industry; and labs and workshops were not appropriately equipped or not working due to a lack of professional maintenance. Nevertheless, a sustainable change towards a competency-based approach to teaching and learning was pursued, mainly by systematically familiarizing teachers with the approach and reviewing occupational standards of the various professions. Recognizing the results of these efforts, local and regional employers became increasingly interested in providing internships for VET students, while in the past, when students were poorly prepared, they were rarely willing to provide internships.

Expanding the number of trades is among the most common strategies for modernizing VET provision. In both formal and informal apprenticeships, the move away from a focus on male-dominated, blue-collar, manual occupations is taking place at a slow rate.[25] However, there are also positive examples in which policy reforms that enable the expansion of trades for WBL also extend training opportunities for young women, especially in the service sector (see Case Study 13).[26]

Partnership with local employers is essential for VET providers

If there is an overarching policy option that can be highlighted as particularly promising for modernizing the school-based VET system, then it is the idea of making it more demand-driven by giving greater consideration to the interests of companies and by promoting cooperation between the education system and industry, particularly at local level between VET institutes and SMEs (see Case Studies 11 and 12, on Mexico and Indonesia, respectively). In this scenario, a basic idea of apprenticeship training comes into play: work in a real production process forms the basis of learning. The essential feature for a **demand-driven approach in VET** is therefore to approach concepts and contents of teaching and learning in school from this perspective. It is not enough to orient VET programmes towards national qualifications frameworks and occupational profiles. In addition, the requirements at workplaces in companies in the VET school's local environment must be considered more closely and become a point of reference for action. Making WBL mandatory is a step in this direction, as mandatory WBL shifts the mindset of VET providers, "so that partnership with employers becomes essential rather than an optional extra".[27]

Another approach to modernizing WBL within school-based VET, which has recently received a strong push from the COVID-19 pandemic, is **digital learning** (see also Chapter 10). For instance, in **Albania**, the pandemic has led to the development of a Moodle-based online platform (Mesovet.al) in VET schools, as there was nothing similar in place before to support VET students' online learning.[28] In **Ecuador**, a portal

24 Adel Ahmed and Khairy Sayed, "Development of Competency-based Training System in Assiut-ITEC: A Case Study", Journal of Competency-based Education 5, No. 3 (2020); Adel Ahmed and Khairy Sayed, "An Extensive Model for Implementing Competency-based Training in Technical and Vocational Education and Training Teacher Training System for Assiut-Integrated Technical Education Cluster, Egypt", Journal of Competency-based Education 6, No. 2 (2021).

25 OECD, 2017a.

26 Where strong data is available, the participation of women is shown to be concentrated in just a few traditional "female courses", such as dressmaking, hairdressing and cooking.

UNESCO Office Beirut and Regional Bureau for Education in the Arab States.

Billett, Stephen, 2019. Reviewing work-based learning programmes for young people in the Arab Region: a comparative and longitudinal analysis; Algeria, Egypt, Jordan, Lebanon, Morocco, Oman, Palestine and Tunisia. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000375257?posInSet=1&queryId=f00953e8-3727-4879-a696-aaa442108d1d.

27 Musset, 2019, p. 42.

28 ILO, "Draft Report on MOOC on Quality Apprenticeships. Key Challenges and Innovative Solutions in the Context of the Future of Work and the COVID-19 Pandemic", 2021.

was created where students and teachers could access more than 840 digital teaching–learning resources. For students without internet access or without appropriate equipment, the same information was offered through television and radio channels.[29] A similar portal in **India** is Bharat Skills, which provides National Skills Qualification Framework (NSQF) curriculum, course material, videos, question banks, mock tests, etc. – all in digital form.[30] on virtual classrooms, but more recent developments, such as e-internships, hold particular potential for WBL. For instance, **e-internships** offer VET students in lower-income economies the opportunity to work for companies in high-income countries without having to travel there.[31] Further pilots should be promoted, and international guidelines and recommendations on traineeships and internships should explicitly include (remote) e internships.

Finally, VET schools have to **prepare their students** carefully for WBL periods in companies. In Mexico, students must first participate for one year in full-time VET at a school, before they can be accepted for the dual programme, depending on their performance (see Case Study 11). The quality of WBL is monitored by the school and students are supported by regular checks at the students' workplace by schoolteachers. It is important that staff in VET schools fulfil this monitoring and coordinating function professionally and perform the various tasks appropriately. VET school staff, teachers and trainers must understand the requirements at the workplace and be able to support in-company staff (who are not usually expected to be pedagogical experts) in organizing appropriate learning processes. Suitable **training of VET school staff** to allow them to implement WBL effectively is therefore very important but, above all, their motivation and capacity (or lack thereof) to coordinate training between school and workplace must be taken as the starting point.

VET schools that pursue a consistent demand-driven approach are accepting only those applicants for WBL who have successfully passed a selection and testing process

▶ 7.7 WBL without real companies?

The initiatives to introduce or strengthen WBL in school-based VET presented so far depend on fruitful cooperation with private companies, municipalities, NGOs or other organizations. But what should be done if there are no relevant or adequate learning-conducive workplaces available?

In several countries, WBL is provided **within VET schools** by creating real-life working environments where VET campuses include restaurants, bakeries, shops, spas and other authentic working environments that are open to the public. In accordance with real work procedures and by following prevailing standards in industry, students are involved in the main stages of a production process (see box 41). Provision of WBL in simulated workplaces, such as **"learning factories",**[32] certainly cannot replace the experience of learning in a company, and it does not follow the principle of a demand-led approach. However, it may serve as a solution to the challenge of how to enable WBL in VET schools for students who have no opportunity to take part in WBL in industry. Furthermore, learning in teaching factories may complement learning in a company.

29 See https://recursos2.educacion.gob.ec.

30 See https://bharatskills.gov.in.

31 Jeske, Debora, and Carolyn Axtell, "Going Global in Small Steps: E-internships in SMEs", Organizational Dynamics 45, No. 1 (2016): 55–63.

32 A variety of terms have been used in this context, such as teaching factories, learning factories, practice firms, etc. In fact, the model is not limited to productions in "factories" but is open to any type of business; see Eberhard Abele et al., "Learning Factories for Future Oriented Research and Education in Manufacturing", CIRP Annals – Manufacturing Technology 66, No. 2 (2017): 803–826.

Box 41 Schools as business organizations and "employers" for their own students

The Lviv Professional College of Hotel, Tourism and Restaurant Service in the city of Lviv, in Western Ukraine, close to Poland, trains students for the hospitality, tourism and restaurant sector in authentic working environments by cooperating closely with well-known restaurants and hotels in the area. Admission to the college is competitive, and graduates are in high demand and enjoy a good reputation among local employers. In addition to work placements and dual arrangements with its partner companies, the college also operates as a business entity and runs its own educational restaurants, a hotel and a tourist office under real working conditions. Moreover, for local businesses and resellers, bakery products and pastries are made under paid, commissioned working conditions.[33]

7.8 Key takeaways for policy

Seen from a global perspective, there are very different forms of VET provision and many variants of WBL in school-based VET. This diversity of approaches presents a challenge for developing innovative strategies for WBL in a dual perspective. In all cases, however, the key components for effective WBL are to implement appropriate strategies for relating school-based learning to demands in the workplace and to allow learning in a real production process. The interventions to boost WBL in school and colleges presented in this chapter can be categorized into three levels. First, policy and governance frameworks to promote WBL in school-based VET should be reformed with a focus on the following:

- providing basic **legal standards for WBL**, such as a clear status and defined working conditions for students during WBL periods;
- **incentivizing** both VET schools and SMEs to offer WBL;
- allowing a high degree of **flexibility of VET programmes** for WBL implementation (including modularization and individualization) while maintaining a balance with standardization;

33 More information can be found at the college's website: https://lpcollege.com.ua/.

- creating leeway for **self-organization of VET schools** while providing guidelines for the implementation of WBL.

Second, in terms of networking with (local) industry and social partners:

- creating **networks for interaction** between public authorities, VET schools, employers and social partner organizations;
- **strengthening the participation of the private sector** in developing curricula, modules and standards for assessment of WBL;
- **strengthening the capacities of social partner** organizations and companies in managing WBL;
- **equipping VET teachers and school staff** with the right skills and abilities to persuade companies to offer WBL and/or apprenticeships.

Third, cooperation between VET schools and companies at local level and modernizing learning in VET schools is key for the development of WBL by:

- providing **appropriate preparation of students** for WBL;
- **supervising students during WBL periods** and supporting in-company trainers;
- **implementing competency-based teaching** and training;
- **mediating between employer needs and students' skills development;**
- making **WBL a mandatory part** of VET programmes while securing sufficient training places;
- expanding **school-run businesses** and piloting **e-internships.**

Case Study 11

Establishing a dual WBL programme in a school-based VET system: The Mexican Sistema de Educatión Dual (SED)

Mexico has become an attractive destination for foreign investment, especially in the automotive sector. In this context, companies reported talent shortages and problems finding qualified personnel[34] which the Government, in cooperation with the social partners, sought to address by establishing a dual track system within the school-based Mexican VET provision.

As in many other countries, upper-secondary education in Mexico is divided into general and vocational education. The so-called **Sistema de Educatión Dual (SED)** has been introduced by the Ministry of Education as a variant of upper-secondary vocational education (secundaria técnica). Students opting for the new dual track are given training in a company with accompanying lessons in a VET school. They retain their status as school students and remain the responsibility of the Ministry of Education.

Students regularly attend full-time school-based teaching in the first year and spend the next two to four semesters in the company. During this time, they should follow a rotation plan which is

34 OECD, "OECD Thematic Studies: Work-based Learning in Vocational Education and Training (VET) – Papers and Reports" 2017, p. 9. See also Alfonso Figueroa Saldaña, "The COVID-19 Pandemic and Dual Vocational Education and Training in Mexico: Main Impacts and Opportunities for Resilience", paper presented to the Caribbean TVET Conference: Creating Opportunities in a Global Pandemic, 2021.

based on training standards and is jointly agreed between the school, the company and a training adviser. Additionally, they must record their respective activities in a report book each week.[35] On graduating, they obtain a double qualification, i.e. the general university entrance qualification and a qualification in their respective profession.

Cooperation between the public education system and the private sector is organized by a complex system of tripartite partnerships, in which stakeholders communicate with one another in various committees. At the local level, in every company taking part in the dual system, there is a person trained by the business association. In the VET schools, a linkage manager is responsible for the connection to the business organizations and the training companies.

In the 2019–2020 school year, 7,231 students were being trained in over 800 companies (compared to 1.9 million students enrolled in TVET). Although a small-scale initiative, evaluation results show that the SED is clearly superior to the purely school-based VET: 83 per cent of the companies and 84 per cent of the VET schools participating in SED consider that dual VET graduates are better prepared for employment than graduates from the traditional TVET system.[36] SED offers a sustainable approach, which is continuously developing thanks to intensive communication on many levels between the education system and the private sector, supplemented by vital communication within the public–private partnerships.

VET schools also play an important role in making the model a success. They have to prepare their students carefully for the WBL periods in companies. Students regularly attend full-time school-based teaching in their first year. Only those students who have done well and are at least 16 years old can be proposed by their teachers for participation in the SED model for the respective companies. Of course, the final decision on admittance rests with the companies.

The full case study can be found in the thematic report *Strengthening Work-based Learning in VET Institutions* by Erwin Seyfried.

Case Study 12

Demand-driven and supply-driven approaches to WBL in Indonesia

Like many other countries, Indonesia has made several attempts to increase the quality and effectiveness of its vocational education at secondary level. In 2017, a revitalization programme for Vocational High Schools (SMKs) was launched in order to better align education and training in SMKs with the requirements in industry by improving school equipment, modernizing curricula, strengthening digital literacy, ensuring that VET teachers are better qualified and enhancing cooperation between VET schools and industry. Implementation of the programme has been challenging due the increasing number of schools (approximately 13,000) and students (about 4.4 million), fragmented political responsibilities and regional skills mismatches. While in some areas

35 Kristina Wiemann, Mexico: International Handbook of Vocational Education and Training (Bonn: BIBB, 2020).

36 GIZ, "Dual Vocational Training Supports Young People and Companies", 2021.

there is an urgent need for qualified workers, the overall number of VET students looking for internship opportunities far exceeds the places available.[37] The example of **Bekasi SMK** and the **Teaching Factory Model** illustrates the differences between demand- and supply-driven approaches to WBL in Indonesia.

MM2100 Industrial Town[38] is one of the most highly regarded industrial estates in Indonesia, with around 190 manufacturing and supporting companies. Bekasi SMK was set up to service the whole industrial estate. Admission is highly selective. Students attend for three years and go out for work experience in their second and third years, amounting to one year's work experience in total. Following this, the majority go into companies on the business park. Companies are reportedly "queuing up" to take graduates and the SMK has become a recruitment hub for local companies.[39]

The Teaching Factory Model is another attempt to keep pace with developments in industry. The basic idea of the Teaching Factory is to replicate the working conditions in industry as far as possible at the school premises, and thus align learning in VET schools with the demand for skills in companies.[40] Researchers[41] who examined three VET schools in Indonesia that operate baking factories, emphasized that VET students should be fully involved in the main stages of the production processes (for example, the procurement, management and quality control of raw materials) and follow the prevailing standards in industry (such as health and safety standards).

The example of Bekasi School demonstrates how to implement a consistent demand-driven approach in VET. Of course, this is a selective model and conditions are more favourable for a school located in an industrial park with large employers than for a school located in a rural environment where SMEs predominate. In contrast, the Teaching Factory Model shows how WBL can also be provided in less conducive environments. While it cannot replace the experience of real business cultures, such a supply-oriented approach may be better placed to meet the pedagogical requirements and needs of students with disabilities and other disadvantaged groups.

The full case study can be found in the thematic report *Strengthening Work-based Learning in VET Institutions* by Erwin Seyfried.

37 The unemployment rate of VET school graduates in Indonesia is striking compared to graduates from general education pathways, which is essentially attributed to the lack of practice-orientation and to the poor public image of the VET system (Indonesia Central Bureau of Statistics, "The State of the Labour Force in Indonesia August 2018", 2018).

38 See http://mm2100.co.id/.

39 Erica Smith, Fieldnotes from research meetings at MM2100 Industrial Estate, August 2017.

40 It should be noted, that "the concept of the Teaching Factory has its origins in the medical sciences discipline and, specifically, in the paradigm of the teaching hospitals, namely the medical schools operating in parallel with hospitals. It aims to incorporate the learning and working environment from which realistic and relevant learning experiences arise" (George Chryssolouris et al., "The Teaching Factory: A Manufacturing Education Paradigm", Procedia CIRP 57 (2016), p. 45).

41 Ana Sri Subekti et al., "Work-Based Learning-Teaching Factory in Indonesia as a Model to Increase Employability Skills", TVET@Asia 13 (2019): 1–17.

Case Study 13

Flexibility between corporate interests and educational standards: The Dual System of Training in India

India has over 15,000 Industrial Training Institutes (ITIs), of which 85 per cent are run by the private sector. Realizing that school-based courses offered in ITIs were not effectively meeting the requirements for a skilled workforce in industry, a new scheme – the Dual System of Training (DST) – was introduced in August 2016. The DST entailed a larger element of work-based learning than was offered in the traditional Craftsman Training Scheme (CTS).

Under the new DST scheme, on-the-job training is conducted in an industry environment, while the theoretical component is covered by the ITI. Under the CTS system, students take regular examinations and are awarded an E-Certificate, like other ITI students. Graduates under the new scheme have an advantage over regular ITI graduates in terms of employability and employment opportunities in industry.

At its inception, in 2017, the DST was operational in 17 trades. With new guidelines in place from 2019 onwards, the scheme has been expanded to all trades, including service sector trades, which has resulted in significantly more female students participating. To increase and promote the participation of industry, and especially SMEs, the eligibility criteria were revised. While, at start of the programme in 2017, a company had to have at least 200 employees to be eligible, under the revised guidelines only 40 employees are required in engineering trades and six employees in non-engineering trades. Additionally, the annual minimum turnover of companies has been lowered significantly. Furthermore, the number of months of practical WBL in industry, which was previously fixed, has been made more flexible, reflecting the fact that requirements vary from trade to trade. The ITI and partners from industry also have the freedom to choose the training pattern, i.e. either a block mode, multiple block mode (with a few months in the ITI, followed by a few months in industry) or a mixed mode (with a few days per week shared between ITI and industry) according to mutual agreement and suitability of the ITI and partners in industry.

ITIs may sign a Memorandum of Understanding (MoU) with multiple industry partners to fulfil the required WBL needs of a batch of trainees, for particular trades. However, they must ensure that, in cases of DST candidates undergoing work-based learning in more than one company, the WBL blocks are synchronized with the content of the theoretical foundations taught in the ITI. When signing an MoU, the industry partner is required to ensure that trade-relevant tools, equipment and machinery are available for the WBL periods and assign a trainer or trainers. As of 1 January 2020, a total of 748 MoUs had been signed, which represents a huge jump from the 136 MOUs signed in the three years before the revamp of DST.

Industry is highly interested in hiring DST graduates, as these candidates need no special introductory training. However, no comprehensive evaluation is as yet available and questions remain regarding how the balance between industry's interest in flexibility and compliance with educational standards can be maintained.

The full case study can be found in the thematic report Strengthening Work-based Learning in VET Institutions by Erwin Seyfried.

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8 Adapting apprenticeships for the reskilling and upskilling of adults

Adapting apprenticeships for the reskilling and upskilling of adults

We live in a world that is increasingly characterized by high rates of job change. In addition, millions of people are unemployed while there are growing skills needs in jobs that can't be filled due to skills mismatch. We are currently experiencing exceptional demand for upskilling and reskilling for which adult apprenticeships provide an effective solution.

▸ 8.1 Introduction

As noted in Chapter 1, the world of work is being shaped by a range of factors, such as digitalization, technological advancements, the greening of the economy and demographic shifts, which are driving up the **demand for reskilling and upskilling of the adult workforce and requiring apprenticeships to focus on lifelong learning.** Digitalization and greening are requiring existing workers to acquire new skills, while in many countries increasing life expectancy is delaying labour market entry and prolonging careers, a development that is foreseeable even for low-income countries, where the effects of longevity are currently offset by large cohorts of young people and high birth rates.[1]

Apprenticeships need to be reshaped to embrace the concept of lifelong learning due to extended phases of late adolescence, diversified and less linear career pathways and the ageing of societies

Towards the end of the twentieth century, apprenticeship training in most parts of the more economically developed world changed from a dead-end training programme that equips youth to become skilled workers into an **open pathway at various skill levels** for diverse professions and, increasingly, for adults. This trend towards greater permeability, the expansion to lower and higher levels as well as the **trend towards adult apprenticeships** has continued since the turn of the century and can be expected to persist into the future. Despite the long tradition of lifelong learning policies, apprenticeship training for adults, in particular to support the low-skilled and unemployed, has achieved more visibility and momentum only in the past two decades.[2] Adult apprenticeships are now seen as key tools for meeting upskilling and reskilling needs. But what are they

1 Information on adult apprenticeships is very unevenly distributed across countries. For instance, examples were easier to track for European countries, Australia, Canada and the United States and, in contrast, very difficult to find for countries from other world regions, particularly, low- and middle-income countries. This disparity is certainly related to differences in the research infrastructure and traditions but it may also reflect the fact that, while ageing of populations is a trend observed in the majority of high-income countries (such as European countries, Australia, Canada and the United States), low or middle-income countries (e.g. Egypt, India and South Africa) have larger youth populations as a proportion of the total population and do not seem to consider adult apprenticeships to be a pressing policy issue.

2 Cedefop, Apprenticeship for Adults: Results of an Explorative Study, 2019; Jörg Markowitsch and Wolfgang Wittig, "Understanding Differences Between Apprenticeship Programmes in Europe: Towards a New Conceptual Framework for the Changing Notion of Apprenticeship", Journal of Vocational Education and Training, 2020.

and how do they differ from apprenticeships for young people? And how can they be developed to make them more attractive to both employers and adults? This chapter looks at each of these topics in turn.

8.2 Understanding adult apprenticeships

Although apprenticeships for adults and those for young people usually lead to the acquisition of the same vocational qualification, they may differ in many other aspects, such as their duration, the structure of programmes, learning approaches, flexibility of learning pathways, remuneration, social security contributions, working conditions and entitlements. In most countries, **apprenticeship programmes are open to people of all ages** and there is no upper age limit. Nevertheless, age limits are commonly used to regulate access to particular programmes or specific funding options for adults. For instance, in **Denmark**, people aged over 25 years old have access to dual VET programmes[3] designed especially for adults on the basis of recognition of prior learning (RPL) and relevant work experience. In **Germany**, the initiative "Zukunftsstarter" (meaning "jumpstart the future") promotes apprenticeships among adults aged 25 to 35 to address skills shortages and a lack of young apprentices in some sectors.[4]

Determining minimum and maximum ages for accessing education programmes or different educational levels is not specific to apprenticeships and **age norms differ around the globe.**[5] Consequently, neither chronological nor biological age is of much help in categorizing adult apprenticeships. Instead, apprenticeships for young people can be differentiated from

Age is only one proxy for defining adult apprenticeship. The individual life situation and experiences of learners, their motivation and maturity need to be considered. In addition, age norms differ between countries, and there are huge differences between high- and low-income countries

3 Namely, erhvervsuddannelser for voksne (EUV) [VET for adults].

4 Cedefop, Apprenticeships for Adults: Helping Secure Good Jobs for People and Skills for Businesses and Labour Markets, Briefing Note 9147 EN, 2020, p. 3.

5 While statistics and empirical literature on adult education mainly define adult learners as being above traditional college-going age (often defined as 25 years old), this remains a "flawed measure" (Yuliya Kosyakova and David B. Bills, "Formal Adult Education and Socioeconomic Inequality: Second Chances or Matthew Effects?", Sociology Compass 15, No. 9 (2021), p. 3.

apprenticeship schemes for adults in other ways. The former must put more emphasis on the need for socialization during adolescence, the acquisition of emotional and cognitive skills and interactions with parents. Furthermore, apprentices who are minors enjoy particular legal protections. Frameworks for adult apprenticeships, in contrast, need to provide an income (remuneration and any state benefits that are relevant) that is high enough to cover the living costs of a person who is no longer supported by a family or who may even be supporting their own family.[6]

Countries differ widely in terms of the provision of adult apprenticeships, their function and their role within the employment system and there is no single aspect or theory which can explain this disparity. Instead, the historical development of countries' apprenticeship systems needs to be scrutinized, as the example of Finland shows. The majority of Finnish apprentices are between 30 and 40 years old, and there are relatively more apprentices among people who are over the age of 50 than among those who are under 20 years old (see Case Study 15).

Countries can be roughly divided into three groups when considering the age distribution of apprentices (see table 7).

Even in countries in which apprenticeships can be considered as predominantly for youth, the average starting age of apprentices has risen in recent years due to extended years of schooling, later transitions to work and the inclusion of migrants

In the **first group** of countries, the apprenticeship systems of Austria, Germany and Switzerland, all of which have strong apprenticeship systems, are still quantitatively dominated by young people who have just finished compulsory schooling. In particular, in Austria and Switzerland the average age for starting an apprenticeship is very low (16 to 17 years old), although it has increased slightly over the past two decades. In fact, the average age for starting an apprenticeship has increased in many high-income countries due to extended years of schooling, later transitions into work and patterns of migration delaying the completion of preparatory school-based education.[7]

Table 7 Apprenticeship population according to age

	Country group	Approximate share of apprentices over 25 years old	Countries
I	Predominantly used by young people	Below 33%	Austria, Egypt, France, Germany, India, Norway, Spain, Switzerland, Türkiye
II	Used equally by young people and adults	33–66%	Australia, Denmark, England, Ghana, Indonesia, Nigeria, Republic of Korea, South Africa
III	Predominantly used by adults	Above 66%	Canada, Finland, Ireland, United States

Source: Based on Smith and Kemmis, 2013; Jeon, 2019; OECD, 2020, Table B7.3; and own research by Jörg Markowitsch et al. for the thematic report Adapting Apprenticeships for the Reskilling and Upskilling of Adults.

