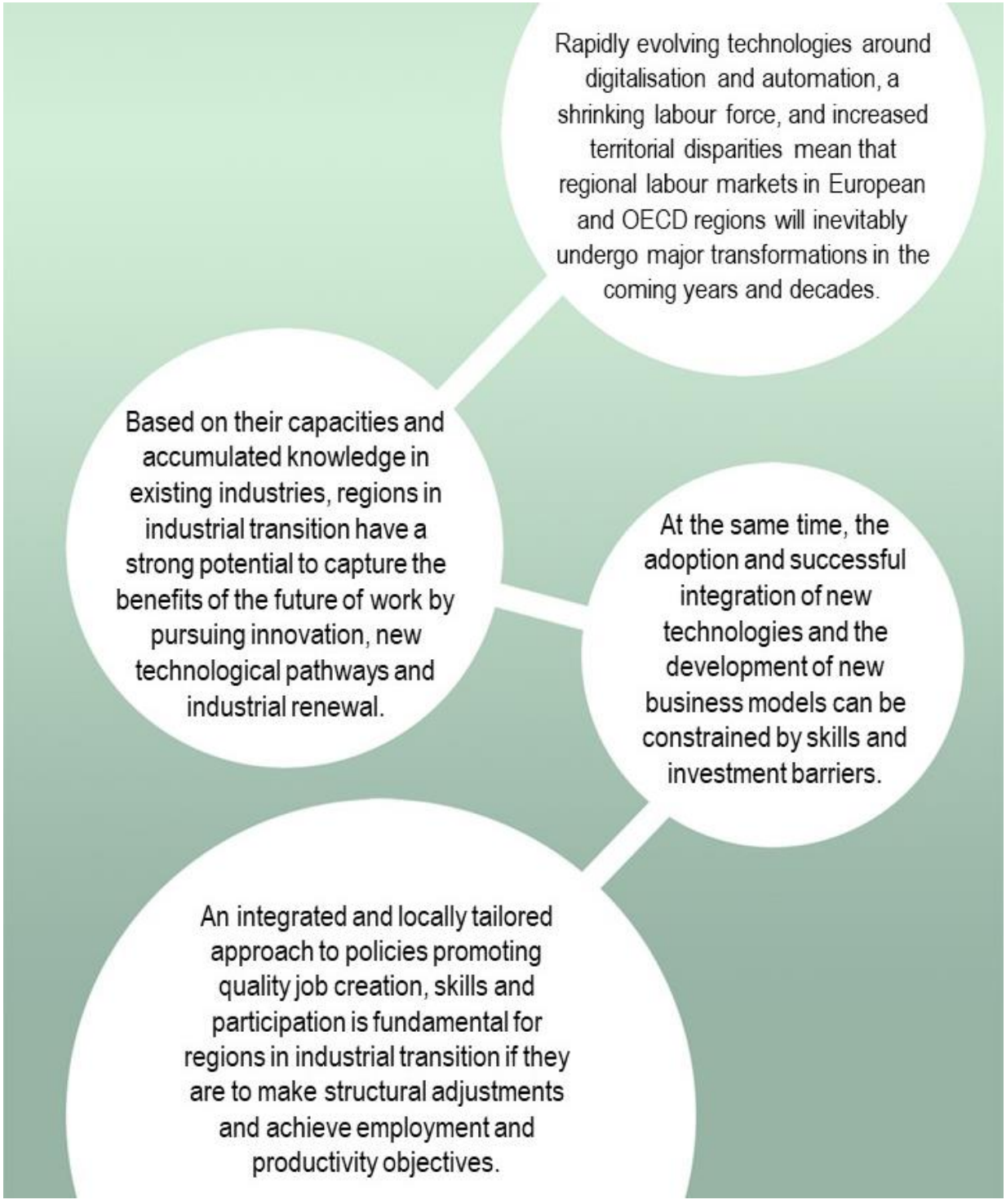
2 Preparing for the jobs of the future

Increased globalisation and rapid technological change, together with demographic, migration and industry developments, are altering the structure of local labour markets and skills requirements across OECD countries – and these trends are expected to continue in the foreseeable future. This chapter explores how regions in industrial transition can seize the benefits of automation and digitalisation for industrial modernisation while also managing the costs of structural adjustment. The chapter identifies a range of specific jobs and skills barriers that regions in industrial transition face and discusses policy approaches and instruments to overcome them. It also highlights factors that can support an effective policy agenda for regions in industrial transitions to prepare for the future of work.

Infographic 1. Key messages: Preparing for the jobs of the future



Changing skills and jobs profiles affect regions in industrial transition

Regions that have experienced industrial decline or that still base their economic activity on traditional manufacturing or extractive industries are increasingly confronted with the need to modernise their industrial base. A key challenge for successful industrial transition centres on how such regions and industries can pursue innovation and new technological opportunities pathways to break out of locked-in paths of development and generate industrial renewal. Technological innovation and organisational innovation are an opportunity to encourage broad industrial modernisation. They are also a source of concern with respect to outsourcing and job losses in these regions.

Because industrial transition often requires a shift from old and traditional manufacturing industries to future-oriented activities (even in traditional sectors), industrial transition can lead to higher than average unemployment (at least temporarily) due to locally concentrated deindustrialisation, as well as a skills base in declining sectors. It is crucial that policies to address industrial transition help workers and local communities manage the transition with the least possible disruption while maximising potential benefits.

Automation will critically affect local labour markets and regions in industrial transition in specific ways

Job tasks have been automated for centuries, boosting productivity and giving rise to new jobs that provide employment and contribute to rising living standards. The introduction of steam power is a prominent early example of technology that saved labour on a massive scale. Historically, the changing nature of workplace skills, a requirement of technological progress, has led to fears of “technological unemployment” (Keynes, 1931). At the same time, technological innovation has always led to new jobs, while productivity growth from automation has been the most important driver of rising living standards (Autor and Salomons, 2018).

Yet, automation also poses challenges. First, technology can change labour markets very suddenly, while it may take considerable time to create new jobs and replace those lost to technological progress. Second, the skills profiles of jobs lost to automation and those required to replace the jobs lost might not be the same. The automation of jobs, therefore, can lead to a temporary (in principle) but potentially prolonged period of unemployment (OECD, 2018a).