6 In the United States, adult apprenticeships often engage incumbent workers, while younger apprentices are more likely to be workers who are new to the firm. Renumeration rates for apprentices sometimes differ by incumbent status but not by age.

7 Jörg Markowitsch and Günter Hefler, "Future Developments in Vocational Education and Training in Europe. Report on Reskilling and Upskilling through Formal and Vocational Education Training", JRC Working Papers Series on Labour, Education and Technology, No. 2019/07. In Germany, the average age at which apprentices start their apprenticeship rose from 18 years old in 1993 to about 20 years old in 2016 (BIBB, Datenreport zum Berufsbildungsbericht 2018: Informationen und Analysen zur Entwicklung der beruflichen Bildung (Bonn, 2018); Henning Pätzold and Florian Brendebach, "Erwachsene in der Berufsbildung", in Handbuch Berufsbildung, ed. Rolf Arnold, Antonius Lipsmeier and Matthias Rohs (Springer, 2020), 109–120), and university dropouts are increasingly competing for attractive apprenticeship places (Selin Arusoğlu and Marc Thielen, "Studienabbruch und Einstieg in die duale Berufsausbildung", Zeitschrift für Berufs und Wirtschaftspädagogik 113, No. 2 (2017): 251–275).

Still belonging to the first group of countries, but outside Europe, the apprenticeship systems of Egypt and India are aimed predominantly at young people.[8]

In the **second group** of countries, including Australia, Denmark, England, Indonesia and South Africa, apprenticeship enrolment is more balanced between younger and older age groups. In Denmark, the average age of apprentices has risen rapidly in recent years as the clientele and role of VET has changed significantly due to the declining interest in apprenticeships among young Danish school leavers, and a growing number of adult migrants and refugees for whom the apprenticeship track has become the most feasible option to obtain a qualification.[9] In Australia, the apprenticeship system allows for RPL, and increasing numbers of adults with diverse prior work experience are taking up apprenticeships. The percentage of apprentices aged 25 and older has increased compared to the number of younger apprentices in Australia since 1996.[10]

In the **third group** of countries (Canada, Finland, Ireland and the United States), apprentices are predominantly adults. In Canada and the United States, apprentices aged 25 and over are typically employees and their share is 80 per cent and 95 per cent, respectively.[11]

A low proportion of adult apprentices should not be taken as a sign of weak development of adult apprenticeship provision, as it might simply reflect the strong role of the apprenticeship model in initial vocational education and training (IVET), with no corresponding implications for the provision of apprenticeships for adults. Conversely, a high proportion of adult apprentices does not necessarily indicate an approach that is well-adjusted to adult participants' needs but might rather be the effect of a lack of provision or attractiveness of the apprenticeship model for young people. Hence, the share of adults doing an apprenticeship within a given country cannot be used to draw direct conclusions about the quality of that country's apprenticeship provision.[12]

A low proportion of adult apprentices in a country does not necessarily signal a lack of appropriate training provision but may simply reflect the strong role of IVET. Conversely, a high proportion of adult apprentices does not necessarily indicate an approach that is well-adjusted to adult participants' needs

▶ 8.3 Towards a more nuanced understanding of adult apprenticeships

For any policy measures, it is necessary to distinguish the needs of different types of adults. The needs of young people just entering employment differ from those of people at a later stage in their working lives. Other aspects, such as prior skills, are relevant too and need to be reflected in policy. For instance, when

8 Erica Smith and Ros Brennan Kemmis, Towards a Model Apprenticeship Framework: A Comparative Analysis of National Apprenticeship Systems (ILO, 2013). In both countries, apprentices are mainly school leavers and the strength and popularity of the higher education route, as well as the proliferation of informal apprenticeship models, potentially limit the capacity for growth of formal apprenticeships (Maia Chankseliani et al., People and Policy: A Comparative Study of Apprenticeship Across Eight National Contexts (WISE, 2017)).

9 Martin B. Carstensen and Christian Lyhne Ibsen, "Three Dimensions of Institutional Contention: Efficiency, Equality and Governance in Danish Vocational Education and Training Reform", Socio-Economic Review (2021): 1037–1063.

10 ILO and World Bank, 2013. Between 1996 and 2018, the share of adult apprentices commencing in a non-trade apprenticeship increased from 22 per cent to 39 per cent, while adult apprentices commencing in a trade apprenticeship increased from 8 per cent to 22 per cent (Jo Hargreaves et al., The Changing Nature of Apprenticeships: 1996–2016 (NCVER, 2017)).

11 ILO and World Bank, Towards a Model Apprenticeship Framework: A Comparative Analysis of National Apprenticeship Systems, 2013.

12 See Markowitsch et al., forthcoming, for a discussion of factors and theories explaining the difference between countries in terms of adult apprenticeship provision.

targeting migrant workers with apprenticeship programmes it is essential to distinguish whether they are in employment or not and whether or not the programme can build on existing skills. Depending on the purpose of reskilling or upskilling[13] and the extent of transferable skills and RPL, **four target groups of adult apprenticeships** can be distinguished (see also table 8).

For sustainable career changes, moving up corporate hierarchies or becoming self-employed, apprenticeships and master craftsperson training may be more viable options than non-formal or informal learning at the workplace

Adults with low levels of transferable skills, unemployed or early school leavers often find themselves in the same situation as young people who would like to do an apprenticeship. They face the challenge of finding the right apprenticeship programme and an apprenticeship place (Type A). This is also the case for college and university graduates (or those who have left education early), and people with work experience or a vocational qualification in a different field from the apprenticeship that they are aiming to secure. However, this latter group can usually have some of their experience recognized and opt for a shortened apprenticeship (Type B). A different situation arises if incumbent employees want or need to upgrade their skills by doing an apprenticeship (Type C). In these cases, the type of apprenticeship selected largely depends on the extent of the employer's training investment. If existing skills are merely "converted" to a VET qualification, research speaks of "conversion" (Type D),[14] a practice that is vulnerable to certain bad practices which should be avoided (compare Case Study 14).

This typology offers an initial starting point for understanding and adapting apprenticeship policies to address the different challenges that adults may face but, of course, must be further refined to accommodate the local context.

Table 8 Target groups for adult apprenticeships according to the purpose of training, the beneficiaries' level of transferable skills and/or the extent of RPL

	Reskilling	Upskilling
No RPL, attending the full apprenticeship programme/ low level of transferable skills	Early school leavers, unemployed and redundant employees (with low levels of transferable skills) Type A "Standard apprenticeships for reskilling"	Incumbent low-skilled employees who need to upgrade their skills and/or want to change job with the same employer Type C "Standard apprenticeships for upskilling"
Full or partial RPL/ high level of transferable skills	University/college graduates and people with work experience or a vocational qualification in a field different from the apprenticeship they are aiming for (with high levels of transferable skills) Type B "Shortened apprenticeships"	University/college graduates and people with work experience or a vocational qualification in a field different from the apprenticeship they are aiming for (with high levels of transferable skills) Type B "Shortened apprenticeships"

Source: Jörg Markowitsch et al., thematic report Adapting Apprenticeships for the Reskilling and Upskilling of Adults.

13 In this report, reskilling refers to an employee learning a new set of skills in order to perform a new/different job with the same or a different employer (retraining), while upskilling refers to an employee learning additional skills to be better equipped to do his/her job or a related job with more responsibility and/or higher requirements. Also, it should be noted that these terms were originally used mainly in human resources and economic literature, and only very rarely by adult education researchers. On the contrary, the latter have frequently expressed concern about the downgrading of the role and value of adult education in upskilling and reskilling (e.g. Lorna Unwin, "A Critical Approach to Work: The Contribution of Work-based Learning to

14 Lifelong Learning", in Second International Handbook of Lifelong Learning, ed. David N. Aspin et al. (Springer, 2012), p. 760).

Compare Alison Fuller and Lorna Unwin, "What's the Point of Adult Apprenticeships?", Adults Learning 23, No. 3 (2012), p. 8.

8.4 Making adult apprenticeship more attractive to employers

While the reasons for individuals to engage in apprenticeship compared to other forms of training may not differ significantly between younger and older people, **employers may prefer older apprentices** for various reasons, such as expectations of higher productivity during the apprenticeship, their greater experience, better general knowledge and social skills and the fact that they may need less time for off-the job learning (compare also table 9). Of course, there are also reasons why employers might prefer younger apprentices: they may accept lower wages, tend to learn new things more easily, may have more energy and may be easier to integrate into existing corporate cultures.

Table 9 Reasons for employers to engage in adult apprenticeships

Compared to youth apprenticeships	Compared to on-the job training
Not limited by any youth protection regulations (for example, those covering late working hours)	Less costly because co-funded by the state
Expectations of higher productivity	More likely to bring new know-how and innovation into the company
Can rely on greater experience, better general knowledge and soft skills	The skills needed are only available via the apprenticeship route
Can use shortened apprenticeships/require less off-the job learning	Higher levels of job satisfaction and self-esteem of apprentices due to the social recognition of their apprenticeship status
Adults are less likely to change job/employer	

Source: Jörg Markowitsch et al., thematic report Adapting Apprenticeships for the Reskilling and Upskilling of Adults.

All things being equal, many employers may prefer adult apprentices over younger ones. Funding instruments need to target disadvantaged adults (for example, unemployed, low-skilled and migrants)

In cases where costs are equal and companies follow a short-term rational choice approach, it can be assumed that employers are more likely to choose older candidates who have sufficient work experience and core skills, have completed their family plans and expect to stay with the employer for longer. Furthermore, employers often criticize young people for lacking general knowledge and positive work attitudes and, above all, there are special youth protection regulations in place which limit the employability of juvenile workers. Thus, from an employer's point of view and assuming a classical human capital perspective, it would be expected that adult apprenticeship would, in fact, be the norm rather than apprenticeships for young people (see also Chapter 5).

General incentives for companies to provide apprenticeship places benefit both adults and youth, but adult apprentices may benefit more

In light of this supposed preference for older workers, it is scarcely surprising that general support for apprenticeships can end up benefiting mainly adults, as the development of apprenticeships in England over the past 20 years shows (see Case Study 14).

From a lifelong learning perspective, it is important to consider that certain disadvantaged groups are benefiting from access to apprenticeships more than others. For instance, during the COVID-19 pandemic, a lot of money was spent in some countries to help companies maintain or even expand apprenticeships

(see, for instance, the Irish example in box 42). Without further targeting of funds to benefit specific groups, **older apprentices indirectly benefit** more from such subsidies, as companies tend to orient themselves towards seniority in times of crisis and are more likely to lay off younger people. However, if adults experience disadvantages themselves (e.g. long-term unemployment, migrant background, low skill level) and cannot compete with younger apprentice candidates, they are particularly severely disadvantaged and dependent on public support.

Box 42 Grant for companies that can be used equally for young or adult apprentices: The Apprenticeship Incentivisation in Ireland and the National Apprenticeship Promotion Scheme in India

The Irish Government introduced the Apprenticeship Incentivisation Scheme for employers of apprentices as part of the 2020 July Jobs Stimulus package. Employers who take on an apprentice, irrespective of age, are given €3,000. To date, over 1,500 employers have benefited from the Scheme, hiring over 3,000 apprentices. "The decision to extend the Scheme to the end of 2021 underlines the Government's commitment to the new action plan for apprenticeship, while acknowledging the real financial challenges faced by employers as Ireland navigates its way out of the Covid-19 pandemic".[15]

India introduced the National Apprenticeship Promotion Scheme (NAPS) in 2016. The Government of India subsidizes the cost of basic training and the cost of monthly stipends. The scheme is now under revision to provide greater benefit to SMEs that offer formal apprenticeship opportunities. NAPS is not linked to the age of apprentices.[16]

There is a wide **variety of existing measures in many countries to incentivize companies** to take on apprentices that can be applied equally to young and adult apprentices (grants, bonuses, tax incentives, etc.).[17] Whether a particular instrument is transferable to other contexts and countries needs to be proved in each case.

However, as explained above, **the specific economic situation and the special needs of individual groups may require more targeted measures** or, as Aggarwal and colleagues put it:

Depending on the socio-economic context surrounding skills development and desired policy outcomes, governments may provide incentives (financial and non-financial) to promote the participation of employers, particularly SMEs, young women, disadvantaged groups and adult workers in quality apprenticeship programmes.[18]

For this purpose, more specific instruments to subsidize companies that provide apprenticeships to adults or the unemployed may be needed. Depending on the specific national or regional skills strategies, it might be necessary to incentivize adults of a certain age or with specific disadvantages (see box 43).

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15 See https://apprenticeship.ie/news-events/news/apprenticeship-incentivisation-scheme-for-employers.

16 See https://nsdcindia.org/naps.

17 Cedefop, Vocational Education and Training in Europe 1995–2035: Scenarios for European VET in the 21st Century, 2020; OECD, "Striking the Right Balance: Costs and Benefits of Apprenticeship", OECD Education

Working Paper No. 153, 2017. An overview of measures in Europe is described in Cedefop's "Database on Financing Apprenticeships in the EU", accessed 24 October 2022. See also Cedefop, Financing Apprenticeships in the EU, 2020.

18 Ashwani Aggarwal et al., Quality Apprenticeships: Addressing Skills Mismatch and Youth Unemployment, ILO Skills for Employment Policy Brief (2019), p. 7.

Box 43 Examples of public subsidies for companies that provide apprenticeships to adults or unemployed persons

In **Finland**, companies employing formerly unemployed persons can apply for a subsidy from municipal employment authorities to allow the employee to take a vocational examination while working as an apprentice. The amount of the subsidy is based on the length of unemployment and ranges from 30 to 50 per cent of the wage costs. This instrument has been used by the country's public employment service since 1995.

In **France**, employers receive additional financial incentives, of €2,000 per person, for taking on older (45+) jobseekers under the apprenticeship scheme "contrat de professionnalisation" (for the purposes of comparison, the minimum wage in France is around €1,500).[19]

In **Austria**, employers that take on apprentices who are over 18 years old (the age of majority) are entitled to a grant which corresponds to three collectively agreed auxiliary staff monthly salaries (in the respective sector) for the first year of apprenticeship, two monthly salaries for the second year of apprenticeship and one month's salary for the third and fourth apprenticeship years.

In **Australia**, companies can receive a grant of 4,000 Australian dollars for employing an adult apprentice (over 21 years old) once the apprentice has successfully completed 12 months of training (i.e. roughly 10 per cent of the average apprentice's annual wage). The idea behind the subsidy is to remove the barriers to taking on an adult apprentice.

Source: Jörg Markowitsch et al., thematic report Adapting Apprenticeships for the Reskilling and Upskilling of Adults.

8.5 Improving the attractiveness of apprenticeship for adult learners

From an adult learner's perspective, there are at least two crucial arguments for starting an apprenticeship rather than engaging in other forms of training (table 10). First, apprentices get to know their workplace from the very first day and don't have to wait until they finish their qualification, as is the case with school- or college-based programmes. Also, in contrast to on-the-job training, they receive a qualification that is recognized in the national qualification system. Second, an apprenticeship offers the most efficient and least risky approach to reskilling in terms of the cost-benefit ratio, because training and opportunity costs are lower.

Table 10 Reasons for adults to engage in apprenticeships

Reasons for adults to engage in apprenticeship compared to on-the-job training or non-formal training
Apprenticeships enable more sustainable career changes, i.e. easier to change occupation or job, move up corporate hierarchies, become an in-company trainer or become self-employed
Increased job security and better incomes
Increase self-confidence, build occupational identity and provide entry to professional communities/ associations
Better career opportunities in terms of access to further and higher education
Enable qualifications to be recognized in the national qualification system

Source: Jörg Markowitsch et al., thematic report Adapting Apprenticeships for the Reskilling and Upskilling of Adults.

19 See https://travail-emploi.gouv.fr/emploi-et-insertion/mesures-seniors/article/l-aide-a-l-embauche-d-un-demandeur-d-emploi-de-45-ans-et-plus-en-contrat-de.

Against this backdrop, it is also clear which conditions need to be fulfilled to persuade adult learners to choose an apprenticeship. First, the training should not be any longer than necessary and any prior learning should be recognized. Second, learning needs to be individualized or modularized to a high degree to cater for different learning requirements, while at the same time qualifications need to be linked to national standards. Finally, the cost-benefit ratio, which is usually only considered from the employer's perspective, also needs to be viewed from the learner's perspective. Of course, such requirements pose a challenge for the governance and management of apprenticeship training, both on the part of the state and on the part of employers.

Remuneration, social protection coverage and other working conditions usually differ between youth and adult workers undertaking an apprenticeship (box 44). In countries that aim to promote adult apprenticeships, wages will strongly influence whether adults will be able to afford to pursue programmes, as they usually have to support themselves and often have family responsibilities.[20] Adult apprentices are more often incumbent workers and are thus more likely to receive higher wages. Regarding the **remuneration of apprentices**, there are essentially two models. Either a practice of higher pay for adult apprentices is in place (irrespective of whether this is set collectively or centrally, regulated by an age threshold or dependent on the individual's age[21]) or the level of pay for young and adult apprentices is the same, in which case additional individual grants are usually provided.[22]

The higher financial needs of adult apprentices are fulfilled either by determining higher levels of apprentice pay or by additional individual grants. No comparisons of the two approaches are available, but it can be assumed that the first model (higher apprentice pay for adults) is more likely to attract adult learners

Box 44 Apprenticeship wages for adults in Denmark

In **Denmark**, adults are entitled to higher apprenticeship salaries compared to young people. A special adult apprentice salary (voksenlærlingeløn) has been introduced to make it less of a financial burden for adults with low levels of qualification to enrol in apprenticeships. Salaries differ according to the employment status of the apprentice at the time of enrolment.

Source: Cedefop, 2020c, p. 47.

The *ILO Toolkit for Quality Apprenticeships* highlights the fact that extending "apprenticeship opportunities to adults and older workers would require corresponding adjustments in apprenticeship systems and programmes".[23] Adjustments may refer to the duration of programmes, the balance between work-based

20 OECD, Seven Questions about Apprenticeship: Answers from International Experience, Reviews of Vocational Education and Training, 2018.

21 Only in a few European countries (Belgium, France and the Netherlands) are the different financial needs of young and adult apprentices regulated via the apprenticeship remuneration to be paid by employers, whereas in most cases additional public funding is made available. For instance, in France, remuneration for apprentices ("contrat d'apprentissage") under the age of 21 varies between €855 and €1,010 and for apprentices aged between 21 and 25 it varies between €1,088 and €1,243. In the Netherlands, an apprentice bricklayer's annual gross income in the first year of apprenticeship would be €4,670 and €7,150 in the fourth year. However, for over 23-year-olds it would be €12,200 (figures derived from own research by Jörg Markowitsch et al., for the thematic report Adapting Apprenticeships for the Reskilling and Upskilling of Adults, reference year 2021).

22 For instance, in Germany, apprentices can apply for a specific grant if the apprentice wage is not sufficient to cover their living costs. The German public employment service (Bundesagentur für Arbeit/Federal Employment Agency) supports apprentices during their training with a non-repayable grant of up to €700 per month to cover living expenses, travel costs, costs for childcare, etc. (Cedefop, 2020c and own research by Jörg Markowitsch et al. for the thematic report Adapting Apprenticeships for the Reskilling and Upskilling of Adults). Student loans (Bundesausbildungsförderungsgesetz or "BAföG") are also available to participants in post-apprenticeship continuing vocational education and training (CVET) courses, notably for Meister candidates. Among other things, the loans may cover payments for childcare (during the courses). Citizens of the European Union (EU), migrants and refugees living in Germany can also receive BAföG as financial support during their studies or while at school. For more information, see https://www.xn--bafg-7qa.de/de/bafoeg-auch-ohne-deutschen-pass-591.php.

23 ILO, ILO Toolkit for Quality Apprenticeships. Volume 2: Guide for Practitioners, 2020, para. 6.1.4.

and school-based learning and productive contributions, access, standards and curricula, and RPL. For instance, approaches including modularization, distance learning and part-time provision enable education to be combined with the responsibilities of adult life.

Since "adult entrants to apprenticeships may already have considerable work experience and, therefore, possess some or even all of the skills and knowledge necessary to perform the job",[24] **recognition of prior learning (RPL)** is particularly important. RPL can facilitate accelerated completion of the apprenticeship, or even allow direct access to the final qualifying examinations without undergoing apprenticeship training.

For instance, the Artisan RPL process in South Africa targets the upskilling of adult artisans to allow them to pass a trade test and receive a nationally recognized certificate, enabling them also to receive a higher salary (see Case Study 5). In Denmark, adult apprentices are able to shorten the total length of their learning trajectory due to a system for accreditation of prior learning. Thus, the total duration of the programmes for adults differs according to the student's prior practical experience and educational achievements.[25]

Shortening the process of acquiring recognized apprenticeship certificates, either by RPL, general shortening of programmes or access to final external examination (or a combination of these), is key for adult learners

Essentially, two approaches can be distinguished in adapting apprenticeship programmes to the needs of adults, which are not mutually exclusive and can be combined. One approach suggests a **general shortening of the duration of apprenticeship programmes** and/or a reduction of the programme depending on the prior experience of the learner (as in Austria or Germany, for example). This approach usually targets particular groups: graduates from general education or higher education; experienced workers, etc.[26] It is also quite common to shorten apprenticeships in general for adults from certain age groups (compare table 3 in Jörg Markowitsch et al., thematic report *Adapting Apprenticeships for the Reskilling and Upskilling of Adults)*.[27]

The other approach builds on **individualization and modularization**, meaning that it is even more flexible and open, and does not necessarily target specific groups. This is the approach taken in Australia, South Africa and the United Kingdom, as well as in Finland (see also box 45 and Case Study 15). Irrespective of the two approaches outlined above, in many of the countries that have been studied for this report final apprenticeship exams are offered as external examinations and do not require any attendance of an educational programme (although preparatory or additional courses are usually in place).

Personalized approaches in adjusting apprenticeships to the needs of adults help to avoid overlapping studies and shorten the study period

24 ILO, 2020, para. 6.1.4.

25 Cedefop, 2019

26 For instance, apprenticeship applicants with an upper-secondary school-leaving certificate, qualification at European Qualifications Framework/International Standard Classification of Education level 4 or higher, usually do not have to participate in the school-based part of the training.

27 These measures for shortening traditional apprenticeships need to be distinguished from other reasons to provide fast-track dual vocational training programmes. These could be either apprenticeship programmes in which only a part of the full programme needs to be completed to cater for persons with disabilities or those who face other difficulties entering full-length dual programmes (e.g. in Austria, Denmark or Germany), or programmes for particularly gifted young people who don't need a full programme to achieve the expected standards (e.g. in Switzerland). For the different national purposes and approaches to fast-track apprenticeships see, for instance: Gina Di Maio et al., "Torn Between Economic Efficiency and Social

Equality? Short-track Apprenticeships in Denmark, Germany and Switzerland", European Educational

Research Journal 18, No. 6 (2019): 699–723; Gina Di Maio et al., 2020; Matthias Becker et al., Ausbildung zum Beruf: Internationaler Vergleich der berufsförmigen Ausbildungskonzepte für benachteiligte Jugendliche (Bern: Peter Lang, 2018).

Box 45 Adjustment of apprenticeships to the needs of adults: Individualization in Finland

In Finland, there is an "individualization process"[28] for adult learners. "Individualization" is an official concept, defined in guidance-related legislation. It can be understood as a "mode of delivery" of VET. For example, an individualization plan is prepared for each apprentice, outlining how the apprentice will learn to achieve the desired qualification. This includes, for example, if and how existing vocational skills need to be supplemented (such as through on-the-job learning or participation in preparatory training).

Source: Jörg Markowitsch et al., thematic report Adapting Apprenticeships for the Reskilling and Upskilling of Adults.

Approaches which emphasize the individualization method require **more and better career guidance.**[29] For instance, career guidance is an integral part of the Portuguese adult learning system and it is integrated into the provision of validation services through the "Qualifica centres", which may also be used for starting an apprenticeship (see box 46).

Box 46 Career guidance and validation (RPL) services for adults with low levels of qualifications in Portugal

Qualifica centres are local-level structures that are embedded within a wide range of entities (i.e. public, private and profit-making organizations as well as non-governmental/civil society organizations) and are funded from the European Social Fund and the State budget. They provide information, counselling and career guidance to adult learners, including apprentices, helping them to be more confident, aware of themselves and capable of making decisions about their educational and professional pathways (guidance); they also offer adult learners the opportunity to validate their knowledge, competencies and skills and to certify them according to established standards (RPL/validation).

Source: Jörg Markowitsch et al., thematic report Adapting Apprenticeships for the Reskilling and Upskilling of Adults.

Measures to allow employed adults to make use of trial apprenticeships should be considered, for instance by adapting existing rights of individuals to education and/or by reforming the labour law

One particular limitation in the range of educational guidance services available for employed adults is the fact that **trial apprenticeships**, which are very successful and common in the youth sector, are difficult to implement. Trial apprenticeships allow young people who are still at school to spend two or three days in a company to see whether the occupation they are aiming for is really the right choice for them. While the approach also works for the unemployed, it is difficult to undertake a trial apprenticeship in another company when one is already in an existing employment relationship. New forms of **short-term educational leave** could be a potential way of offering trial apprenticeships for adults interested in retraining; however, their popularity with employers would be questionable.

Finally, as highlighted by studies on formal adult education,[30] the provision of apprenticeships for adults requires the curricula and pedagogies of initial education schemes to be applied to mature learners. Applying **adult-centred approaches** (i.e. andragogy) to teaching and learning is an important precondition

28 "Individualization" is an official concept defined in guidance-related legislation. It can be understood as a "mode of delivery" of VET, in which the student-centred approach is particularly relevant.

29 Tristram Hooley et al., Career Guidance for Social Justice: Contesting Neoliberalism (Routledge, 2017).

30 See, for instance, Sheila Riddell and Jörg Markowitsch, Lifelong Learning in Europe: Equity and Efficiency in the Balance (Bristol: Policy Press, 2012).

for the "good" quality of adult apprenticeships. Furthermore, it may also inspire improvements in the organization of apprenticeships for youth, as andragogical approaches may be more effective in meeting the needs of the ongoing process of individualization in education and society. In this respect, the professionalism of adult educators and career counsellors is critical in supporting adult learners to achieve their educational and career aspirations and also in overcoming social stereotypes, such as the "young person paradigm of apprenticeships".[31]

8.6 Key takeaways for policy

The increase in the number of adult workers or unemployed people in apprenticeship programmes has led to apprenticeship programmes becoming, in reality, adult training programmes in many countries, although they do officially target youth as well. This is a fact that is highlighted impressively in the case of Finland, where more than 90 per cent of the apprenticeship population is over 19 years old. The political issue in countries such as Finland or the United States[32] is not to expand apprenticeship further to adults but to make sure that it also remains an option for young people. Countries with strong dual systems (Germany, Switzerland, etc.) are still largely immune to such a development, but even there the average age of apprentices has risen (weakly in Austria and Switzerland, moderately in Germany, strongly in Denmark).

Irrespective of the individual situation, this chapter has shown that the following elements are essential when adapting apprenticeships for the reskilling and upskilling of adults:

- Apprenticeship opportunities must be flexible enough to accommodate the **needs and demands of adults,** who may have more responsibilities and domestic/family commitments than young people. Measures such as modularization, distance learning and part-time provision help adults to fit learning around such commitments.

31 Michael Gessler, "Concepts of Apprenticeship: Strengths, Weaknesses, and Pitfalls", in Handbook of Vocational Education and Training: Developments in the Changing World of Work, ed. Simon McGrath et al. (Springer, 2019), 677–709.

32 For instance, in the United States arguments have been made for increasing the participation of young people in apprenticeships, so expanding apprenticeships in this context has the opposite meaning (Robert Lerman, "Expanding Apprenticeship in the United States: Barriers and Opportunities", in Contemporary

- RPL is essential to improve the attractiveness of adult apprenticeships for workers and employers alike **(validation and recognition of prior learning).**
- Higher remuneration for adult apprentices is required **and other financial and non-financial support mechanisms** (such as training leave, grants, counselling, childcare, health insurance).
- In all forms of public funding conceived and implemented for adult apprentices, **socially disadvantaged groups must always be given significantly more support,** as inequality might otherwise be exacerbated.
- Adults require proper counselling on the opportunities at hand and strategies to overcome any difficulties encountered along the way **(lifelong career guidance).**

A starting point for **international organizations** could be to re-examine their own quality frameworks for apprenticeships,[33] regarding the extent to which they explicitly refer to adult learning and disadvantaged learners and adhere to principles of lifelong learning, and revise them if necessary.

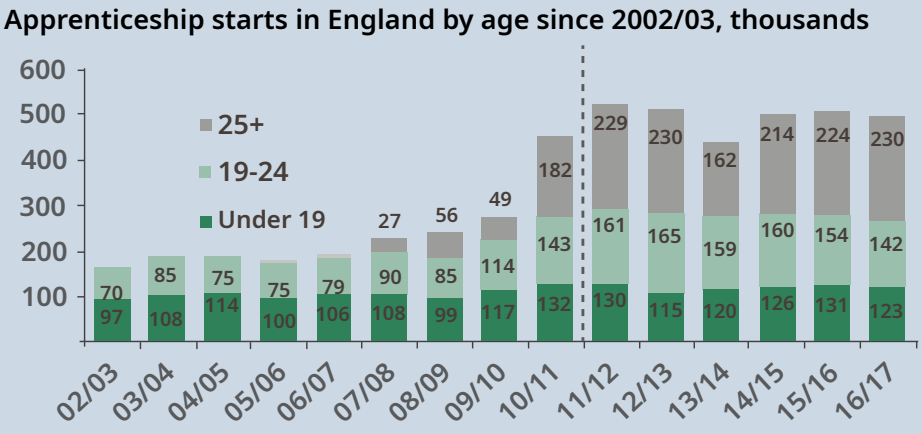
National governments should make sure that apprenticeships for adults are explicitly stated as an option for upskilling and reskilling in their national lifelong learning or skills strategies, and eventually also in broader economic and political strategies, such as those related to greening the economy. **Social partners,** and in particular trade unions, should strive for quality jobs and workplaces, which are preconditions for quality apprenticeships, and seek to foster measures to overcome gender inequality and other forms of discrimination in apprenticeship training.[34]

Case Study 14

The growth of adult apprenticeships in England and the practice of "conversion"

Since 2000, apprenticeship starts in England have tripled and this remarkable growth has been driven in large part by those aged 25 years old and over. After 2003, the upper age limit of 25 for apprentices was gradually abolished in England; previously, virtually all apprentices had been under the age of 25. There has been a steady growth in the number of adult apprenticeships since then, with a sudden jump between 2009/10 and 2010/11, reflecting employers' preferences for older apprentices (see figure 4).

Figure 4 Apprenticeship starts in England by age group, 2002 to 2017



Source: Based on Powell, 2018, p. 11.

Apprenticeship: International Perspectives on an Evolving Model of Learning, ed. Alison Fuller and Lorna Unwin, 105–124 (Routledge, 2013)).

33 Such as the European Framework for Quality and Effective Apprenticeships (EFQEA), ILO Toolkit for Quality Apprenticeships, etc.

34 Compare also the ILO's work on decent work and job quality (see https://www.ilo.org/global/topics/decent-work/lang--en/index.htm).

A report on reforms to apprenticeship funding assumes that the increase between 2009/10 and 2010/11 for those aged 25 and over is likely "to reflect, at least partly, the reduction of funding for the Train to Gain programme – which subsidised employer training of (primarily) those aged 25 and over". To fill the gaps, regular training for adults over the age of 25 seemed to become rebranded as a form of apprenticeship to qualify for the available funding. "This implies that a lot of the increase is in fact 'relabelling' of [corporate non-formal] training as apprenticeships".[35]

Also, Hogarth and Gambin claim that many of those apprentices were already (sometimes even long-standing) employees of the company that was about to train them, and expressed reasonable concerns "that apprenticeships have been used as a human resource management practice designed to improve recruitment and retention and drive-up employee motivation rather than as a skills intervention".[36] This practice has been labelled "conversion" (see also table 8) and has been commented on by Fuller and Unwin: "The practice of converting existing employees into apprentices to support the attainment of the government's numerical targets is grossly undermining the concept of apprenticeship as a model of learning".[37] However, conversion can also be viewed positively, as providing an opportunity for recognition and certification of existing skills. Looking at the years between 2011 and 2017, the age distribution of apprentices has been relatively stable, with an exception in 2013/14, when there was a large fall in the number of apprentices aged 25 or over. This has been attributed to the Government's attempts to make these apprentices pay for part of their apprenticeship during that year.[38] In contrast, the introduction of the apprenticeship levy in England in 2017/2018 gave a boost to apprenticeship enrolment numbers, probably attributable to adult starters continuing the practice of conversion.[39]

Case Study 15

How apprenticeship training in Finland has become an educational pathway mainly for adults

The current Finnish apprenticeship system constitutes only a small part within a strong school-based VET system, which has been the dominant model of VET in Finland for a long time. Currently, more than two thirds of all Finnish students at the upper-secondary level are enrolled in vocational education, but only one quarter of them are in apprenticeship training. Apprenticeship training has become an educational pathway mainly for adults (see figure 5).

35 Amin Smith et al., "Reforms to Apprenticeship Funding in England", in IFS Green Budget 2017 (London: Institute for Fiscal Studies, 2017), p. 14.

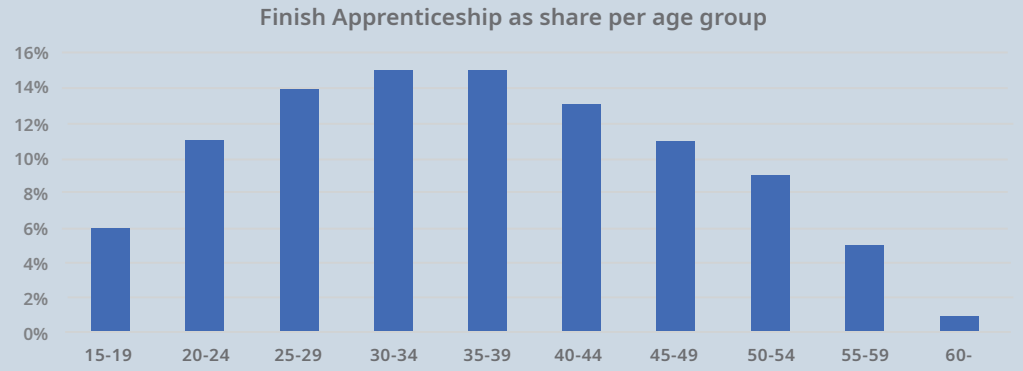
36 Terence Hogarth and Lynne Gambin, "The Changing Nature and Role of Vocational Education and Training in Europe: Case Study Focusing on England", report prepared for Cedefop, 2017, p. 7.

37 Fuller and Unwin, 2012, p. 8

38 Amin Smith et al., 2017.

39 For background information on apprenticeships in England, see: Andrea Laczik and Katherine Emms, "Apprenticeships, England", in Apprenticeship Governance and In-company Training: Where Labour Market and Education Meet, Cedefop Working Paper No. 3, (2021), 164–172.

Figure 5 Distribution of Finnish apprentices by age group, 2018



Source: Own calculations by Jörg Markowitsch et al. for the thematic report Adapting Apprenticeships for the Reskilling and Upskilling of Adults, based on Education Statistics Finland.

Finland has a population of approximately 5.5 million. A key feature of the national education culture is to ensure equal opportunities for all and there is a particular focus on lifelong learning. In 2017, over 27 per cent of Finnish adults participated in adult education, compared to an EU average of 11 per cent.

As in many other countries, in Finland the origin of the apprenticeship system goes back to the guild system. When crafts developed into small-scale industries during industrialization, the guild and apprenticeship system began to break down. After the Second World War, Finland was in favour of a classroom-based VET system to meet the growing demand for skilled labour, strengthening the welfare state in the Nordic countries and equal educational opportunities. Following the Vocational Institutions Act, in 1958, numerous municipal vocational schools were founded and became symbols of equality and of the progress of modern industry, while the apprenticeship system deteriorated further.[40] Apprenticeships were thought to be particularly appropriate as an alternative for those who had not applied or not been accepted for the school-based vocational training in institutions affected by "restructuring problems", "unwilling students" and other marginal groups.[41] Between 1981 and 1993, the share of under 20-year-olds among new apprenticeship entrants decreased from over 50 per cent to just a few per cent.

In the 2000s, VET in Finland has become more popular for several reasons (strengthening WBL; skills competitions, establishment of polytechnics, etc.). However, apprenticeship training has continued to be largely used in retraining and continuing education for adults. Hence, contrary to the situation in many other countries, the challenge in Finland is not how to open the apprenticeship system to adults but how to make it more attractive to young people.

The full case study can be found in the thematic report *Adapting Apprenticeships for the Reskilling and Upskilling of Adults* by Jörg Markowitsch et al..

40 Osmo Kivinen and Mikko Peltomäki, "On the Job or in the Classroom? The Apprenticeship in Finland from the 17th Century to the 1990s", Journal of Education and Work 12, No. 1 (1999), p. 78.

41 Kivinen and Peltomäki, p. 80.

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Section D

Making systems more flexible, inclusive and digital

Ensuring that apprenticeships are more flexible and inclusive, and that they make full use of digital technologies will be key to the future uptake of apprenticeships. These topics interact, often in complex ways, and making sense of these interactions will be key to the successful implementation of so many of the new developments discussed in this report.

9 Ensuring greater inclusivity and improving flexibility

Ensuring greater inclusivity and improving flexibility

Enhancing the flexibility of apprenticeships is key to meeting the challenges of modern production and service delivery. We need to ensure that more flexible systems distribute the benefits of economic progress more fairly. This means tackling flexibility and inclusivity simultaneously across all aspects of apprenticeships.

▸ 9.1 Introduction

The topics of flexibility and inclusion arise frequently as part of the policy and practice of modernizing and transforming apprenticeships. Indeed, they run as threads throughout the chapters in this report. Making apprenticeships more flexible is an important part of the response to the digital and green transitions (Chapters 2 and 3) and helps to improve their attractiveness and encourage participation by young people, adults and employers alike by opening up more ways in which apprenticeships can be accessed, undertaken and delivered (Chapters 6, 7 and 10).

Increasing the flexibility of apprenticeships is also a key part of inclusivity. Making sure that the benefits of apprenticeships are open equally to all involves tailoring them to better meet the specific needs of people who suffer disadvantage and discrimination in education and the labour market because of their gender, sexual orientation, ethnic background, disability or other factors. Apprenticeships have considerable potential to support inclusion policies by virtue of their perceived ability to appeal to people who might prefer the practical work-focused and less abstract forms of learning they offer. Making apprenticeships more flexible in this context means taking steps both to remove potential obstacles to participation and actively enabling the participation of people from disadvantaged communities.

While flexibility and inclusion are common threads that run throughout this report, the needs of enterprises and of individuals dictate that these topics should be treated holistically rather than in a piecemeal fashion, first to ensure coherence and, second, to make sure that increasing flexibility does not unintentionally exacerbate inequalities; for example, by opening up opportunities that are mostly taken up by those who are already advantaged in the labour market.

From this perspective, three topics are key when looking at how apprenticeship systems can be made more flexible and inclusive:

- how apprenticeships are designed, updated and customized
- how, when and where apprenticeships are delivered
- how apprenticeships relate to other parts of education and training systems – access and progression issues.

Flexibility and inclusion are closely related. It is important that they are treated holistically both in policy and in practice

9.2 Building flexibility into the way that apprenticeships are designed and updated

The ability to respond quickly and flexibly to changes in the context of apprenticeships has been shown to be a critical capability by the impact of the COVID-19 pandemic, but longer-term underlying trends were already pushing in this direction. The major drivers of change detailed in Chapters 1, 2 and 3 (the digital and green transitions, globalization, demographic shifts, etc.) highlight the need for greater flexibilities in the content of apprenticeship programmes so that they can be more responsive to the needs of different industries and can equip people with the wider employability skills they need to thrive in rapidly changing labour markets.

Responding to these challenges means taking a fresh look at mechanisms for designing, updating and customizing apprenticeships. Effective and efficient structures and processes for **skill needs anticipation** (see Chapter 2) **and the development of occupational/competency standards** have a key role to play in reducing the timescales required for designing new programmes and for reviewing and updating existing ones, especially if coupled with a **modular approach to qualifications,** which enables apprenticeships to be kept up to date by developing new modules or revising existing ones rather than reworking entire qualifications (see section 9.3 below).

More agile systems **engage employers and workers actively** in identifying skill needs and translating them into new apprenticeship content through the process of designing occupational and competency standards. New structures for employer and worker engagement have been created, facilitating improved employer engagement, such as India's Skill Council for Green Jobs (see Chapter 3, section 3.3).

Greater flexibility can also be achieved by **decentralizing responsibilities to stakeholders**, as in India's system of optional trades in apprenticeship training.[1] In countries like Georgia and Kazakhstan, tripartite sector councils have been developed to address structurally weak partnerships between the VET system and the private sector and to extend the responsibilities of the private sector for WBL in VET. In these

1 See https://nsdcindia.org/sites/all/themes/ibees/pdf/apprenticeship-faqs.pdf, p. 4.

countries, a stronger role has been given to sector councils in developing curricula, modules and standards for the assessment of WBL, including independent sectoral certification of graduates via the private sector.

Such decentralization requires not only the passing of enabling legislation but, crucially, also capacity building for stakeholders. In Jordan, it was found that tripartite and sectoral skills councils needed to be supported with sufficient resources and capacity-building so that, for example, TVET providers were equipped with the competencies to manage WBL, and employers and trade unions to manage training. A centralized commission for skill development was also put in place to manage accreditation.

It is important that the processes of designing more flexible apprenticeships give priority not just to the anticipation of skill needs in the labour market but to the wider issues around inclusion. Programme design is not only about demand from the labour market. Where apprenticeships simply service the needs of the economy, they are likely to reflect the social status quo in terms of access to occupations in the labour market, helping to reproduce gender-based and ethnicity-based divisions of labour. Tackling issues of inclusion requires that they be integrated into qualification systems at national level, such as through the guidance shown in box 47.

Box 47 Embedding inclusivity in national programme design in Zimbabwe

Zimbabwe's Green enterPRIZE programme (2017–21) has developed new curricula for the green transition, which include guidance on gender equality. The guidance promotes a "gender-sensitive" curriculum to overcome traditional gender stereotypes in industry. A gender sensitivity checklist was used during curriculum preparation to ensure that key factors relating to gender sensitivity were addressed. The curriculum also provides instructors with guidelines for delivery, such as: ensuring equal participation of women and men in workshops; directly addressing any discriminatory or offensive comments made by learners; and using teaching techniques like working in small groups where women might feel more comfortable about speaking openly. [2]

It is important not to overlook the significance of regional and local flexibilities in being able to make apprenticeships more agile and responsive – and also in expanding their role into "non-traditional" areas. Although globalization has an important role to play in driving change in apprenticeships (see Chapter 1), industry clusters also play a key role in the comparative advantage of regions.[3] Clusters are geographical concentrations of particular sectors or subsectors of business, which are supported through interconnected networks of both private and public sector actors. While initial thinking about clusters and regional development from the skills perspective focused on high-level skills, and therefore on higher

2 Section 3.2.1 of the "Certificate in Biogas System Installation, Level 4: Final Draft Curriculum Document" published in October 2020 by the Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development (MHTEISTD), Government of the Republic of Zimbabwe.

3 Michael E. Porter, "The Competitive Advantage of Nations", Harvard Business Review, March–April 1990, pp. 83–84.

education and the role of universities, in recent years the potential for TVET to play a key role in regional development has come to the fore.[4]

Apprenticeships can play an important role in supporting regional innovation needs through Centres of Vocational Excellence

TVET and apprenticeships are now seen as fulfilling important roles within regional skills "eco-systems"[5] and regional innovation systems,[6] and building flexibility into provision at this level enables a wide range of specialized regional needs to be met, **developing apprenticeships beyond their traditional role.** In particular, the establishment of Centres of Vocational Excellence (CoVEs) provides the opportunity for apprenticeships and WBL to be expanded beyond their "normal" role by, for example, playing a part in innovation.[7] Some countries have networks of CoVEs (such as the inter-company training centres (ITCs) in Germany – see Case Study 17), while individual TVET institutions can also function as CoVEs within their localities and regions.

While universities are likely to continue to be dominant in science-based research that might stimulate innovation in business processes and products, VET – especially higher-level VET – has a role to play in applied research by involving apprentices in **applied research** projects, which will enhance learning and lead to a more innovative workforce.[8] But it is probably in **technology diffusion among firms, especially SMEs,** that apprenticeships stand to make the greatest contribution to innovation.[9] The dissemination and adaptation of new technologies from knowledge-intensive to mainstream industries is central to the spread of innovation. For example, sectors with low levels of research and development, such as food-processing, timber and textiles, are highly dependent on knowledge-intensive inputs from other sectors. Poor innovation diffusion has been cited as a cause of poor productivity growth and is due, in part, to a lack of appropriate skills to absorb innovations across a broad range of companies, sectors and regions.[10] It is especially important that regions which are lagging economically strengthen their innovation capabilities by forging strong relationships between skills development and innovation systems (see box 48). Apprenticeships can play a part in this by equipping apprentices with the requisite core skills to support innovation, such as critical thinking, problem-solving and entrepreneurship, as well as involving them in innovation-related projects.

4 Ellen Hazelkorn and John Edwards, Skills and Smart Specialisation: The Role of Vocational Education and Training in Smart Specialisation Strategies, JRC Science for Policy Report (Luxembourg: Publications Office of the European Union, 2019).

5 An ecosystem can be thought of as a network or interconnected system in which success depends on actors working together in mutual interdependence: if a key element is missing, the whole ecosystem is damaged and becomes less effective. See also David Finegold, "Creating Self-Sustaining High-Skill Ecosystems", Oxford Review of Economic Policy 15, No. 1 (1999): 60–81; Paul Dalziel, Towards a New Zealand System of Skill Ecosystems, EEL Research Report No. 11 (Lincoln University, 2012).

6 Jukka Viitanen, "Profiling Regional Innovation Ecosystems as Functional Collaborative Systems: The Case of Cambridge", Technology Innovation Management Review 6, No. 12 (December 2016).

7 European Commission, Mapping of Centres of Vocational Excellence (CoVEs) (Luxembourg: Publications Office of the European Union, 2019), Section 8.2; ETF, Centres of Vocational Excellence: An Engine for Vocational Education and Training Development, 2020.

8 Francesca Beddie and Linda Simon, VET Applied Research: Driving VET's Role in the Innovation System (Adelaide: NCVER, 2017).

9 Richard Curtain, Vocational Education and Training, Innovation and Globalisation (Adelaide: NCVER, 2004).

10 European Commission, "Workforce Skills and Innovation Diffusion: Trends and Policy Implications", Research and Innovation Working Paper Series, 2020.

Box 48 Meeting regional innovation needs in Spain's Basque Country: The Tknika Centre of Vocational

Tknika, the Basque Centre for Applied Innovation in Vocational Training, plays an intermediary role between VET centres, universities and research centres and Basque companies, focusing on technological innovation in VET centres and the use of associated new pedagogies as a way of supporting innovation in enterprises. Tknika also plays a role in creating partnerships around applied innovation projects between training centres and SMEs, which often lack access to the innovation resources of large companies. One of its key developments is the model of collaborative, challenge-based learning (ETHAZI) that enables learners to develop not just technical skills but also the core skills needed for innovation; for example, teamwork and problem-solving skills. It also develops innovative training programmes based on close relationships with businesses that use the latest equipment; for example, in cybersecurity, 3D printing and sustainable agriculture. The Ikaslab project, for instance, has created laboratories in Vocational Training Centres equipped with 3D printing equipment to support practice and experimentation with the technology among learners and, from there, to promote the use of 3D printing in companies in the field.[11]

Source: https://tknika.eus/en/; and Basque Government, V Plan Vasco de Formación Profesional 2019–2021: La Formación Profesional en el entorno de la 4ª Revolución Industrial, 2019.

▶ 9.3 Building flexibility into the "how, when and where" of apprenticeship delivery

All the major drivers of change affecting apprenticeships point to the need to enable greater flexibility in how, when and where people can acquire the skills they need to be successful in their working and day-to-day lives. In essence, this means being able to access provision **when and where a learner – or employer – requires** and to follow **shorter programmes of learning** than hitherto. An example of one of the most flexible systems is provided by Finland (see Case Study 16).

Progress in digital learning technologies is hugely expanding the opportunities available in this respect, not least because of the impetus brought about by the **COVID-19 pandemic,** which seems to have caused a seismic shift in what had, until 2020, been a general and slow-paced movement towards the adoption of smaller modules and more flexible learning. It remains to be seen which of the changes brought about by the enforced shift to remote learning will become permanent, but there is now greater familiarity with and acceptance of many online technologies and awareness of the potential for the delivery of short courses over the internet. At the same time, the drawbacks of digital learning should not be overlooked, such as the limitations on the extent to which the latest technologies can offer substitutes for real hands-on experience and the downside of learning outside a work environment, such as the restrictions on acquiring core skills.

Apprenticeships face some challenges but also opportunities in embracing smaller units of learning and greater flexibility in delivery. First, there is the question of whether an **"anytime, anywhere" delivery**

11 See Cedefop, "Spain: Basque Country VET Innovation Offers Good Practices for Future Employment", 2018; Tknika, "Ikaslab (3D Printing)"; Tknika, "ETHAZI".

Despite some inherent constraints on where and when skills can be acquired, apprenticeships can increasingly benefit from the flexibilities of new technologies

of workplace components can actually be achieved. Chapter 10 describes in detail the potential for technologies to support more flexible learning in apprenticeship by uncoupling learning from the restrictions of place and time, but here it is worth noting that online learning enables greater flexibility not just in how the theoretical aspects of apprenticeship might be undertaken but also increasingly the practical part too; for example, through the application of virtual and augmented reality to learning work tasks. Technology also offers opportunities for more inclusive practices. We have also seen, in Chapter 2, how governments have responded to the flexibility challenge by creating online portals, such as that in Singapore (see box 4). At the same time, it is critical to note that a key benefit of apprenticeship lies not simply in being able to acquire technical skills and knowledge through practice, but being able to have a holistic workplace experience that helps to develop core skills, such as teamwork, the ability to listen to and understand instructions from supervisors, timekeeping, etc. It seems unlikely that such skills can be fully acquired through digital solutions, although the advent of the "metaverse" is opening up new possibilities even here, such as the ability to work in teams in 3D spaces (see box 49).[12]

Box 49 Faster and more inclusive learning with VRhoogte (or "Working Safely at Virtual Height")

This virtual reality learning tool enables apprentices to build scaffolding for high-voltage pylons or wind turbines safely without the need to learn the necessary skills in high places. It is a highly efficient way of learning, since virtual scaffolding can be erected and dismantled in 30 minutes, compared to half a day with real scaffolding. The software has been particularly popular among young people who are disaffected with learning, who tend to adopt their own competitive gaming approach to the tool. Evaluation shows that the approach fosters greater motivation and better cognitive outcomes than in traditional education. It is funded by the Flemish Government and available free of charge to education providers.[13]

Second, the traditional model of apprenticeship has involved the delivery of a **holistic learning experience** by TVET schools and employers in an unbroken sequence. The idea of breaking up programmes into smaller units of learning and enabling them to be taken outside a single sequence of learning experiences is not new and some countries have introduced modularized qualification systems. However, there are challenges to the application of this type of flexibility in practice,[14] for example:

- it can weaken the relationship between qualifications and occupations and lead to less transparency since it can become harder for employers to know precisely what skills lie behind the "label" of a qualification (if programmes are more modularized, and hence more individualized, qualifications can become much broader);
- learners need to receive good quality guidance and advice, which require resources and the development of appropriate expertise, and they need to know that a modularized course will have the same value in the labour market as a traditional programme;
- TVET providers face practical challenges related to how to sequence learning effectively and efficiently.

12 Deloitte, "Ed on the Metverse: Can it Bring People Closer than Ever?".

13 See http://www.immersiveeducation.be/2020/01/30/vrhoogte-veilig-leren-werken-op-hoogte-met-vr/; video available (in English) at https://www.imec.be/nl/sectoren/smart-education/smart-education-schools/projecten/smart-education-schools-project-videos.

14 See, for example, Matthias Pilz et al., "Modularisation Approaches in Initial Vocational Education: Evidence for Policy Convergence in Europe?", Journal of Vocational Education & Training 70, No. 1 (2018): 1–26.

Added to these "traditional" challenges of modularization are several new challenges:

- keeping pace with business developments by having up-to-date and perhaps highly technical knowledge (as in the IT sector);
- whether and how to integrate very small units of learning ("micro-credentials") into apprenticeships;
- determining a suitable approach to the globalization trends in learning that have emerged in recent years.

New **globalized learning markets** have become a feature of the technology field and illustrate these trends well. In the past few decades, multinational tech businesses have found solutions for their skills development needs that do not depend on traditional programmes and qualifications validated through national state-managed TVET systems. Instead, they have organized their own structures and processes for learning and validating the skills required for entering occupations and career progression through private VET providers and credentialling. This is partly a result of the global nature of these industries and the need for globally recognized competency standards; partly, it is driven by the highly technical nature of operations for which traditional TVET providers would struggle to develop programmes and keep them up to date. These new global markets in qualifications have been enabled by improvements in digital technologies, including blockchain, and offer considerable flexibilities to employers and learners in terms of when and where digitally enabled "micro-credentials" (sometimes known as "digital badges") can be acquired (for more detail on the nature of digital badges see Chapter 10). Micro-credentials have the potential to offer benefits, if carefully incorporated into apprenticeships – for example, vendor qualifications from global technology companies often have currency in terms of entry into employment and career progression. Enabling apprentices to acquire such badges could be beneficial to their future prospects, by providing learning in the most up-to-date technologies while at the same time ensuring that the micro-credentials are embedded within full programmes, thereby avoiding the inherent pitfall – that micro-credentials can encourage a focus on narrow skill sets.

The presence of global learning markets raises two important issues: ensuring quality and value, and inclusivity.

Ensuring quality and value: The global learning and credential market is unregulated. Only in some sectors do courses have the backing of multinational companies and de facto industry recognition, which stand as guarantors of the value of the credentials obtained. Outside these sectors, it is hard for apprenticeship stakeholders to know which courses and micro-credentials are of sufficiently good quality to be integrated into apprenticeships. At the same time, such provision can help in certain situations, as in LICs, where sectors like high-technology are under-developed and where the base of in-country experience on which to build provision is weak.

To deal with these issues, national authorities may consider entering into partnerships and forging contracts with private providers in the international learning marketplace, where there are clear benefits in doing so (see box 50), although a challenge here is that the landscape of providers is more complex than in "traditional" provision. Adjustments may also be made to national qualifications frameworks, for example to adjust restrictions on the minimum size of learning units/modules and ensure that quality standards are fit for purpose. Such changes may spark debate. For instance, adjusting the minimum size of learning units is likely to raise questions about how small a unit should be in order to provide learning that would be viable in terms of a specified learning outcome ("to know how and be able to do" a task) as opposed to simply acquiring information. Currently, we are still in the early stages of these developments.[15]

Box 50 Accessing the global learning market for the benefit of VET in Ireland

Microsoft provides a variety of certificates related to its products, and it contracts with Certiport (owned by Pearson VUE) to provide its certifications around the globe. SOLAS (the state agency responsible for Further Education and Training (FET)) has an agreement with Certiport on behalf of the FET sector in Ireland to access industry-recognized examinations and certifications, including Microsoft, Adobe and others. Certificates (around 4,000 annually) are issued as part of publicly funded FET programmes. Certificates form the basis of several traineeships. SOLAS's agreement means that FET providers can make unlimited use of the certifications in the agreement free of charge and the agreement is cost-efficient for the sector.

Ensuring inclusivity: The globalized learning and credentials market is a private market, which raises important equality questions: only those who can afford the courses or examinations can take them. In many countries, including LICs, TVET and apprenticeships are not free, so having to make extra payments imposes an additional burden. One solution to this issue is for national authorities to strike agreements to enable globalized credentials to be offered as part of existing programmes, as is the case in Ireland. Other options include offering subsidized access to targeted groups of learners from disadvantaged backgrounds.

National systems may need to bring in more diverse provision through partnerships, contracting and appropriate quality controls to cope with rapid and technical changes in skills needs

9.4 Building flexibility into the way that apprenticeships relate to other parts of the lifelong learning system: Access and progression

Access to and progression beyond apprenticeships are areas where there is a strong potential for the convergence of flexibility and inclusion goals by making apprenticeships – and the lifelong learning systems within which they sit – more permeable at both the entry and exit points. Having greater flexibility in how people get on to apprenticeships can open up possibilities for those who might otherwise struggle to meet traditional entry requirements. At the "other end" of an apprenticeship, opening up progression pathways into higher levels can offer new opportunities that were previously open only to people on general (academic) educational tracks. Importantly, achieving greater flexibility at the entry and exit points of apprenticeship requires consideration of the way in which apprenticeships relate to other parts of countries' education and training systems; in short, how we achieve the types of connectivities needed in lifelong learning systems.

As has already been shown, **access** can be enhanced by the development of systems for RPL (Chapter 8) and through measures such as mentoring, advice and counselling, financial support and pre-apprenticeship

15 More information is available from Cedefop, "The Role of Micro-credentials in Facilitating Learning for Employment".

programmes (Chapter 6). Pre-apprenticeship programmes can act as "taster" programmes in cases where employers are struggling to recruit apprentices, and are often used to provide people from disadvantaged backgrounds with an entry route into apprenticeships where their lack of formal qualifications might otherwise inhibit entry (see box 51).

We need to move away from seeing apprenticeship as a separate track and focus attention on how it connects with other parts of the education and training system

Box 51 Supporting women into male-dominated occupations through apprenticeships in British Columbia, Canada

In British Columbia, Canada, the Industry Training Authority (ITA), which leads and coordinates the province's skilled trades system, has set up the BC Centre for Women in the Trades as part of its Women in Trades Training initiative. The Centre aims to tackle the issues that deter women from entering and staying in these careers: gender-based isolation, discrimination and poor workplace culture created by men. The Centre seeks to increase the number of women entering trades such as bricklaying and plumbing through apprenticeships using networks, funding, programmes, tools and resources for individuals and trades organizations. Apprenticeship incentive grants and tax credits are available to encourage women into trades where they are under-represented, along with loans to help pay for pre-apprenticeship programmes. The Centre also promotes the benefits of diversity in the workplace, such as the introduction of new ideas, increased employee satisfaction and a competitive edge for employers in an increasingly globalized marketplace. Employers can sponsor female apprentices through the initiative.[16]

Regarding **progression**, the key concern is how to enable apprentices to move on to higher levels of education and training by making systems more permeable. As shown in Chapter 2 in particular, systems are being made more flexible by the development of higher-level apprenticeships. But progression can be achieved in a variety of ways:[17]

- through supplementary training and/or examinations
- by integrating preparation for external examinations into apprenticeship programmes
- through RPL.

However, simply **providing access is not enough.** Even where progression pathways are available, there is no guarantee that they will be attractive to apprentices, since the pedagogical approach at university level delivers less of the practical content that is attractive to apprentices and many young people do apprenticeships in order to enter the labour market. Making the system more academic is likely to reduce the inclusiveness of the system for those students who do not opt for higher education.

Although evidence is scarce, certainly in the past both take-up and completion rates were low for progression routes from TVET into higher education in Europe.[18] To support the use of progression

16 See https://www.itabc.ca/women-trades/overview; https://bccwitt.ca/.

17 Alexander Petanovitsch and Kurt Schmid, Permeability of Dual Vocational Education and Training: Comparative Study including Austria, Germany, Switzerland, Italy, France, and Slovenia, 2020.

18 Andrew McCoshan et al., Beyond the Maastricht Communiqué. Developments in the Opening Up of VET Pathways and the Role of VET in Labour Market Integration, 2008.

pathways, **extra measures** are required. Additional pedagogical support, such as bridging courses, can help apprentices to transition into the more theoretical learning of universities. Other measures, such as financial support and incentives, and pastoral support and guidance, can also help. Furthermore, a permeability measure is likely to be more attractive if it provides unrestricted access to higher education rather than only to specific programmes, although both options can co-exist.

Nonetheless, universities may not be an appropriate choice for all apprentices. Indeed, from the inclusion perspective, it is **important not to focus simply on progression rates into higher education** as a sufficient indicator of inclusivity since this risks mistaking educational mobility for social mobility. It would be more relevant to know whether graduate apprentices find a sufficient number of appropriate further training and career opportunities, if they are equipped with the necessary resources to realize them and if the jobs and incomes they secure are appropriate. In line with this, it is important that options for non-academic higher vocational education are expanded, such as advanced further training or Master craftsperson training, which allow apprentices to continue with the learning approaches and pedagogies they are used to.

▸ 9.5 Key takeaways for policy

Looking across the three topics examined above, we can identify several common threads in terms of recommendations for future policies.

While the need for increased flexibility in apprenticeships flows from labour market demands, this is not the case with respect to inclusion, the demand for which tends to be expressed through other channels. For this reason, care should be taken to ensure that, in making apprenticeships more responsive to rapidly changing skill demands, inclusion is not overlooked. Indeed, it is vital to make sure that new opportunities opened up by increased flexibility do not unintentionally favour those who are already advantaged in the labour market. **Flexibility and inclusion in apprenticeship should be dealt with together at policy level**

to ensure that they are mutually supportive, and steps towards greater flexibility should be given an initial "inclusion check", backed up by monitoring during implementation.

Increasing flexibility in apprenticeships in the modern labour market context means being able to offer smaller units of learning in a flexible way, especially to support upskilling and reskilling. Who is to provide these smaller units and more flexible delivery options, especially in leading fields of increasing technological complexity – not just the tech sector itself but associated fields, such as biotechnology, food science and advanced manufacturing? **To enable the existing provider base to rise to the challenge, measures such as Centres of Vocational Excellence can facilitate collaboration between providers and the private sector to build the requisite capacity, and additional support and resourcing can assist in the development of micro-credentials and associated learning packages.**

But expertise and experience also lie elsewhere, and the global learning and credentialling market in the tech sector shows the potential in this respect for a sector to meet its needs outside traditional public provision. Flexibility may mean **embracing a wider and more diverse range of providers than hitherto in order to have a more agile provider base which has not only the technical knowledge to develop new provision, especially in areas like the digital and green transitions, but also experience in adult upskilling and reskilling.**

Achieving greater variety in both provision and the provider base will require attention to be given to national qualification and quality frameworks to ensure that they can accommodate the new realities of rapid skills demand changes and an increasingly globalized learning market; for example, through a modular structure built on a common foundation. The global credential market is fraught with risk for learners and providers outside those fields where quality and value are backed by global operators. **Small (commercially provided) courses which are to count towards full qualifications should be brought within national qualifications frameworks wherever possible; and public–private partnerships should be developed to bring new providers into the field, to include smaller credentials as an integral part of national programmes and to reduce or eliminate the cost for learners, thus supporting inclusivity goals.**

Case Study 16

VET in Finland: A prime example of flexibility

The Finnish education system is highly regarded, not least because of its above-average PISA scores. VET is mainly school-based, an integral part of the education system and an attractive choice for young people and adults alike. Although it is a school-based system, WBL components traditionally play an important role, which was recently further strengthened.

With its latest reform, in 2018, the Finnish VET system serves as a prime example of building flexibility into VET pathways and curricula. The reform aimed to systematically strengthen the role of WBL in a school-based VET system by making qualifications, programmes, pathways and types of learning as flexible as possible and aligning them with the needs of the learner and demand in the labour market. In addition, VET providers are encouraged to strengthen cooperation with employers by a performance-based funding system and are allowed to adapt qualifications according to employer-specific, regional and personal requirements.

Delivery of VET is characterized by a flexible blend of school-, work- and online-based learning. Previous learning is recognized, and students acquire only the missing skills. A personal competence development plan is drawn up for each student. WBL may be provided during the whole programme duration and cover the whole qualification, a module/unit or a smaller part of the programme.

The most suitable method for a learner is agreed in the personal competence development plan. Legislation does not stipulate a maximum or minimum amount of WBL.

In fact, any qualification can be acquired through apprenticeship training (which is a fixed-term employment contract in which the student is categorized as a worker and receives payment) or by a training agreement (which involves no employment relationship with the company and no payment). Learners may flexibly transfer from a training agreement into apprenticeship training. Additionally, training via a training agreement may be used as a pre-apprenticeship that may lower the threshold sufficiently to allow the employer to recruit an apprentice.

Since the last VET reform, there has been no indication in the legislation concerning where the theoretical part should be acquired. The term "theory" is no longer used; this has been replaced by "learning in the working place" and "learning in other environments". If the company is able to cover all training needs, there is no need for the learner to attend a school venue at all.[19]

The COVID-19 pandemic accentuated the importance of flexibility within the education system to make it resilient. However, it also increased teachers' workloads as teachers had to spend more time on planning, adopting new digital tools, writing individual feedback to students and providing continuous communication. Also, there are indications that the increased autonomy has led to unequal practices and that the flexible study pathways have not yet been fully realized. [20]

The full case study can be found in the thematic report *Strengthening Work-based Learning in VET Institutions* by Erwin Seyfried.

Case Study 17

Inter-company training centres in Germany

Apprenticeships are provided in Germany for 323 recognized training occupations and they mostly last for 36 months. Work-based training is conducted in companies and complemented by vocational education in part-time vocational schools one or two days a week. Accordingly, apprentices spend most of their training time in companies. Enterprises enter into a contract with apprentices, bear the costs of the in-company training and pay the apprenticeship remunerations. Remunerations are regulated by collective agreements and increase with every year of training, averaging about a third of the starting pay for a trained skilled worker. On passing the final examination, apprentices receive a chamber certificate that is fully recognized, trusted and highly regarded among employers. [21]

SMEs train more than two thirds of the apprentices in Germany but due to increasing specialization they have not always been able to offer the full training content as prescribed in apprenticeship regulations. Therefore, inter-company vocational training centres (ITCs) have developed as a third learning venue and, over time, have taken on more and more functions within the German apprenticeship system. ITCs are non-profit associations run by various sorts of employer organizations and co-funded by public authorities.

Introduced in the 1970s, ITCs have built a nationwide network of multifunctional VET centres. They offer initial and continuing VET training that is especially oriented to local SMEs by running practice-oriented VET courses and offering suitable training facilities in addition to learning that takes place at

19 Cedefop, Vocational Education and Training in Finland: Short Description, 2019, p. 36.

20 Heta Rintala, "Country-Level Report: Apprenticeships for Adults and Older Workers in Finland" (ILO, Forthcoming [Second Draft]).

21 ReferNet, 2019; BIBB, Datenreport zum Berufsbildungsbericht 2021: Informationen und Analysen zur Entwicklung der beruflichen Bildung (Bonn, 2021).

VET schools and training companies. In specific fields, ITCs also take over for SMEs the basic practical training that large companies would normally offer within their in-house apprenticeship workshops.[22]

So, essentially, ITCs have three main functions:

- to complement in-company training in terms of breadth and depth;
- to systematize in-company training to achieve standardized vocational requirements; and
- to support the transfer of innovations and technology into training and practice.

ITCs also play a complementary role in the qualification of long-term unemployed people and further training of unemployed professionals.[23] Furthermore, in recent years, ITCs have extended their portfolio to offer guidance and counselling, thus providing additional support during the transition from school to VET, as well as supporting the recruitment of apprentices.

In 2016, a specific funding programme "Digitalisation in ITCs and Competence Centres" was established to enable ITCs to better support technological development processes for SMEs and prepare trainees for digital work processes.[24]

Learners benefit from the high level of training quality that is guaranteed by the cooperation of their employers with ITCs. They become acquainted with the latest technology and acquire skills that enable them to keep up with the pace of innovation. On a local and regional level, ITCs contribute to increasing the commitment of firms to offer apprenticeships by relieving them of the responsibility to teach difficult or time-consuming content, or other content that they would struggle to provide.

The full case study can be found in the thematic report *Unlocking Apprenticeship Potential in Small and Medium Enterprises* by Philipp Grollmann et al.

22 Martin Pfeifer and Christiane Köhlmann-Eckel, "Dauerhaft und doch flexibel – ÜBS-Förderung mit unterschiedlichen Schwerpunkten", BWP 5/2018 (BIBB, 2018).

23 BMBF, 2020; Philipp Bauer et al., Evaluation der Förderung überbetrieblicher Berufsbildungsstätten und ihrer Weiterentwicklung zu Kompetenzzentren [Evaluation of the Funding of Inter-company Vocational Training Centres and Their Further Development into Competence Centres] (Bonn: Bundesinstitut für Berufsbildung, 2020).

24 Bauer et al., 2020.

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10 Improving apprenticeships through digital technologies

Improving apprenticeships through digital technologies

While it remains to be seen what the long-term effects of the COVID-19 pandemic will be, there is little doubt that it has had a major impact on how the use of digital technologies is perceived within apprenticeships. Before the pandemic, implementation was still quite limited. Now we are in a different world: exposure to technologies has revealed their potential to shape every element of apprenticeship.

▸ 10.1 Introduction: Technologies' potential to impact all areas of apprenticeship

There are opportunities to benefit from technology throughout the apprenticeship life cycle,[25] from the development of quality programmes through the preparation of quality training places and the organization of training to the post-training transition and evaluation.[26] The following sections show how technology can be deployed to positive effect across the whole cycle from skills forecasting through programme design and the recruitment of enterprises and individuals into delivery and learning management and onwards into the progression of learners after their apprenticeships. It also shows the roles to be played by all stakeholders, including workers' and employers' organizations, in the changes taking place.[27]

Across these different elements, the landscape is quite varied in terms of how far technologies have been applied to date. In some areas, like the use of Open Educational Resources (OERs) in the school-based part of apprenticeships, digital learning has been available for many years. In other areas, such as the use of big data analysis in skills anticipation, progress reflects the state of play in technological development more generally, as we await the application of the latest AI and machine learning. It is difficult not to have the feeling that we just on the brink of major shifts across the board in the use of technology for learning in workplaces and classrooms.

25 ILO, ILO Toolkit for Quality Apprenticeships, Volume 2: Guide for Practitioners, 2020.

26 See also ILO, Digitalization of National TVET and Skills Systems: Harnessing Technology to Support LLL: An Enquiry and Action Framework, 2021.

27 Employment Policy (Supplementary Provisions) Recommendation, 1984 (No. 169), of the International Labour Standards, section IV, sets out the need for education and training systems to offer workers sufficient opportunities to adjust to the changes in employment brought about by technology, including through the promotion of new technologies and the role of employers' and workers' organizations in setting up relevant training programmes.

10.2 Skills anticipation: A role for big data

Digital technologies have the potential to make an important impact on both how we assess skill needs to inform the development of programmes and qualifications, and the make-up of those qualifications and programmes.

The strengthening of **skills anticipation mechanisms** has been part of the landscape of apprenticeships in many countries in recent years. As noted in Chapters 2 and 3, the speed of change in the labour market means that policymakers need more detailed information on skills to be made available more quickly. **Big data analysis** enables online data sources to be used to address this need (see box 52).[28] Methods include using job advertisements to identify *skills demands*, online CVs and social media profiles to identify *skills supply,* and electronic patent and scientific paper repositories and education and training programmes and curricula to anticipate *future skills demand and supply,* respectively.

Box 52 Using big data analysis to identify training opportunities to bridge the gap between skills demand and supply

In Flanders, Belgium, the public employment service uses text analytics on online job advertisements and CVs to match open positions to jobseekers and identify training opportunities that bridge the gap between jobseekers' skills and what employers are demanding. The Competent database,[29] which was developed in collaboration with social partners, is used as a backbone to link qualifications and work experience to skills requirements. This approach has also been successfully implemented in Malta.

28 Cedefop et al., Perspectives on Policy and Practice: Tapping into the Potential of Big Data for Skills Policy, 2021.

29 More information is available on https://www.vdab.be/competent.

Such data sources provide real-time, detailed information on jobs and the skills and educational qualifications/levels they require. However, they suffer from inherent biases: not all jobs are advertised online (a particular issue in LICs); they tend to be skewed towards high-skilled white-collar jobs; and the skills listed in a vacancy notice do not necessarily reflect the full job profile. Furthermore, the data sets involved are large and unstructured and were not designed for labour market and skills analysis. Consequently, they require significant processing, which requires systems that are complicated and resource-intensive.

Big data analytics stand to make a key contribution to skills anticipation mechanisms

Nonetheless, new techniques are likely to evolve that can deliver more effective and efficient processing. For example, automatic content analysis of online job advertisements, usually supported by natural language processing techniques, and other AI-based solutions enable analyses to be undertaken frequently, which enables trends to be identified even over short time periods. Currently, reproducing analysis frequently can be expensive but as machine learning techniques evolve costs may fall, and the sophistication of analysis may increase. However, deploying AI raises key ethical issues. For instance, machine intelligence learns primarily from observing the data that it is presented with and if that data is laden with stereotypical concepts of gender, race and class, the resulting application of the technology will perpetuate this bias.[30] Being aware that ideology is embedded in language would help to prevent the generation of biased algorithms in machine-learning approaches to texts, including job advertisements.

The limitations of big data analysis based on online job-search platforms mean that its chief function is to complement traditional labour market analysis. Big data analysis is not possible without a human element in the collection, analysis, validation and interpretation – and this combination of artificial and human intelligence will be central in shaping the role of big data in the coming years.

▶ 10.3 Designing apprenticeships: The disruptive potential of digital badges

In any country, the way that apprenticeships are designed depends on various regulations and policies surrounding their content and structure and in this respect there is also potential for digital technology to have an impact through digital micro-credentials – also known as **digital badges.** As has been shown in previous chapters (Chapters 2 and 3 in particular), short courses, micro-credentials and their digital form – digital badges – could play an increasingly important role in apprenticeships, and in skills development more generally, particularly with regard to upskilling and reskilling. Being "digital pictograms or logos that can be shared across the web to show the accomplishment of certain skills and knowledge",[31] digital badges are highly flexible and can be used in relation to all types of skill – from general to specialized skills and knowledge, and from cognitive to non-cognitive skills.[32] They can be used both to recognize skills acquired before or during an apprenticeship programme through external courses or other informal

30 Susan Leavy, "Gender Bias in Artificial Intelligence: The Need for Diversity and Gender Theory in Machine Learning", Proceedings of the IEEE/ACM 1st International Workshop on Gender Equality in Software Engineering, 2018.

31 SURFnet, Whitepaper on Open Badges and Micro-Credentials (Utrecht: SURFnet, 2016).

32 Shizuka Kato et al., "The Emergence of Alternative Credentials", OECD Education Working Paper No. 216, 2020

learning experiences, and to recognize skills acquired as part of a mainstream apprenticeship programme (at school or at the workplace). Digital badges are well-suited to supporting the global trend towards competence-based qualifications.[33]

Providers of digital badges are highly varied, and include private learning providers, large multinational corporations (for example, where digital forms of "vendor certificates" are offered – see Chapter 2) and a wide range of other organizations, including trades unions (see box 53). There is much sectoral variation. Technology firms are particularly active: for example, Amazon, Cisco, Google and Microsoft provide digital badge programmes that focus on information technology, particularly in emerging technology areas, including AI and cybersecurity. Access to digital badges and their associated learning is also varied, being hosted on a wide variety of platforms from companies with their own internal badge systems for their employees to open source platforms, such as Moodle or WordPress,[34] and commercial platforms which act as intermediaries between learners, learning providers, governments and providers of programmes and badges, like Microsoft.

Box 53 UK trades unions use digital badges

SkillCheck is a tool created by Unionlearn (the educational arm of the national Trades Union Congress in the United Kingdom) to help trades unions deliver learning in the workplace. This tool contains learning themes for badges that are designed to help engage learners, providing both an initial assessment and a way to encourage further learning. Specific badges for apprentices have been developed, which also include ICT skills, everyday finances, and green skills and environmental awareness.[35]

Digital badges offer flexible skills solutions but issues of quality are key

For all countries – but particularly countries with less well-developed apprenticeship/VET infrastructures, which tend to be LICs – digital badges and their associated learning programmes offer the potential for "ready-made" solutions to the issue of keeping their qualifications and programmes up to date. While they have many potential advantages, digital badges also present some challenges which stem from their unregulated nature and recent proliferation, leading to a lack of clarity for learners as to their quality and value (or currency) in the labour market, as discussed in Chapter 9, section 9.3. In addition, some learners may be tempted to use digital badges as a shortcut to employment without doing an apprenticeship, which may disadvantage them in the long run since they will not have developed a full set of skills in an occupational field.

Public providers and employers are responding to the growth in digital badges in a number of ways. Some companies are developing internal badge systems for their employees, which can also be beneficial for apprentices (see box 54).

33 Sanna Brauer et al., "'Learning Online' for Vocational Teachers: Visualisation of a Competence-Based Approach in Digital Open Badge-Driven Learning", Ammattikasvatuksen aikakauskirja 20 No. 2 (2018): 13–29.

34 Mark Aberdour, "Transforming Workplace Learning Culture with Digital Badges", in Foundation of Digital Badges and Micro-Credentials: Demonstrating and Recognizing Knowledge and Competencies, ed. Dirk Ifenthaler et al., 203–219 (Springer, 2016).

35 More information is available at https://www.unionlearn.org.uk/apprenticeship-badge.

Box 54 Employers develop internal badge systems

In the United Kingdom, the National Health Service ran **Open Badge pilot programmes** in two of their regional organizations and involved staff in sharing informal and formal learning activity data, as well as reflective statements, in an xAPI Learning Record Store. To achieve a badge award, employers had to undertake a formal learning course.

In some cases, badge systems have been coordinated at the national level with the cooperation of employers' associations or trade unions (see box 55), which, inter alia, helps to ensure a higher comparability of badge certification across programmes, both nationally and internationally.[36]

Box 55 A US manufacturing employers' association develops a national badge system

The Manufacturing Institute in the United States built the National Manufacturing Badge System,[37] recognizing the wide range of skills, competencies, capacities, qualities and achievements that students and workers need to be successful in today's advanced manufacturing workplace and which they acquire through their participation in a limited number of world-class youth- and worker-development organizations partnered with the institute. The National Manufacturing Badge System and the badges it supports will supplement formal learning requirements and pathways and will give individuals an additional platform (based online) to instantly convey to employers what they know and what skills and experiences they bring to the table.

As discussed in section 9.3, an important issue for national authorities is whether and how digital badges might be incorporated into state-regulated qualification systems, which provide a guarantee of quality. Striking agreements and forging partnerships with existing providers to enable existing digital badges to be integrated into apprenticeships offers a promising way forward, which has already been seized upon in some countries (see the example from Ireland in box 50, section 9.3). More generally, and where national structures and processes allow, publicly funded providers can embed professional digital badges delivered by externally recognized institutions into apprenticeships[38] or include them as "add-ons" so that they are not part of the mainstream programme but enable wider skills to be acknowledged.

▶ 10.4 Engaging enterprises and potential learners

Digital technologies can support the engagement of both enterprises and learners. Online portals can be used to register both groups, offering improvements in cost-effectiveness over paper-based methods. They can also offer enhancements. For

Digital solutions can not only provide effective platforms for registration but can help engage and recruit apprentices and employers

36 Jonathan Finkelstein et al., 2013. The Potential and Value of Using Digital Badges for Adult Learners: Final Report (Washington DC: American Institutes for Research, 2013).

37 For more information, see Manufacturing Institute: Badges for Informal Learning and Experiences (DML Reaearch Hub).

38 Holly Zanville et al., Report on Phase I Study: Embedding Industry and Professional Certifications Within Higher Education, Corporation for a Skilled Workforce (Indianapolis: Lumina Foundation, 2017).

instance, online portals can provide tools to support enterprises in assessing their eligibility to provide apprenticeship training and calculating the return on their investment.[39] They can enable apprentices to gauge the availability of apprenticeship places. By bringing enterprises and apprentices together, they can also provide a centralized platform for matching apprenticeship supply and demand (see box 56). AI is increasingly being explored as a way of supporting job applications, with potential application to apprenticeships; for example, systems can enable the filtering of applications, consulting candidates at the data collection stage through chatbots as well as conducting digital interviews.[40] However, there are important challenges to be tackled, such as issues of data privacy and the use of selection algorithms, which can unintentionally reinforce social stereotyping.[41]

Box 56 India's comprehensive online portal for apprenticeships

India has a comprehensive online portal covering elements of the entire apprenticeship process. Apprentices, enterprises, intermediaries, basic training providers and third party aggregators[42] can register on the platform. Enterprises can select apprentices and register apprenticeship agreements through the portal. Apprenticeship candidates and enterprises can access information on available apprenticeship opportunities and applications by parameters such as state, district, sector and trade, organization and qualification. Enterprises can also submit claims for national subsidies. Grievances from both apprentices and establishments can also be logged. Apprentices can also check the results of their final assessment and obtain their e-certificates.

Digital technologies can also be used to help potential apprentices develop a better understanding of the opportunities provided by apprenticeships: for example, by attending webinars with employers;[43] watching videos where former apprentices tell their educational and career stories; and actively exploring their future workplaces through virtual reality (VR) and 360-degree video experiences (see box 57).[44]

Box 57 Using virtual reality to give would-be apprentices a taste of construction

In Switzerland, the Valais Association of Master Builders and the HES-SO Valais-Wallis University of Applied Sciences are using immersion and **VR** to counteract the lack of young talent in the construction industry. Using **VR glasses,** young people can immerse themselves in the day-to-day work of various construction professions, choosing from more than a dozen **360-degree videos**. These were conceived and filmed in collaboration with the professional associations involved in the Valais canton. The films show various typical work situations of a particular profession. One of the videos begins in a metal construction workshop, where workers cut and weld metal components.[45]

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39 More information is available at https://nationalapprenticeship.org/roi.

40 Patrick van Esch et al., "Marketing AI Recruitment: The Next Phase in Job Application and Selection", Computers in Human Behavior 90 (2019): 215–222.

41 J. Stewart Black and Patrick van Esch, "AI-Enabled Recruiting: What Is It and How Should a Manager Use It?", Business Horizons 63, No. 2 (2020): 215–226.

42 For further information, see https://apprenticeshipindia.org.

43 Peter Chatterton and Geoff Rebbeck, Report: Technology for Employability: Study into the Role of Technology in Developing Student Employability (Bristol: JISC, 2015).

44 Fathima Assilmia et al., "IN360: A 360-Degree-Video Platform to Change Students Preconceived Notions on Their Career", in Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems (2017), 2359–2365; Pia Spangenberger and Sarah-Christin Freytag, "Career Choice of Adolescents: Can Occupational VR 360-Degree Videos Facilitate Job Interest?", in Proceedings of the 12th International Conference on Computer Supported Education (CSEDU 2020), 552–558 (Science and Technology Publications, 2020).

45 More information is available at https://www.hevs.ch/en/projects/my-virtual-house-23343.

10.5 Improving learning through innovative technologies

Apprenticeships provide opportunities to get hands-on experience of businesses' latest digital solutions and innovations in diverse work settings, which are out of reach for students in general education`v

A range of developments have taken place in recent decades which have caused an expansion in digital and now online learning, changing how people learn and offering new learning experiences. **OERs** – perhaps most famously **Massive Open Online Courses (MOOCs)** – were developed originally outside apprenticeships, but they have enormous potential to be tailored to workplace needs, including apprenticeships, to satisfy demand for anytime-anywhere learning.[46] In addition, we have seen a parallel explosion in technology deployment in workplaces, which means that apprenticeships are, of all the sectors of education and training, uniquely positioned to give learners experiences that employ the latest technologies being used in the private sector.

There is now an enormous range of digital learning tools available, from smartphone apps to the latest augmented reality (AR) headsets and software. In this section, we focus on what can be seen as the next wave of developments, but this is not to overlook the other – and currently more pervasive – types of e-learning. Indeed, digital learning that is "lo-tech" compared to the latest developments has just as vital a role to play in many contexts, as box 58 demonstrates.

Box 58 Open Educational Resources to improve agricultural practices in poor rural communities

Digital Green is a global development organization sponsored by the Bill & Melinda Gates Foundation, UK Aid and US Aid that empowers smallholder farmers to lift themselves out of poverty by harnessing the collective power of technology and grassroots-level partnerships. Digital Green joins forces with governments, private agencies and rural communities to co-create digital solutions to improve agricultural practices in **India**, **Ethiopia** and **Nigeria**. Partners and communities have produced more than 6,000 locally relevant videos[47] in 54 languages with Creative Common Licenses about productive farming, health and conservation practices. These videos are used by trainers to effectively support evidence-based agricultural practices. In **Ethiopia**, the community video approach has been incorporated into the country's National Agricultural Extension Strategy, allowing it to reach over 420,000 farmers.

OERs were given a major boost by the pandemic. But even before the pandemic, OERs were being promoted worldwide because of their potential to enhance collaboration and networking,[48] meet the needs of learners with diverse requirements and preferences (for example, learners with disabilities),[49]

46 ILO, Draft Report on MOOC on Quality Apprenticeships: Key Challenges and Innovative Solutions in the Context of the Future of Work and the COVID-19 Pandemic, forthcoming.

47 See https://www.youtube.com/user/digitalgreenorg.

48 Lisa Tappeiner et al., "Expanding Access to Education through Open Educational Resources (OERs)", in Developing Educational Technology at an Urban Community College, ed. Kate S. Wolfe et al., 135–146 (Springer, 2019).

49 Xiangling Zhang et al., 2020. "Accessibility Within Open Educational Resources and Practices for Disabled Learners", Smart Learning Environments 7, No. 1 (2020): 1–19.

help teachers and trainers save time when preparing learning materials,[50] achieve learning outcomes comparable to studying traditional textbooks[51] and empower learners as co-producers on their lifelong learning paths.[52]

However, there is an uneven pattern of OER projects and programmes in TVET and apprenticeship and a lack of skills relating to OER constrains trainers' and teachers' ability to adopt and use OER to improve their pedagogical practices and learning outcomes for apprentices.[53] Key skills for OER adoption by teachers and trainers, which are often poorly developed, include searching and selecting (for example, using specific OER repositories); creating, adapting and modifying; and managing, protecting and sharing (for example, choosing the proper creative commons licence).[54]

Digital solutions are not just for the rich. Technological solutions to support apprenticeships range from highly accessible and low-cost digital tools (for example, videos and mobile phone apps) to high-end solutions (such as head-mounted AR and wearable technologies)

On the learners' side, accessing OERs requires learners to have a high level of self-regulating skills.[55] In order to develop a higher level of engagement with OERs, attention has shifted from content-delivery approaches, which focus on educational resources, to more practice-centred ones (for example, Open Educational Practices (OEPs)), which foster collaboration between learners and teachers for creating and sharing knowledge.[56] OEPs engage learners in creating and revising OERs, thus contributing to the learning of learners who come after them.

Additional challenges related to OERs in apprenticeships include sustainability (creators generally do not receive any type of payment for their OER, so incentives for updating are limited), the dominance of the English language (limiting their use in non-native English contexts) and their tendency to be used in VET schools rather than in the workplace.

Apprenticeships can be fertile ground for the development and implementation of types of technologies that further enhance the experiential aspects of learning. Notable examples include video-annotation technology and simulations involving AR and VR.

Video annotation is a feature provided by some hyper-video platforms that can be used to enhance the process ``of reflection by learners, such as apprentices. Reflection is essential for professional competence development in every profession and teachers and trainers can use the annotation of videos, perhaps shot by the apprentices themselves during a particular activity, to

Video annotation facilitates the apprentices' reflection on real or simulated workplace practices and enriches workplace experiences

50 Leigh Blackall and Bronwyn Hegarty, Open Education Practices: A User Guide for Organisations and Individuals (Wikibooks, 2012).

51 John Hilton, "Open Educational Resources and College Textbook Choices", Educational Technology Research and Development 64, No. 4 (2016): 573–590.

52 Ulf-Daniel Ehlers, "Extending the Territory: From Open Educational Resources to Open Educational Practices", Journal of Open, Flexible and Distance Learning 15, No. 2 (2011): 1–10.

53 Robert Schuwer and Ben Janssen, Open Educational Resources in Technical and Vocational Education and Training (Bonn: UNESCO-UNEVOC, 2018).

54 Christine Redecker and Yves Punie, European Framework for the Digital Competence of Educators: DigCompEdu (Luxembourg: Publications Office of the European Union, 2017); Max Ehlers et al., OER in TVET: Open Educational Resources for Skills Development (Bonn: UNESCO-UNEVOC, 2018).

55 Dongho Kim et al., "Exploring Student and Teacher Usage Patterns Associated with Student Attrition in an Open Educational Resource-Supported Online Learning Platform", Computers & Education 156 (2020).

56 Catherine Cronin, "Openness and Praxis", International Review of Research in Open and Distributed Learning: IRRODL 18, No. 5 (2017): 15–34.

support apprentices' reflection on professional practices at work, by connecting implicit and procedural knowledge with theoretical knowledge.[57] Video annotation facilitates individual reflection on real or simulated workplace practices and helps users to understand which elements of practices are important or controversial and to add theoretical knowledge to workplace experiences. Hyper-video platforms can be used for both individual and collaborative (group) annotation (see box 59 and Case Study 18 on the e-Dap mobile learning solution in Switzerland).[58]

Box 59 Video annotation to stimulate reflection-on-action in apprenticeship training of care and health professionals in Switzerland

Video, and more specifically hyper-video, is used to stimulate reflection on professional practice in the apprenticeship training of care and health professionals in Switzerland. Videos are used to record the apprentices' relevant procedures (for example, the most difficult or the most important in performing a specific task). The video material is then imported into iVideo.education, a digital platform specifically designed to turn simple videos into hyper-videos for professional training purposes. iVideo allows the trainers to highlight critical incidents within the video, for instance by adding simple animations like active points to stimulate apprentice reflection. Moreover, apprentices and their teachers can insert comments into specific video time frames (so called video annotations), allowing more detailed and focused feedback from the supervisors.[59] Apprentices are also asked to design hyper-videos as a learning resource for their peers. This method produced positive effects on the acquisition of theoretical knowledge, compared to learning in a traditional classroom setting.[60]

57 Note-taking specifically enhances reorganization, elaboration and recall, and it enables the learner to better connect the new information with prior knowledge (Erhan Delen et al., "Effects of Interactivity and Instructional Scaffolding on Learning", Computers & Education 78, No. 3 (2014): 312–320; Xiangming Mu, "Towards Effective Video Annotation", Computers & Education 55, No. 4 (2010): 1752–1763), as well as supporting analysis and reflexivity (Meg Colasante, "Using Video Annotation to Reflect On and Evaluate Physical Education Pre-service Teaching Practice", Australasian Journal of Educational Technology 27, No. 1 (2011); Peter Rich and Michael Hannafin, "Video Annotation Tools", Journal of Teacher Education 60, No. 1 (2009): 52–67; Tonya Tripp and Peter Rich, "The Influence of Video Analysis on the Process of Teacher Change", Teaching and Teacher Education 28, No. 5 (2012): 728–739). See also Alberto Cattaneo and Elisa Motta, "'I Reflect, Therefore I Am ... A Good Professional'", Vocations and Learning 14, No. 2 (2021): 185–204; Alberto Cattaneo et al., "Evaluating a Mobile and Online System for Apprentices' Learning Documentation in Vocational Education", International Journal of Mobile and Blended Learning (IJMBL) 7, No. 3 (2015): 40–58; Marco Perini et al., "Using Hypervideo to Support Undergraduate Students' Reflection on Work Practices", International Journal of Educational Technology in Higher Education 16, No. 1 (2019).

58 Individual video annotation allows the integration of notes into video-based artefacts while watching them (Meg Colasante, "Using Video Annotation to Reflect on and Evaluate Physical Education Pre-Service Teaching Practice", Australasian Journal of Educational Technology 27, No. 1 (2011): 66–88). Some hyper-video platforms give users the option to generate a PDF file, which collates all the notes taken with the corresponding frames that they refer to (Alberto Cattaneo et al., "Scuolavisione: Teaching and Learning with Hypervideo in the Swiss Vocational System", Journal of e-Learning and Knowledge Society 11, No. 2 (2015): 27–47).

59 Collaborative video annotation allows multiple users to annotate the same video (Robert Hulsman and Jane van der Vloodt, "Self-Evaluation and Peer-Feedback of Medical Students' Communication Skills Using a Web-Based Video Annotation System", Patient Education and Counseling 98, No. 3 (2015): 356–363) or to share the annotations in a group-learning environment with online sessions or blog-like interfaces.

60 For more information, see Florinda Sauli et al., "Hypervideo for Educational Purposes", Technology, Pedagogy and Education 27, No. 1 (2018): 115–134; Alessia Evi-Colombo et al., "Technical and Pedagogical Affordances of Video Annotation", Journal of Educational Multimedia and Hypermedia 29, No. 3 (2020): 193–226; Alberto Cattaneo and Florinda Sauli, Integrating Interactive Video in a Learning Scenario (Lugano: SFIVET, 2017); Alberto Cattaneo et al., "Teaching and Learning with Hypervideo in Vocational Education and Training", Journal of Educational Multimedia and Hypermedia 25, No. 1 (2016): 5–35; "An Empirical Test of Three Instructional Scenarios for Hypervideo Use in a Vocational Education Lesson", Computers in the Schools 35, No. 4 (2018): 249–267; "A Model for Designing Hypervideo-Based Instructional Scenarios", Interactive Learning Environments 27, No. 4 (2019): 508–529; "Take a Look at This! Video Annotation as a Means to Foster Evidence-Based and Reflective External and Self-Given Feedback", Nurse Education in Practice 44 (2020).

Simulations outside workplaces (for example, in intercompany courses and VET schools) can be carried out in both physical spaces through the support of digital technologies (for example, apprentices can simulate, video record and analyse a consultancy interview in class) and in virtual environments accessed through a screen (for example, laptop, desktop, tablet or smartphone) or through head-mounted displays (immersive VR).[61] Simulations have long been known to make theoretical knowledge more relevant and facilitate making sense of practical situations in the workplace, as well as offering a range of other benefits (see box 60). Such benefits include enabling more realistic practical experiences, which otherwise would not be possible for reasons of cost or lack of workplace access (including in situations such as during the COVID-19 pandemic, when physical learning became impossible), allowing activities to be repeated more quickly and with less supervision, enabling apprentices to access training at their convenience and with less risk of injury (see also Case Study 19 on haptic simulators in India).[62]

Recent developments, however, have taken a further step forward. **Immersive 3D VR environments,** for example, have been found to outperform desktop or table VR experiences because learners have a heightened sense of presence in the immersive VR experience.[63]

Box 60 VR application for simulating professional practice training

GardenVR[64] is an Immersive 3D VR experience which allows apprentices to practise and develop their designing skills by designing a garden and exploring it in an immersive environment. Developed by the Swiss Federal Institute of Technology Lausanne (EPFL) within the context of the project DUAL-T,[65] GardenVR was used by gardener apprentices in Swiss VET schools. In the design mode, the learners are given the top view of the garden and they can place objects, such as trees, in the garden. In the explore mode, learners can instead explore the garden by walking through it in a 360-degree 3D environment. These options allow them to experiment with different solutions before completing their garden. For instance, they can plant a tree, observe the consequences and undo the action. Moreover, learners can fast-forward time to visualize the evolution of the garden. It was found that GardenVR clearly supports the development of apprentices' design skills.[66]

The project **VR and Mixed Reality Assessment for Plumbers** is an initiative developed by GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) in partnership with the **Institute of Plumbing South**

61 See Bibeg Hang Limbu et al., "Using Sensors and Augmented Reality to Train Apprentices Using Recorded Expert Performance", Educational Research Review 25 (2018): 1–22 and Daniel Carruth, "Virtual Reality for Education and Workforce Training", 15th International Conference on Emerging eLearning Technologies and Applications (2017). See Raija Hämäläinen and Alberto Cattaneo, "New TEL Environments for Vocational Education: Teacher's Instructional Perspective", Vocations and Learning 8, No. 2 (2015): 135–157.

62 See Bibeg Hang Limbu et al., "Using Sensors and Augmented Reality to Train Apprentices Using Recorded Expert Performance", Educational Research Review 25 (2018): 1–22 and Daniel Carruth, "Virtual Reality for Education and Workforce Training", 15th International Conference on Emerging eLearning Technologies and Applications (2017).

63 See AKBG Bharathi and Conrad Tucker, "Investigating the Impact of Interactive Immersive Virtual Reality Environments in Enhancing Task Performance in Online Engineering Design Activities", ASME 2015 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (2015) and Max North and Sarah North, "A Comparative Study of Sense of Presence of Traditional Virtual Reality and Immersive Environments", Australasian Journal of Information Systems 20 (2016). The immersive 3D VR experience can be further enhanced in different ways:

- by introducing gamification elements into the experience (David Checa and Andres Bustillo, A Review of Immersive Virtual Reality Serious Games to Enhance Learning and Training", Multimedia Tools and Applications 79, No. 9 (2020): 5501–5527);
- by integrating the immersive VR experience with sensorial feedback by, for example, using haptic simulators (Damian Grajewski et al., "Immersive and Haptic Educational Simulations of Assembly Workplace Conditions", Procedia Computer Science 75 (2015): 359–368, see also Case Study 19);
- by integrating virtual agents to provide feedback during the immersive experience (Zhenjie Zhao and Xiaojuan Ma, "Designing an Artificial Agent for Cognitive Apprenticeship Learning of Elevator Pitch in Virtual Reality", IEEE Transactions on Cognitive and Developmental Systems, 2021).

64 See https://www.youtube.com/watch?v=ivgi1b8IS7A.

65 EPFL, "Leading House Dual-T: Technologies for Vocational Training".

66 Kevin Gonyop Kim et al., "Using Immersive Virtual Reality to Support Designing Skills in Vocational Education", British Journal of Educational Technology 51, No. 6 (2020): 2199–2213.

Africa (IOPSA).[67] Apprentices in plumbing are offered the opportunity to experience a VR construction site as well as simulations with the aid of a digitized 3D virtual construction site. The VR house offers a virtual world environment with activities designed according to the principles of problem-based learning methodology. In addition to solving interdisciplinary professional and work-related problems, the virtual house forces participants to interact, with other participants, within a digital interface. Common topics, such as hot water preparation, earthing of metal piping and rainwater harvesting, have to be performed digitally within this virtual environment.

AR, which overlays the physical world with virtual content to create an immersive platform that places the trainee in a real-world context, engaging all their senses, has been shown to be particularly effective to support and scaffold procedures within real workplaces (see box 61).[68] AR smart glasses seem to be the most promising type of AR device for workplace learning because apprentices can manipulate objects and execute tasks without any impediment.

Digital solutions (for example, AR or VR, simulations) can both expand experiential learning of apprentices and compensate for it in the event that it is not viable (for example, due to missing resources or a pandemic)

Box 61 Applications for AR in work-based learning

EON Reality, a company providing AR and VR solutions for academic and industry training, has created a marker-based handheld AR application called **LKDF Interact for Volvo's Selam Vocational Training Centre** in **Ethiopia**. The app teaches the basics of diesel engine maintenance through hands-on learning using a **gamified** AR experience. By letting the learner experience the subject and by directly showing rather than telling, AR learning overcomes literacy and language barriers.[69]

A marker-based handheld mobile AR application named **Paint-cAR** has been developed for supporting the learning process of repairing paintwork on a car in the context of a vocational training programme of car maintenance in Spain. Repairing car paintwork is a complex process that involves a sequence of multiple steps and the use of many chemical products and tools. Results of a preliminary evaluation revealed that, by using the app, apprentices improved their attention during the procedure and felt more self-confident in executing it.[70]

The latest AR systems can communicate with various **sensors** (cameras, pressure sensors, eye-trackers) in real time, which can offer an even broader range of training affordances.[71] **Sensor-based AR training** environments can support apprentices by providing personalized guidance and feedback when company tutors are not available or in remote-working scenarios.[72]

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67 See https://www.iopsa.org/.

68 Examples that have been evaluated by researchers include carpentry (Lee et al., 2019), maintenance (Riccardo Palmarini et al., "A Systematic Review of Augmented Reality Applications in Maintenance", Robotics and Computer- Integrated Manufacturing 49 (2018): 215–228), assembly (Xiangyu Wang et al., "A Comprehensive Survey of Augmented Reality Assembly Research", Advances in Manufacturing 4, No. 1 (2016): 1–22), nursing (Hanna Wüller et al., "A Scoping Review of Augmented Reality in Nursing", BMC Nursing 18, No. 1 (2019): 1–11) and agriculture (Mingze Xi et al., "Future Agriculture Farm Management Using Augmented Reality", 2018 IEEE Workshop on Augmented and Virtual Realities for Good (VAR4Good), 1–3, 2018). See also Jorge Luis Bacca-Acosta et al., "Augmented Reality Trends in Education", Journal of Educational Technology and Society 17, No. 4 (2014): 133–149.

69 See https://eonreality.com/use-case/formation-ar-maintenance-du-moteur/?lang=fr.

70 Jorge Luis Bacca-Acosta et al., "Mobile Augmented Reality in Vocational Education and Training", Procedia Computer Science 75 (2015): 49–58.

71 Bibeg Limbu et al., "WEKIT.one: A Sensor-Based Augmented Reality System for Expérience Capture and Re-Enactment", European Conference on Technology Enhanced Learning (2019), 158–171.

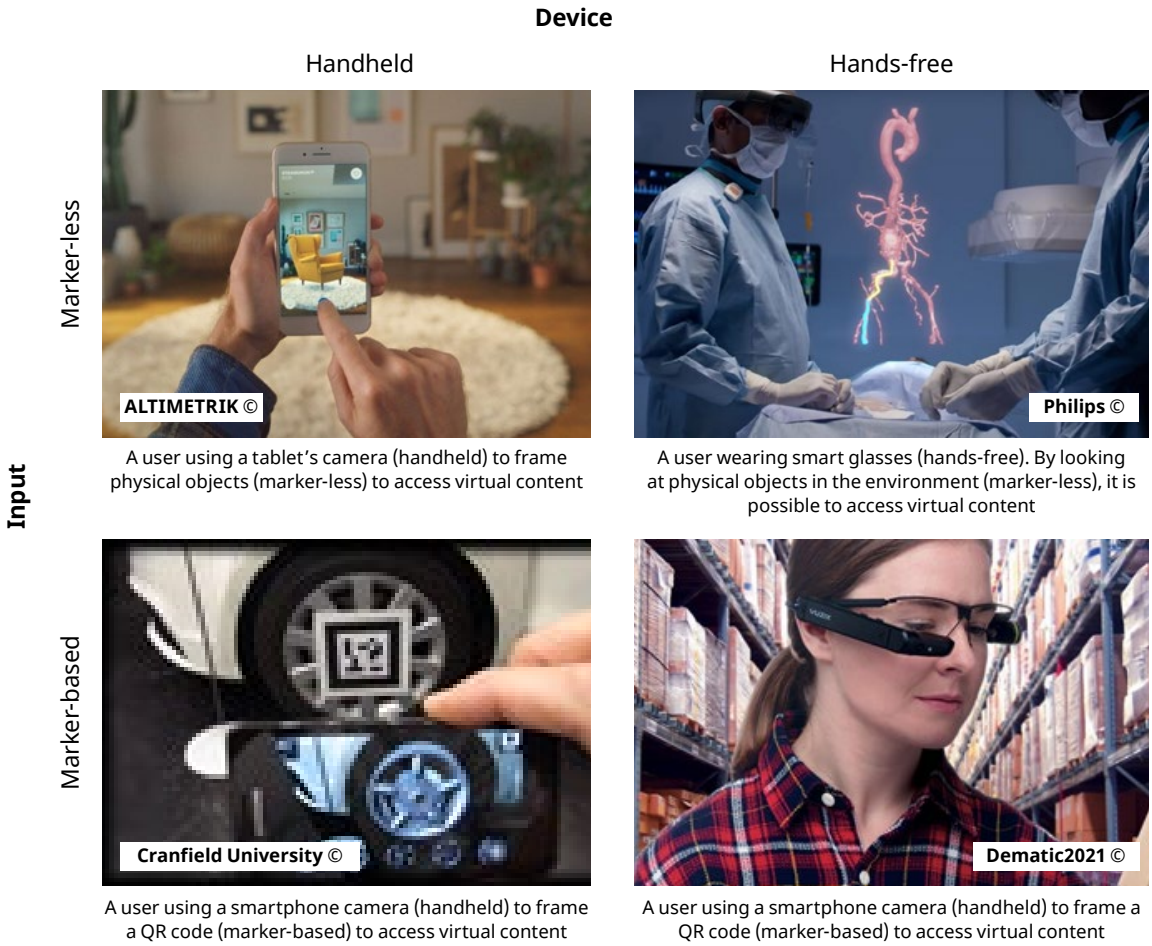
72 Bertrand Schneider et al., "Benefits of a Tangible Interface for Collaborative Learning and Interaction", IEEE Transactions on Learning Technologies 4, No. 3 (2010): 222–232; Limbu et al., 2018.

While AR/VR systems can appear complex and costly, in fact they span a range from the less costly/simpler technological infrastructure (which uses handheld devices and is based on "markers"[73]) to the most advanced implementation in terms of both hardware and software development, as illustrated in figure 6. This range makes the latest technologies highly scalable.

Technological assisted pedagogical approaches are scalable. They range from highly personalized practices (such as assistive technologies, recording and commenting apprentices' professional practices) to mass solutions (for example, MOOCs, OERs)

The focus here has been on the latest tech, which is evidently "hi-tech". This is not to ignore the other types of technology. As has been noted, "lo-tech, hi-tech and no tech" all have a place in education,[74] and AR applications can be available on smartphones, making the technology much more accessible.[75] What teachers and trainers do with the technology matters as much as the technology itself; they remain indispensable – a point we return to later.

Figure 6 Different forms of augmented reality



A user using a tablet's camera (handheld) to frame physical objects (marker-less) to access virtual content

A user wearing smart glasses (hands-free). By looking at physical objects in the environment (marker-less), it is possible to access virtual content

A user using a smartphone camera (handheld) to frame a QR code (marker-based) to access virtual content

A user using a smartphone camera (handheld) to frame a QR code (marker-based) to access virtual content

73 Some AR relies on markers such as barcodes or QR codes placed in the physical environment, which are captured by a camera, thus creating an AR experience (Pedro Quelhas Brito and Jasmina Stoyanova, "Marker Versus Markerless Augmented Reality: Which Has More Impact on Users?", International Journal of Human–Computer Interaction 34, No. 9 (2018): 819–833). Devices that do not use markers place virtual 3D objects in the real, physical environment, depending on the environment's real features rather than identifying markers.

74 Ashwani Aggarwal, presentation on Global survey on the impact of COVID 19

on skilling, upskilling and reskilling of employees, apprentices and interns in enterprises, 2021.

75 Currently, approximately half of the world's total population owns a smartphone device (Statista, "Number of Smartphones Sold to End Users Worldwide From 2007 to 2021", 2021).

Technology is also bringing about changes in how to capture and present evidence of achievement in apprenticeships as a means of supporting all forms of **assessment**, whether informal or formal, formative or summative, and also as a tool for certification. Tools such as **e-portfolios** have been around for some time, enabling learners to capture pictures, videos and any other digital artefacts to "present" to a selected audience as evidence of their learning and/or ability.[76] Such tools are especially valuable in apprenticeships where learning is conducted across different learning settings. However, recent advances in learning analytics, along with the growth of digital badges, have the potential to bring about a step change in the efficiency and effectiveness of assessment, and the ability to respond to continuing and rapid changes in skills in the workplace (see box 62).

Box 62 Computerized competence-based summative assessment

With the ASCOT+ project, Germany's Federal Ministry for Education and Research is supporting the development of digital training and assessment for vocational skills Technology is also bringing about changes in how to capture and present evidence of achievement in apprenticeships as a means of supporting all forms of assessment, whether informal or formal, formative or summative, and also as a tool for certification. Tools such as e-portfolios have been around for some time, enabling learners to capture pictures, videos and any other digital artefacts to "present" to a selected audience as evidence of their learning and/or ability.[77] Such tools are especially valuable in apprenticeships where learning is conducted across different learning settings. However, recent advances in learning analytics, along with the growth of digital badges, have the to potential to bring about a step change in the efficiency and effectiveness of assessment, and the ability to respond to continuing and rapid changes in skills in the workplace (see box 62).

in different domains (from car mechatronics to socio-emotional skills in nursing). In addition to digital training units using videos and simulations, the project is developing assessments that will be used as exams to certify apprentices' skills. For example, an office simulation[77] is being developed that fosters the problem-solving competence of trainees in the occupations of industrial clerks and office management clerks, recording their trouble-shooting performances. To this end, authentic problem scenarios are developed for processing within the office simulation. The software deployed makes use of several innovative technologies. (Partly) automated procedures for the evaluation of written responses are being put into place to efficiently assess the test results of large groups of participants. The software also analyses the problem-solving competence of learners in real time and uses these log data analyses as a basis for providing individualized support.

76 Aikaterini Alexiou and Fotini Paraskeva, "Enhancing Self-Regulated Learning Skills Through the Implementation of an e-Portfolio Tool", Procedia – Social and Behavioral Sciences 2, No. 2 (2010): 3048–3054.

77 More information is available at https://www.ascot-TVET.net/ascot/en/ascot-projects/psa-sim/psa-sim.html?nn=221388.

10.6 Enhancing the coordination and management of learning

The proliferation of digital tools and the extension of technology in new ways into areas such as learning, assessment and certification raise important issues around how to manage and coordinate education and training systems that are likely to become increasingly complex – particularly as the demand for upskilling and reskilling continues to rise.

Technology can support the management of the acquisition of different kinds of knowledge and practices in different learning contexts, which will be an increasing feature of learning and work

Complexity is an inherent feature of apprenticeships, where a central challenge has always been how to **manage the boundary between more educational contexts (for example, VET schools) and the professional contexts of workplaces.** On the one hand, when "crossing the borders" between learning environments, apprentices can perceive discontinuities and, consequently, struggle to connect what they learn in formal and professional learning contexts.[78] On the other hand, if properly accompanied and guided, perceived contradictions between knowledge, practices and values can be vital forces for change, learning and development[79] (see also Case Study 18).

One model for how to deal with these issues, which seeks to create spaces for reflective practices in VET educational systems through the support of digital technologies, is the *Erfahrraum* model,[80] which is a technology-enhanced pedagogical model for supporting students' learning at the borders between vocational learning locations. According to the model, when adequately exploited, technologies can provide a specific space to reflect upon apprentices' professional experiences, thus supporting learning and professional development. Another practical solution is the REALTO platform, detailed in box 63.

Box 63 Learning management systems for apprenticeship training

The **REALTO platform**[81] aims to achieve better integration between schools and workplaces by using a combination of mobile devices and an online learning environment. Apprenticeships can suffer from fragmentation, such that knowledge acquired in one learning context is not applied in another. Developed by the Swiss Leading House DUAL-T,[82] the app enables theoretical knowledge acquired at school to become more understandable and relevant by connecting it to specific examples of workplace experiences; and experiences from the workplace can be used to build connections to knowledge learned in the school context. For example, teachers can get apprentices to collect photos in the workplace about a certain topic so that their practical examples can be used to illustrate abstract concepts back at school. Moreover, apprentices can interact with peers in a social network environment (based on posts, comments, messages, likes and sharing), manipulate images through annotations, overlay and grouping and create workplace-oriented customizable learning journals (Learning Documentations).

78 Ingrid Berglund and Ingrid Henning Loeb, "Renaissance or a Backward Step? Disparities and Tensions in Two New Swedish Pathways in VET", International Journal of Training Research 11, No. 2 (2013): 135–149; Nina Kilbrink and Veronica Bjurulf, "Transfer of Knowledge in Technical Vocational Education: A Narrative Study in Swedish Upper Secondary School", International Journal of Technology and Design Education 23, No. 3 (2013): 519–535.

79 Knud Illeris, The Fundamentals of Workplace Learning: Understanding How People Learn in Working Life (Routledge, 2011); Yrjö Engeström, Learning by Expanding (Cambridge University Press, 2015).

80 Beat Schwendimann et al., "The 'Erfahrraum': A Pedagogical Model for Designing Educational Technologies in Dual Vocational Systems", Journal of Vocational Education & Training 67, No. 3 (2015): 367–396.

81 See https://www.epfl.ch/labs/chili/dualt/current-projects/realto/.

82 Leading Houses contribute to the sustainable development of VET research in Switzerland. Coordinated by one or more Swiss university insititutes, each Leading House serves as a competence network and conducts research under the terms of a service-level agreement with the State Secretariat for Education, Research and Innovation (SERI). The DUAL-T Leading House examines how technologies meet the specific needs of dual-track VET programmes.

Digital Learning Management Systems (LMSs) enable instructors to plan, implement, manage, monitor and assess whole learning processes[83] as well as supporting administration and communication associated with teaching and learning, and sometimes also providing students with the ability to use interactive features, such as threaded discussions, video conferencing and discussion forums. Despite LMSs having been in existence for many years, to date they have tended to be used to support school-based tracks and have lacked effective integration of work-based tracks. Companies sometimes have their own LMSs and there have been some preliminary attempts to integrate VET schools' and companies' LMSs.[84]

Infrastructures are needed which allow coordination and management of all the different elements of learning and which take specific account of the most recent developments, like blockchain and learning analytics

The need to improve coordination and management is likely to increase in the coming years. There is likely to be a growing challenge related to how to integrate the different tools and platforms that are becoming available so as to fully realize their benefits. For example, VR experiences could be integrated within LMSs[85] and digital badge systems could rely on the same data used by learning analytics (LA) systems and integrate certifications acquired in external contexts during or before the beginning of apprenticeship programmes.[86] More broadly, LMSs, badge and LA systems could be integrated into systems of communication between school and workplace platforms, using blockchain technologies (see box 64).[87] And at the level of overall system management, LA systems could be designed to provide data on the effectiveness of apprenticeship programmes, using the learner data automatically stored in LMS systems at school and workplace levels.

Box 64 Learning management systems promoted by the federal authority in the United States

Persona is an LMS that serves organizations with formalized apprenticeship programmes regulated by the US Department of Labor.[88] Persona has worked with many of the American Federation of Labor and Congress of Industrial Organizations to help formalize their online training ecosystems within their 4- or 5-year apprenticeship programmes, as well as their journeymen continuing education series. As an example, Persona Learning developed a system for the Boilermakers National Apprenticeship Program in conjunction with the Construction Sector Operations Division of the K-Learning Group.[89]

83 Nor Aziah Alias and Ahmad Marzuki Zainuddin, "Innovation for Better Teaching and Learning: Adopting the Learning Management System", Malaysian Online Journal of Instructional Technology 2, No. 2 (2005): 27-40.

84 See, for example, Patrick Ocheja et al., "Connecting Decentralized Learning Records: A Blockchain-Based Learning Analytics Platform", Proceedings of the 8th International Conference on Learning Analytics and Knowledge (2018), 265–269.

85 Zuzana Palkova and Ioannis Hatzilygeroudis, "Virtual Reality and Its Applications in Vocational Education and Training", in Handbook of Mobile Teaching and Learning, ed. Yu (Aimee) Zhang and Dean Cristol (Singapore: Springer, 2019), 1245–1274.

86 Aberdour, 2016; Zanville et al., 2017.

87 Qin Liu et al., "Education–Industry Cooperative System Based on Blockchain", 1st IEEE International Conference on Hot Information-Centric Networking (IEEE, 2018), 207–211; Ocheja et al., 2018.

88 See https://www.personalearning.com/apprenticeships-lms/.

89 More information is available at https://www.personalearning.com/boilermakers-national-apprenticeship-program-launches-cutting-edge-training-program/.

10.7 Supporting the follow-up to apprenticeships

Digital technologies have the potential to support both individual apprentices and the stakeholders involved in apprenticeship provision once an apprenticeship is complete. Regarding **the progression choices of individual apprentices,** they often receive support to help them into work or higher study from, for example, employment services, which assist with searching for employment or further study possibilities, CV writing and job interview skills. Digital technologies can help in such processes, including through the use of professional social media (such as LinkedIn) or the use of artificial agents and bots, which can provide individualized counselling based on information provided by the apprentices (see box 65).

Box 65 How artificial agents can support career counselling

Bob emploi[90] is a platform that provides coaching and counselling through artificial agents. An AI system based on **French** Government employment data was developed to offer free tailored support to millions of individuals who are, or will be, at risk of unemployment or underemployment. Since launching in October 2016, Bob has provided coaching to more than 150,000 jobseekers. Some 89 per cent of users say they find the advice useful or very useful, and 43 per cent of successful jobseekers considered Bob crucial to finding their job.

These kinds of applications can be cheap and easy for individuals to use and they have an inherent reliability that stems from their basis in established sources of labour-market information. However, human "intermediation" between the individual and the technology by a career guidance counsellor is important, given that data needs to be correctly interpreted. Data itself is hardly ever neutral: the choice of data provided is likely to influence decisions depending on how it, for example, defines occupations, specifies average incomes and treats issues of geography, gender, etc. As previous work has highlighted, the same type of application can produce different outcomes as a consequence of being used in an environment with different social and economic resources.[91]

Technology is also generating new ways to help stakeholders with the **monitoring and evaluation** of apprenticeships. LA concerns the measurement, collection, analysis and reporting of data about learners and their context for purposes of understanding and optimizing learning and the environment in which it occurs.[92] Educational learning platforms and tools often collect and store data on learners' activities, including their written texts, time spent within a task, navigation behaviour and so on. Increasingly, with the development of AI and machine learning, the potential for personalizing learning is growing ever more sophisticated, and the range of possible applications is expanding; for example, LA could help institutions to develop a clearer understanding of students' future employment prospects, promote better educational and vocational planning[93] and address issues like early leaving (see box 66). Some of the most recent applications are exploring how LA can be used in body-worn sensors in professional contexts.[94] In the future, LA could be used to enable comparisons between institutions with similar apprentice intakes from different regions, as well as comparisons of educational results using national standards.

90 See https://www.bob-emploi.fr/.

91 Luca Fusco et al., "Designing Meaningful Career Tools: A Proposal for an Optimal Use of Technology in Career Guidance", PSYCHOBIT (2020).

92 Rita Kop et al., "A Critical Perspective on Learning Analytics and Educational Data Mining", in The Handbook of Learning Analytics, ed. Charles Lang et al. (Society for Learning Analytics Research, 2017), 319–326.

93 John Avella et al., "Learning Analytics Methods, Benefits, and Challenges in Higher Education: A Systematic Literature Review", Online Learning 20, No. 2 (2016): 13–29.

94 Limbu et al., 2019.

Box 66 Using learning analytics to reduce dropout rates and increase retention and success rates

In **Helsinki**, Finland, an AI-based system (AI-HOKS) has been developed to help limit the risk of TVET students, including apprentices, dropping out and maximize their chances of graduating. Its goal is to identify as early as possible the circumstances and phase of learning when students are most likely to need support, and to provide automated and semi-automated support (for example, mobile coaching). To do this, the system uses information from the personal competence development plan that all students have, data on the use of tools and learning environments, weekly surveys sent to students' cell phones and student feedback.

At the same time, LA comes with challenges. There are ethical implications around the collection, analysis and use of data[95] and careful consideration needs to be given to how the mathematical algorithms that underpin LA reinforce or reshape expectations about learners, whether these be teachers', trainers' or the wider society's expectations.[96] In this context, regulatory frameworks and systems that ensure accountability and transparency will need to be developed.[97]

Furthermore, it is vital not to rely on technology alone. Indeed, it would be unwise in the extreme to place reliance solely on algorithms that are often not transparent (for reasons of commercial confidence), and which can be difficult for the layperson, including teachers and trainers, to understand. Technology should support teachers and trainers and not replace them, being used wisely so that machines and humans each play to their strengths.[98] Indeed, there is an important role to be played by specialist professionals in relation to digital learning, as the example of the Digital Facilitator in box 67 demonstrates.

"Technology can amplify great teaching, but great technology cannot replace poor teaching",

Andreas Schleicher, Directorate for Education and Skills (OECD, 2015, p. 4)

Box 67 Digital Facilitators or Animators to support digitalization of Vocational Schools

The Swiss Federal University for Vocational Education and Training has developed the skills profile of the so-called **Digital Facilitator**, a teaching professional deputed to promote the digital transformation of Swiss Vocational Schools. The **Digital Facilitator** is a teacher with advanced digital competency and strong media education competence who is an expert

Digital Facilitators or Animators are teaching professionals with teaching skills related to the integration of digital technologies and with strong media education competence. They implement digitalization projects for apprenticeship programmes and support colleagues in the use of new technologies

95 Paul Prinsloo and Sharon Slade, "Ethics and Learning Analytics: Charting the (Un)charted", in Handbook of Learning Analytics, ed. Charles Lang et al., (SoLAR, 2017), 49–57 .

96 Ben Williamson, "Coding the Biodigital Child: The Biopolitics and Pedagogic Strategies of Educational Data Science", Pedagogy, Culture & Society 24, No. 3 (2016), p. 4.

97 Paul Prinsloo and Sharon Slade, "Here Be Dragons: Mapping Student Responsibility in Learning Analytics", in Developing Effective Educational Experiences Through Learning Analytics, ed. Mark Anderson and Collette Gavan (IGI Global, 2016), 170–188.

98 See, for example, Hannah Fry, Hello World: How to be Human in the Age of the Machine (New York: W.W. Norton & Company, 2018), who demonstrates the risks of relying on algorithms, including machine learning based on "neural networks" where it is unclear how outputs or solutions are arrived at. Also note that International Labour Standard Recommendation No. 169 on employment policy encourages technological innovation, while emphasizing that technology should contribute to improving working conditions, reducing working time and avoiding job losses.

in facilitating digital innovation within educational institutions, paying particular attention to the interplay among and across learning sites.[99]

A similar profession has been created in Italy – the **Digital Animator**. Action 28 of the country's Digital School National Plan, which came into force in 2015, requires every school to have a teacher nominated as a **"Digital Animator"**, with a strategic role to promote digital skills across all levels of the school, including VET.[100]

▶ 10.8 Supporting social inclusion and participation

The application of digital technology to learning raises important questions about inclusivity. On the one hand, it can aid inclusion (as described below); on the other hand, if digital learning offers faster, more effective and/or more efficient learning (as in the examples of immersive 3D VR environments noted above), its unequal distribution could exacerbate inequalities – will those with access leap ahead in their learning, while those relying on "traditional" methods continue at a "traditional" pace?

Digital Facilitators or Animators are teaching professionals with teaching skills related to the integration of digital technologies and with strong media education competence. They implement digitalization projects for apprenticeship programmes and support colleagues in the use of new technologies

A minimum requirement is to have the appropriate infrastructure in place. However, many people do not have access to key technologies. The **"digital divide"** – the unequal distribution of digital infrastructure and equipment – is a key threat to attempts to ensure that the benefits of digital learning technologies can be fairly dispensed.[101] Ensuring connectivity and hardware availability in all localities is vital (see box 68). Partnerships between national governments, NGOs and ICT companies offer one way forward but, at a global level, we also need to find solutions to the risk of "digital colonialism", whereby dependencies are created between countries that are able to create technology and those who consume it. Ecosystems are needed that decentralize technology to reduce reliance on tech products from other countries.[102]

Box 68 Using solar energy to guarantee connectivity in remote areas

The AMMACHI Lab developed the Mobile Vocational Education (MoVE) van to provide professional training in rural villages in India.[103] The MoVE van units consist of 20 handheld touchscreen devices, a laptop server, one large display monitor, low-cost haptic devices and solar equipment, including solar panels, solar lanterns, batteries, a charge controller, an inverter and a generator for electrical back-up. Harnessing the power of solar energy allowed vocational training courses to be run even in high-risk areas during natural disasters, and in areas where power is in short supply.[104]

99 Alberto Cattaneo et al., "The 'Digital Facilitator': An Extended Profile to Manage the Digital Transformation of Swiss Vocational Schools", in Digital Transformation of Learning Organizations, ed. Dirk Ifenthaler et al. (Springer, 2021), 169–187.

100 See https://www.istruzione.it/allegati/2015/DD_50_15.pdf.

101 Wenhong Chen and Barry Wellman, "The Global Digital Divide – Within and Between Countries", IT & Society 1, No. 7 (2004): 39–45.

102 Michael Kwet, "Digital Colonialism: US Empire and the New Imperialism in the Global South", Race & Class 60, No. 4 (2019): 3–26.

103 More information is available at https://ammachilabs.org/projects/move-project/.

104 Nagarajan Akshay et al., "MoVE: Mobile Vocational Education for Rural India", 2012 IEEE International Conference on Technology-Enhanced Education (ICTEE), 1–5 (2012).

Assistive technologies have great potential to increase the inclusion of people with learning difficulties in apprenticeships

We have already seen in Chapter 9 how digital technologies can support inclusion by offering alternative forms of learning to people who are disengaged from traditional methods. They can also empower **apprentices with learning difficulties**, whether physical, cognitive, psychiatric or health-related.[105] Apprenticeships and traineeships can be key pathways for people with intellectual and learning disabilities in particular[106] because of their combination of training and education with practical work. Assistive technologies and approaches (see box 69) that can help students complete programmes include adaptive technology (i.e. alternative keyboards and mouse interfaces, scanners, screen readers and software to assist with writing and reading); accessible facilities; accessible telecommunication devices; and materials in accessible formats.[107] Technologies can also facilitate the diagnosis and remediation of some special needs (for example, dysgraphia), and help to personalize learning by identifying the knowledge needs of apprentices and providing new exercises, new curriculum units, some form of instruction or just notifying the teacher.108

Box 69 Getting assistive technology into European apprenticeships

H-CARE was an EU-funded project that addressed the specific target audience of unemployed graduate adults, employees in healthcare and sales establishments, and TVET training centres who enriched their training by offering assistive technologies to salespersons and trade companies (SMEs) in the fields of healthcare and food supplements. The project deliverables were developed based on surveys and need analysis in Austria, Bulgaria, Romania and Türkiye. The project produced an H-CARE blended TVET training programme consisting of nine training modules, including (1) trading with medical devices and assistive technologies, (2) communication and working with disabled customers and (3) apprenticeship.

▶ 10.9 Key takeaways for policy

This chapter has shown the breadth and depth of the transformations that are already taking place as a result of the application of digital technologies in apprenticeships, spanning the entire range of the apprenticeship cycle and opening up new ways of teaching and learning. As a consequence, there are many emerging examples of good digital learning practices to be found. A feature of this growing abundance is that a large share of the practices have been driven by individual institutions or partnerships. In a way, this is an inevitable reflection of the nature of innovation, where the freedom to innovate opens up space for creativity but also generates a wide range of diverse yet overlapping products – a complex and confusing environment for stakeholders in apprenticeships. In this context, it is important that **national strategies and actions** are formulated, which include:

- a **coherent vision and objectives for the digital transformation** of apprenticeships, expressing a clear understanding of the role of technology;

105 Lisa Chelkowski et al., "The Use of Mobile Devices with Students with Disabilities: A Literature Review", Preventing School Failure: Alternative Education for Children and Youth 63, No. 3 (2019): 277–295.

106 Greg Lewis et al., "Post-Course Outcomes of Apprenticeships and Traineeships for People with Disability in Western Australia", Journal of Vocational Rehabilitation 35, No. 2 (2011): 107–116.

107 Sheryl Burgstahler and Scott Bellman, "Perceived Benefits of Work-Based Learning: Differences Between High School and Postsecondary Students with Disabilities", The Asia-Pacific Journal of Inclusive Education 2, No. 1 (2005): 1–20; Errol Cocks and Stian Thoresen, Barriers and Facilitators Affecting Course Completions by Apprentices and Trainees with Disabilities (NCVER, 2013).

108 OECD, OECD Digital Education Outlook 2021: Pushing the Frontiers with Artificial Intelligence, Blockchain and Robots, 2021.

- a strategy for how to engage with the **global educational technology market** – through which many new technologies are being developed and marketed – for the benefit of all learners;
- measures for the **systematic roll-out** of technology in all areas, with appropriate **funding**;
- measures to enable the efficiency and effectiveness of new technologies for apprenticeships to be **assessed and evaluated.**

While the COVID-19 pandemic shone a light on the challenges facing us in the digital transformation of workplace learning, it also brought an awareness that technologies could not fully replace existing practices but rather could support learning under certain conditions. To achieve its full potential, digital transformation will need not just technology and research but the full engagement of teachers and trainers. It will need to complement the human role rather than replace it completely. Teachers and trainers will therefore need opportunities to develop the skills they require. Measures could include:

- ensuring that **teacher and trainer training** are integral to any strategies for digital transformation in apprenticeships;
- empowering teachers and trainers so that they are not just consumers of tech learning "products" but can **co-create materials and applications** through open source tools.

Digital technologies have the potential to close inclusion gaps, but also to open them up – at all levels. New methods can engage with disadvantaged learners or learners with disabilities in new ways but there is a risk that unequal access to hardware and software will widen the digital divide, rather than closing it, without appropriate action.

- At global level, consideration needs to be given to how **technology-poor countries** (typically developing countries) can be **empowered for the digital transformation through international support mechanisms.**
- Within countries, a fresh look needs to be taken at how to better engage **people from disadvantaged backgrounds or people with disabilities** in apprenticeships. Emerging technologies are offering new opportunities which will need appropriate planning and funding.

Case Study 18

Strengthening the links between school and workplace learning for apprentice chefs in Switzerland

Cooperation between school and workplace is a pivotal element for the success of apprenticeship training. However, apprentices often struggle to connect what they learn at school and in the workplace, also because communication between school and in-company tutors may be weak. A technological solution to this problem has been created with the **e-Dap mobile learning solution,** which allows apprentice chefs to create their own e-portfolio and recipe book. It is mandatory for Swiss apprentices to document, through a specific template, major works and achievements carried out at their training company (the so-called Learning Personal Documentation (LPD)). The in-company trainer has to discuss the LPD with the apprentice at least once every semester. Developed by the Swiss Leading House DUAL-T,[109] the e-Dap is, essentially, an electronic version of the LPD.

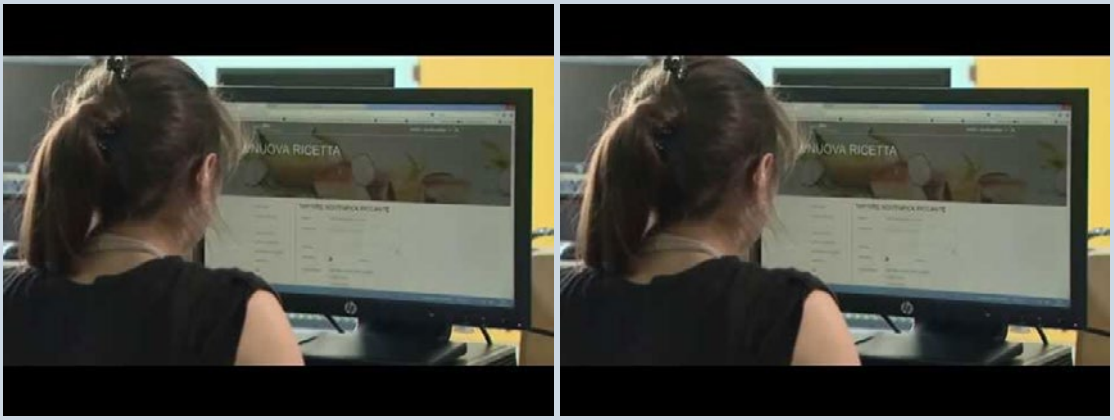
In the e-DAP, the LPD is conceived as a recipe book which can be personalized and updated by apprentices based on what they achieve in the workplace. For each recipe, apprentices can upload a

109 See note 58.

set of pictures of their professional performance, taken with a smartphone. Each recipe in the e-DAP is combined with a few prompts for the apprentices to further reflect on their professional experiences. In-company supervisors can comment on apprentices' reflections, giving contextualized and focused feedback. Apprentices can explicitly request feedback from their supervisors through a simple button click. In addition, teachers can access the apprentices' pictures and recipes and use them to design specific learning activities in the classroom.

This approach resulted in better learning outcomes for the apprentices in at least three areas – knowledge acquisition, meta-reflection and professional performance – and apprentices who used the e-DAP also often achieved higher scores in their final assessments. The e-DAP solution is currently being adapted for use in other professions. Countries that require apprentices to maintain learning documentation within the workplace may find many benefits in digitalizing the learning documentation, such as monitoring, formative assessment, automated feedback, sustaining communication channels, and better organization and storing of relevant information for both the apprentices and the teachers/trainers.

The full case study can be found in the thematic report T*he Digital Transformation of Apprenticeships: Emerging Opportunities and Barriers* by Alberto Cattaneo and Francesca Amenduni.



Video 1 Video trailer of the e-DAP available in German (on the left) and in Italian (on the right)

Case Study 19

Haptic simulators for professional training in rural areas in India

The AMMACHI Lab – a research centre affiliated to Amrita University (Tamil Nadu, India) – uses innovative approaches and technology to overcome traditional obstacles to disadvantaged groups' access to training and employment. Over the past seven years, as part of its project "The Sakshat Amrita Vocational Education" (SAVE), the centre and its partners have developed 300 VR courses and low-cost portable custom-built haptic and touch-based simulators. These compensate for the lack of apprentices' hands-on experience, and the absence of costly heavy machinery, for training in various trades, including construction, manufacturing, healthcare, garment-making, home decor, agriculture and automotive. Haptic simulators are devices which provide sensory feedback, such as vibrations, allowing apprentices to gain experience in close-to-real working conditions and to develop the required motor skills safely, even in the absence of instructors. For instance, in the virtual workshop for hacksaw training, feedback is displayed on the computer screen, including the cutting speed, the average downward pressure, the number of blades broken in the simulation and an aggregate final score for the exercise based on these variables (see figure 7).

This approach can be generalized for training where accessing real situations is not always possible or opportune. Some illustrative cases include situations involving the potential to harm patients (for example, in healthcare), destructive or dangerous procedures (for example, working with hacksaws and blades), costly material or unreachable environments (such as nuclear and deep-water operations).

Haptic simulators help to reduce waste (for example, wood, plastics), make procedural and fine-motor skills training accessible, even when apprentices cannot attend VET schools or workplaces, and reduce the costs of training. Transportable haptic simulators and computers were made available to rural areas through the MoVE van (a vehicle which carries 20 handheld touchscreen devices, a laptop server, one large display monitor, low-cost haptic devices and solar equipment), designed to bring electrical power and devices into rural areas. The third advantage of the combined use of haptic simulators and VR relates to the reduction in the amount of time that a trainer has to devote to guiding their apprentices. The AMMACHI lab reported a reduction in the cost of training of approximately 50 per cent, thanks to the introduction of haptic simulators.

The AMMACHI Lab project managed to involve a wide population (47 villages, 5,487 people trained, more than 50 per cent of whom were women) and to generate economic value (for instance, the launch of more than 40 small business), thanks to the support of national investments.

The full case study can be found in the thematic report *The Digital Transformation of Apprenticeships: Emerging Opportunities and Barriers* by Alberto Cattaneo and Francesca Amenduni.

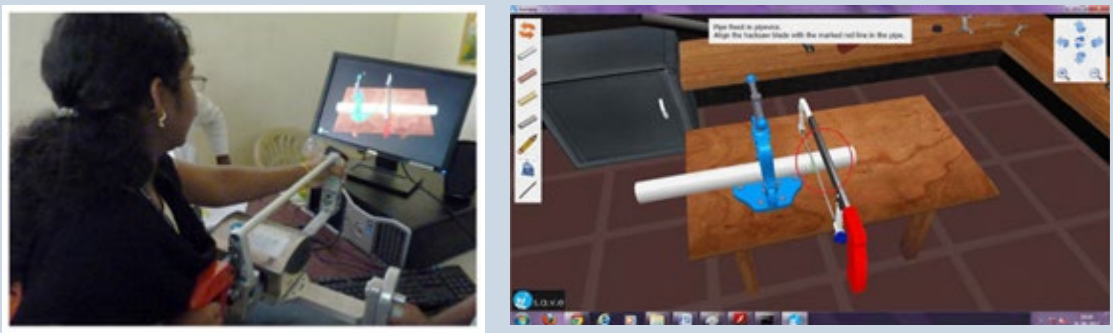


Figure 7 Virtual workshop for hacksaw training

▶ References

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Section E

Moving forwards in a time of change

The ideas for modernizing apprenticeships collected in this report reveal important policy options that can help to meet the needs of all segments of the population – in existing and new economic sectors, and in both the digital and green economy – and for all countries, whatever their stage of development. In so doing, such measures can contribute to the goal of making lifelong learning a reality for all and are equally relevant beyond apprenticeships, in other forms of education.

11

Policy messages for the future of apprenticeships

Policy messages for the future of apprenticeships

As set out at the start of this report, the world is facing a wide range of social, environmental and economic challenges to which apprenticeships need to respond through their role in skills development. Subsequent chapters have shown the enormous variety of creative and innovative ways in which actors within apprenticeship systems are already responding. The practices and policies highlighted demonstrate that apprenticeships can be both facilitators of global drivers like digitalization and greening and also enhancers of trends; that they can contribute in both the short term, accompanying the changes, and in the longer term, helping to maintain and stabilize the new worlds of work and employment. Many of the solutions presented are not limited to apprenticeships but can be transferred to other forms of education that aim to foster work-based learning and may also inspire other areas, such as employment or innovations policies. Nonetheless, there is little doubt that much more still needs to be done.

In this final chapter, a set of overall policy pointers is provided. These have been drawn together from the common threads that run throughout the report to help steer future developments based on experiences to date in the transformation and modernization of apprenticeships.

▸ 11.1 Adjusting apprenticeship design processes

A common thread that runs through the various topics dealt with in this report is the importance of making adjustments to design processes for apprenticeships to ensure that they are fit for purpose in terms of evolving modern labour markets. In particular, the green and digital transitions both require improved alignment between apprenticeship programmes (including occupational/competence/assessment standards) and the skills requirements of labour markets, as well as consideration of how the processes for updating apprenticeships as a whole might be speeded up to keep pace with changes in technology and the green agenda. Key to this are participatory skills anticipation mechanisms and multi-stakeholder processes for designing occupational or competency standards.

Skills anticipation systems vary greatly around the world. As we have seen (for example, in Chapters 2 and 10), recent technological advances are opening up the opportunities to deploy AI, machine learning and big data analysis to enhance the speed and accuracy of skills anticipation. At the same time, their reliance on sources such as online job advertisements may currently restrict their application to high- and middle-income countries where sufficient numbers of jobs are advertised online. In any case, such "hi-tech" solutions may not be appropriate in all cases, such as in countries with large informal sectors.

In relation to **occupational (or competency) standards and learning outcomes in qualifications and programmes**, it is notable that both the green and digital transitions require (a) a modular structure so that emerging needs can be quickly and easily incorporated and (b) the development of core skills that resonate with the types of skill sets that, it has long been acknowledged, are key for work in the twenty-first century.[1] The green and digital transitions therefore provide a fresh imperative to **adopt core** skills and to embed them in modular curricula and teaching and learning methods of apprenticeships, as well as to ensure appropriate training for teachers and in-company trainers. This approach applies across all sectors and occupations and to both young people entering the labour market and existing workers looking to upskill and reskill – as well as in specialist areas like digital technology jobs and jobs in "green" industries, like renewable energy and waste management.

For more ideas and examples of how to improve skills anticipation and occupational standards, see Modules 2.2 and 2.3 of the *ILO Toolkit for Quality Apprenticeships. Volume 2: Guide for Practitioners – Developing Quality Apprenticeship Programmes,* available at https://www.ilo.org/global/topics/apprenticeships/publications/toolkit/WCMS_751114/lang--en/index.htm.

11.2 Improving and widening stakeholder participation

To achieve the goal of closer tailoring of apprenticeship provision to the skill needs set out above will require **more effective participation in apprenticeships by stakeholders, including social partners.** Employers' and workers' organizations are central to the development of apprenticeship programmes and the monitoring of their outcomes in terms of employment and income. Yet, in many countries this solid base is lacking.

1 See ILO, Global Framework on Core Skills for Life and Work in the 21st Century, 2021.

Effective participation can be facilitated through actions at a number of levels. Structurally, at national or regional level, social partners need to be an essential component of the permanent arrangements for planning, implementing, and monitoring and evaluating TVET and apprenticeships – especially through social dialogue and tripartism involving social partners and the state – rather than simply being involved in ad hoc consultation.[2] Social partners should be vested with decision-making powers within such arrangements. In addition, the development of sectoral organizations can also assist in securing social partner inputs to ensure that apprenticeships are tailored more closely to skill needs, including through collective bargaining at sectoral level.

At local levels, the participation of stakeholders representing employers' and workers' organizations can also be energized. They can be included in the governing boards or management or advisory committees of VET providers or in sub-committees that deal with specific issues of relevance to them (for example, WBL and apprenticeships or quality standards). They can be involved in awards and competitions to promote apprenticeships (for example, helping to determine the nature of awards and also in the committees that make decisions about award winners) and employers can also be involved in the sponsorship of awards. They can also be invited to take part in specific projects, as is the case in the European Union, where local employers frequently participate in transnational projects.

Low-income countries face particular challenges in establishing the institutional arrangements necessary to boost participation and, in these circumstances, it is important to build the capacity of those institutions that are already in place – such as business associations and workers' organizations. In the absence of chambers or sector organizations, building the capacity of TVET schools to interact more closely with employers at local level may offer a way forward – see section 11.6. In this sense, apprenticeship policy is as much linked to education policy as it is to employment and industrial relations policy.

There also seems to be scope for apprenticeships to engage more systematically with **a wider range of stakeholders**. There is already a growing track record of civil society and community group involvement in, for example, designing policies for inclusion and community outreach for more inclusive access to apprenticeships. But new needs and opportunities are opening up around the green transition where local environments and expertise have the potential to provide learning resources for apprentices, such as through projects that bring employers and communities together to tackle local environmental issues.

For more ideas and examples of how to enhance stakeholder participation in apprenticeships, see Module 2.1 of the *ILO Toolkit for Quality Apprenticeships. Volume 2: Guide for Practitioners – Developing Quality Apprenticeship Programmes*, available at https://www.ilo.org/global/topics/apprenticeships/publications/toolkit/WCMS_751114/lang--en/index.htm.

▶ 11.3 Upgrading and upskilling teachers and in-company trainers

Without adequately equipping teachers and in-company trainers, including master craftspersons in the informal sector, to deal with the emerging challenges, few of the modernizations and transformations required of apprenticeships set out in this report will come to fruition. **Upskilling teachers and in-company trainers** needs to be an intrinsic part of any development. Both digitalization and the green

2 See, for example, Cedefop, EFQEA Implementation: A Cedefop Analysis and Main Findings. How Schemes in Cedefop's European Database on Apprenticeship Schemes Compare with EFQEA Criteria (Luxembourg: Publications Office, 2021), pp. 22–25.

transition require changes in teaching and learning methods, whether that be through better methods of blended learning and empowering teachers and trainers to become co-creators of materials and applications (building on the sudden shifts required during the pandemic) or through new pedagogies to support apprentices in developing greener mindsets and behaviours. "Green and digital" need to feature as core elements of initial teacher training and continuing professional development. Measures to deal with the need to upskill current teachers and trainers include short courses or modules, and platforms and networks for teachers and trainers to facilitate the exchange of good practices.

There are also opportunities to go beyond upskilling; for example, involving teachers and trainers – and others in senior positions in TVET institutions – in the **design or review of qualifications and programmes** alongside stakeholders who are usually involved, such as social partners. Encouraging their involvement in, for example, designing new occupational/competency standards has the potential to develop ownership and buy-in to changes – as well as making it possible to take advantage of their expertise.[3]

Attention also needs to be given to the **underlying pay and conditions – and overall professionalization** – of teachers and in-company trainers, which can lag behind that of the teaching profession in general, as well as providing them with support to keep up with the multiple roles they are tasked with undertaking in terms of organizing apprenticeship. Even in some high-income countries, the profession of the teacher in apprenticeship is in need of enhancement; and, typically, the role of in-company trainer is under-developed with few, if any, requirements in terms of pedagogical qualifications.[4] Boosting the professional status of teachers and in-company trainers and introducing measures, including financial incentives, to support teacher progression, will underpin improvements to apprenticeship quality and attract more people into the profession, supporting the goal to expand apprenticeships into new areas, like adult apprenticeships.

For more ideas and examples of how to prepare teachers and trainers in apprenticeships, see Module 3.5 of the *ILO Toolkit for Quality Apprenticeships. Volume 2: Guide for Practitioners – Developing Quality Apprenticeship Programmes,* available at https://www.ilo.org/global/topics/apprenticeships/publications/toolkit/WCMS_751115/lang--en/index.htm.

11.4 Increasing flexibility while preserving or improving standards and inclusivity

Innovations described in this report point to the need for greater flexibilities within apprenticeship systems (Chapter 9). TVET programmes need to be flexible enough to implement WBL (Chapter 7). The digital and green transitions need courses that can keep pace with changes without requiring regular wholesale review of qualifications and programmes (Chapters 2 and 3). Extending apprenticeships to accommodate adults means enabling education and training to be combined with the responsibilities of adult life, through measures like the incorporation of short courses or modules on newly emerging skills, where relevant, and through distance learning, part-time provision and validation and recognition of prior

3 This has been the experience of ILO coaching sessions on greening TVET, run in 2022 for participants in Cambodia, the Philippines, Thailand and Zimbabwe.

4 Simon Broek et al., Teachers and Trainers in Work-based Learning/Apprenticeships: Final Report (Luxembourg: European Commission, Directorate-General for Employment, Social Affairs and Inclusion, 2017).

learning (Chapter 8). In the informal sector, making formal provision more flexible, such as through short courses and RPL[5] and micro-credentials, could be one means by which informal apprentices receive formal recognition for some of the skills they have acquired.

At the same time, **flexibility should not come at the expense of quality or inclusion** (as stated in Chapter 9). We should preserve the distinctive features of apprenticeships that give them value as one of the options available to young people – and as they are opened up to adults. Indeed, driving up standards is a vital part of improving participation in apprenticeships (see section 11.7 below), while increasing inclusivity will not only help to deliver decent work goals but also help to expand apprenticeships (inclusion is covered in more detail in section 11.8).

Even so, pursuing flexibility may mean contemplating **new avenues for apprenticeships**. The speed of change in the workplace, particularly in highly technical business or production processes, may mean that consideration will need to be given to how best to engage with a **broader provider base** which possesses the requisite technical knowledge to develop appropriate learning provision and bring in innovative ideas about flexible delivery, and which has the agility to respond quickly to changes in skill needs. The broader base envisaged above might include companies and private providers with specialist expertise to supplement mainstream provision. Apprenticeships need to be able to access the latest technologies and associated learning in an increasing range of fields, such as biotechnology, food science and advanced manufacturing. Furthermore, in many parts of the world the infrastructure for state-funded adult learning is relatively under-developed and engaging with a broader provider base may be part of the package for adult upskilling and reskilling.

As one response to this issue, some countries have already developed well-functioning **partnerships with private providers** – in this case providers of micro-credentials that can be made available to apprentices in certain sectors. Other approaches include developing Centres of Vocational Excellence to enable providers to collaborate with the private sector to build requisite capacity and providing additional supports and resourcing to facilitate the development of micro-credentials and associated learning packages among existing TVET providers. As has been noted (Chapter 6), the commodification and privatization of education must be challenged, as it potentially undermines education's social development and social inclusion functions, but ensuring quality in situations where the provider base is widened is feasible with appropriate tuning of quality and qualifications systems.

For more ideas and examples of how to build partnerships, see Module 3.3 of the I*LO Toolkit for Quality Apprenticeships. Volume 2: Guide for Practitioners – Developing Quality Apprenticeship Programmes*, available at https://www.ilo.org/global/topics/apprenticeships/publications/toolkit/WCMS_751115/lang--en/index.htm; and on increasing flexibility through modular and shorter apprenticeship programmes, see Module 6.1.5: https://www.ilo.org/global/topics/apprenticeships/publications/toolkit/WCMS_751118/lang--en/index.htm.

▶ 11.5 Delivering the benefits of digital technologies

There is potential for new digital technologies to make a significant contribution across all phases of the apprenticeship cycle, from planning through to implementation, monitoring and evaluation (see Chapter 10). Realizing this potential in practice requires the establishment of **systematic plans and strategies**,

5 Ashwani Aggarwal, Recognition of Prior Learning: Key Success Factors and the Building Blocks of an Effective System (ILO, 2015).

backed up by appropriate – and sustainable – **funding**, which can support not just the rollout of the necessary software and hardware but also the associated training of teachers and trainers. It also means looking beyond TVET and apprenticeships to consider the adequacy of the **digital infrastructures** that are needed to deliver more digital content for apprenticeships. The digital divide continues to be an important issue – between communities and also between richer and poorer countries – and it is a divide which, unchecked, may widen in the coming years (see Chapter 2). Since digital technologies make learning in apprenticeships more efficient and effective, they have the potential to exacerbate the digital divide, which in turn may widen social and economic inequalities in the absence of appropriate intervention.

Implementing strategies and investment for digitalization in apprenticeships might sound like a daunting prospect in light of the range and complexity of the digital tools that are already available and an educational technology market that continues to grow. But **funding for technology is an investment** and one that can help to achieve wider goals, not only in relation to digitalization in the economy but also in the green transformation, since many technologies have the potential to make learning more environmentally friendly. Moreover, as Chapter 10 shows, **not all digital solutions need to be "hi-tech" and expensive.** In practice, much of the implementation of technology involves individual teachers, trainers and schools making decisions about which pieces of comparatively inexpensive and "lo-tech" software to weave into their daily teaching, especially given the growing ubiquity of the hardware capable of delivering it (contrast the situation today, in which the use of apps on mobile phones is widespread, to that pertaining 20 years ago, when learning had to take place on computers in classrooms). This raises a critical issue for success in digital technology implementation: how to balance the national need for strategies and planning with the realities of teaching and learning in VET classrooms and apprenticeship workplaces, which involves myriad decisions by individual teachers, trainers and schools.

From the perspective of teachers and trainers, implementing digital technology naturally comes with **risks**: will a particular digital tool or piece of content deliver the desired result? This may be a reason why implementation often involves small-scale, incremental changes rather than the types of change that might be the goal of national strategies. To address this issue, teachers and trainers need support in order to understand better how technology can help them deliver higher quality **apprenticeships** that are more relevant to the labour market: for example, teachers and trainers need help to understand how digital technologies can support the new pedagogies necessary for delivering the core skills required for the digital and green transitions (Chapters 2 and 3). As well as strategies and plans, stakeholders would benefit from a range of measures including: putting in place quality frameworks that help stakeholders to identify high-quality digital education content and determine how it can best be used; supporting research to inform stakeholders' choices of technology and helping to identify the costs and benefits of technology-driven change; and establishing platforms, networks and communities of practice through which teachers and trainers can exchange good practices around new technology.

▶ 11.6 Activating the local and regional dimensions

A corollary of the development of flexibilities is the need to activate the local and regional dimensions of apprenticeships. Indeed, many of the innovations highlighted in this report point to the need for flexibilities and enhancements at regional and local level within apprenticeship systems. Although globalization has become a central feature of economic life in the past three decades (see Chapter 1), this does not mean that what happens at local and regional levels has diminished in importance: arguably, quite the opposite – witness the arguments put forward in economic terms to develop clusters within regions and, more

recently, skills "eco-systems" (see section 9.2). In short, there is an opportunity for "**glocalization" within apprenticeships** – tailoring provision at local level to deal with global issues.[6]

At regional level, the role of apprenticeships in **contributing to regional development and innovation** is increasingly recognized (see section 9.2). Apprenticeships have roles to play in both technology diffusion (through apprentices being trained in the latest techniques) and applied research and development (through teachers and in-company trainers who have access to applied research and through higher-level apprenticeships). To enable this progress, the capacity of apprenticeship providers needs to be enhanced to support regional and innovation strategies and to allow them to play their full part in regional skills ecosystems. Coordination across policy domains can help to support these processes, leading to, for example, the development of incentives to create apprenticeship placements tied to broader economic and employment policies. Another way of enabling apprenticeships to play a stronger regional role is through developments like Centres of Vocational Excellence (CoVEs) (see sections 5.3 and 9.2) and inter-company training centres (ICTs) (section 5.3). In some countries, regional authorities play a key role in the management and organization of apprenticeships and are well-placed to ensure that apprenticeships are engaging in wider regional agendas and that the requisite policy-level coordination through multi-stakeholder governance of the sort discussed in section 11.2 is achieved.

At local level, the **empowering and capacity building of TVET providers** could play an important part in opening up their role as innovators, and not simply as "deliverers" of the school-based part of apprenticeships. Areas where local empowerment of TVET providers might be important include: WBL development – where providers have roles like preparing and supervising students, incorporating and sequencing WBL into the curriculum (Chapter 7); and the green transition, where greening TVET schools has a vital role to play (Chapter 2). Bottom-up development at the level of TVET schools and enterprises requires investment in new courses and teaching equipment, as well as support measures, such as setting up platforms and networks for the exchange of good practice, and national competitions and prizes to recognize innovative teaching. Systemic reforms, such as opening up space within national programmes and qualifications for optional modules, which can be filled by locally developed provision tailored to local employer needs, will also be required.

As noted above, within **low-income countries**, with their large informal economies, developing the role of TVET schools may offer a key way forward in building the capacity of the overall apprenticeship system in a context where the institutional infrastructure provided by employers' and worker's organizations is under-developed (Chapter 4). For example, the delivery of apprenticeship support services to master craftspersons might be best organized by local practitioners and experts who have a thorough grasp of the socio-economic context within which informal apprenticeships are provided.

For more ideas and examples of how to build the capacity of TVET providers, see Module 3.4 of the *ILO Toolkit for Quality Apprenticeships. Volume 2: Guide for Practitioners – Developing Quality Apprenticeship Programmes*, available at: https://www.ilo.org/global/topics/apprenticeships/publications/toolkit/WCMS_751115/lang--en/index.htm.

6 International collaboration on apprenticeships among stakeholders is also an important developmental area, although this aspect has not been covered in this project. See, for example, the European Union's Erasmus+ programme: https://erasmus-plus.ec.europa.eu.

11.7 Expanding apprenticeships: The appeal to employers

A central challenge for the modernization and transformation of apprenticeships is employer engagement. Scaling up apprenticeships for young people, developing new apprenticeship opportunities at higher levels and opening apprenticeships up to adults all demand increased employer commitments. This raises challenges, particularly with respect to SMEs, which comprise the bulk of the employer base.

Growing the numbers of enterprises involved in apprenticeships means overcoming the obstacles they face to engagement, such as lack of time, resources and human resource development capacity. Measures should ideally span the range of intervention levels from macro (policy/strategy), through meso (entrepreneurial eco-systems[7]) level to micro (individual firm) level – and do so in a coherent way as a package of support measures so that there is mutual reinforcement of each of the components. Chapter 5 of this report presents a new model for fostering the commitment of enterprises in apprenticeship training which can be used to assess existing policies at all levels.

At **macro level**, as well as promotion and advocacy interventions to show the benefits of apprenticeships, measures can include the state provision of direct and indirect financial support (perhaps targeted at certain categories of enterprises or to overcome skills gaps in certain sectors or other criteria) through tax relief, wage subsidies and rewards to high-performing enterprises, as well as apprenticeship quotas, etc.; and supporting employers with advice and guidance, inter-company mentoring or networking opportunities. Strategically, the integration of apprenticeships into wider economic development policies, including sectoral policies, may also bring benefits.

At **meso level**, measures to help employers include intermediary organizations that can carry out training functions, such as recruitment and administration, the fostering of organizational networks, such as inter-company training centres or training alliances, and local/regional apprenticeship committees.

At **micro level**, support measures include: strengthening partnerships between education providers and local employers; providing counselling for employers on skills development, supporting them in assessing their skill needs, organizing training and supporting in-company trainers, and matching individual learners to enterprises (for example, by teachers or guidance staff) – perhaps tied in with the type of capacity development of TVET providers described above. The possibilities offered by new technologies should also be considered: for example, digital tools like AR welding or spray painting may lessen demands on employers by offering alternatives to learning such tasks in the workplace, as well as giving learners more opportunities to improve their skills (see Chapter 10).

For more ideas and examples of adapting apprenticeships to better meet the needs of SMEs, see Module 6.1.7 of the *ILO Toolkit for Quality Apprenticeships. Volume 2: Guide for Practitioners – Developing Quality Apprenticeship Programmes*, available at: https://www.ilo.org/global/topics/apprenticeships/publications/toolkit/WCMS_751118/lang--en/index.htm.

7 The resources and supportive networks available in the local environment of the enterprise.

▶ 11.8 Opening apprenticeships up to more learners

Apprenticeships are key tools for tackling youth unemployment and enabling the upskilling and reskilling of the workforce but we face important challenges in respect of raising levels of participation. General educational pathways remain as popular as ever; more so in some cases as entrance requirements for many new "top" jobs, such as in the technology field, require university-level qualifications (notwithstanding that this might be a result of "grade inflation" rather than a real uplift in the level of skills needed). Such general pathways tend to have higher status than apprenticeships, not least because they offer the possibility of a route to university – and despite evidence that apprenticeships can offer better returns in terms of lifetime earnings.

Social perceptions can be hard to alter. Tackling them **requires integrated packages of measures aimed at potential apprentices** – and employers too – in which the different elements are well integrated so that they can support one another. This is a matter not just of promoting apprenticeships to "traditional" candidates but of opening up apprenticeships to "new" groups in order to improve the inclusion and gender equality dimensions, which will also help to increase the overall numbers of apprentices. It is also a matter of ensuring that apprenticeships are available in all sectors.

Enhancing awareness and accessibility requires measures such as:

- efforts to promote and champion apprenticeships, including not just awareness-raising campaigns but also awards and competitions at national, regional or local levels to give public recognition to "top" apprentices, showcasing different categories to promote inclusivity – for example, "best female apprentice in engineering";
- taking steps in the early phases of compulsory education to promote the benefits of apprenticeships impartially in terms of employment and progression and during the later phases of education to ensure permeability between the various educational and training routes;
- introducing pre-apprenticeship programmes including, to enhance inclusion, ensuring the universal availability of short work experience periods, "tasters" such as trial apprenticeships (distinct from longer pre-apprenticeship programmes) and job shadowing;
- effective career guidance and matching of candidates to apprenticeship placements; and
- for adults, appropriate financial and non-financial support measures, such as career guidance and counselling, training leave, grants, childcare and health insurance.

Concrete steps are also required **to improve the availability and affordability of apprenticeships,** such as:

- ensuring decent working conditions and entitlements;
- making it possible to undertake an apprenticeship in small modules, which can be especially appealing to adults;
- providing good pay and conditions that take into account regional and sectoral differences; and
- developing apprenticeships at higher levels, so that there are pathways that enable progression into the highest levels of education and training.

For more ideas and examples of how to attract and recruit more candidates into apprenticeships, see Modules 4.1 and 4.2 of the *ILO Toolkit for Quality Apprenticeships. Volume 2: Guide for Practitioners – Developing Quality Apprenticeship Programmes*, available at: https://www.ilo.org/global/topics/apprenticeships/publications/toolkit/WCMS_751116/lang--en/index.htm.

▶ 11.9 Developing the inclusion and gender equality roles of apprenticeships

It is well known that apprenticeships' unique combination of school-based and practical learning in the workplace is preferable for many people who do not find general educational pathways appealing. This places apprenticeships in a good position to **support inclusion goals**. In the informal sector, the fact that apprenticeships are embedded in local social customs and practices can sometimes replicate social disadvantages, such as excluding women from masculinized occupations. Upgrading apprenticeships has the potential to tackle such issues. And, where there is a high rate of early school leaving, measures such as pre-apprenticeship schemes can play an important role in helping people attain the skill levels they need to enter "full" apprenticeship schemes.[8]

Developing the inclusion function of apprenticeships requires the same combination of **national support measures and local flexibilities** discussed in the preceding sub-sections of this chapter. At national level, it is important that strategies are based on robust evidence and analysis of who has access to apprenticeships and who does not, and to provide the framework for supporting vulnerable people, while local action is key to providing outreach and tailoring support at a level where local needs can be fully understood.

It is important that vulnerable people are able to access support – should they require it – throughout their "apprenticeship journey". In other words, **"end-to-end" support** needs to be available for getting into, staying on and completing an apprenticeship – and then smoothly transitioning into employment or further education and training (support may even be required in the initial phases of post-apprenticeship employment, for instance). Vulnerable people can find participation in apprenticeships challenging for a wide variety of reasons – physical impairments or learning difficulties, mental health issues, domestic or care responsibilities, etc. – and such issues may not be readily resolved or might recur, hence the need for ongoing support, including mediation between apprentices and employers.

Developments such as the digital transition and the need for upskilling and reskilling come with both **opportunities and risks** for inclusion. Digitalization – with government intervention – can open up the gap between digital "haves" and "have nots"; but apprenticeships can help to tackle this by offering remedial support as well as continual digital skills upgrading to apprentices. Upskilling and reskilling in general might open another inequality gap according to who can afford to pay, given that much provision is privately provided, not least through the growing digital badge "marketplace", in which guarantees of quality can be opaque. Again, apprenticeships can help to tackle this issue through reforms that set robust quality standards for short courses, provide personalized support to (potential) apprentices and integratethe courses into state-funded national programmes, reducing or eliminating costs for learners without lowering apprenticeship standards.

Apprenticeships also have enormous potential to tackle the barriers faced by women in accessing masculinized occupations. Proactive policies are needed to increase and support female participation (of both girls and women) in apprenticeship schemes. Measures can include:

8 See, for example, Michael Axmann and Katharina Jaik, Pre-apprenticeship Programs (PaPs) for Latin America and the Caribbean during and after the COVID-19 Crisis (Montevideo: ILO/Conterfor, 2021).

- promoting apprenticeships for women in masculinized occupations, like the building trades, and offering appropriate support and additional subsidies to enterprises to facilitate their inclusion;
- using female role models in schools;
- expanding the coverage of apprenticeships beyond their "traditional" occupations in male-dominated trades;
- opening up education and job opportunities in sectors with high social reputations (for example, ICT, banking and finance);
- providing options for remote working and reconciliation of work and family lives.

For more ideas and examples of how to support entry into apprenticeships through pre-apprenticeship programmes, see Module 6.1.3 of the *ILO Toolkit for Quality Apprenticeships. Volume 2: Guide for Practitioners – Developing Quality Apprenticeship Programmes,* available at: https://www.ilo.org/global/topics/apprenticeships/publications/toolkit/WCMS_751118/lang--en/index.htm; and on how to improve post-apprenticeship transitions see Module 5.1: https://www.ilo.org/global/topics/apprenticeships/publications/toolkit/WCMS_751117/lang--en/index.htm.

11.10 Much still remains to be done

This chapter has provided a selection and summary of the key policy messages of this project. Additional recommendations and suggestions can be found at the end of each thematic chapter and also in the individual thematic reports on which this report builds. At the **international level**, much progress has been made in the past decade to improve the global knowledge base on apprenticeships, and peer learning among policymakers and practitioners has increased. This report adds to this knowledge base and provides many new examples and insights. Nevertheless, a lot remains to be done in the future, such as harmonizing international definitions of apprenticeship, improving international data on participation (both individual- and enterprise-based), evaluating the effectiveness of public support measures for apprenticeships, building up online collections of good practices for key dimensions of apprenticeships (for example, quality, inclusion and governance) and expanding the existing supranational monitoring of apprenticeship systems to a global level.

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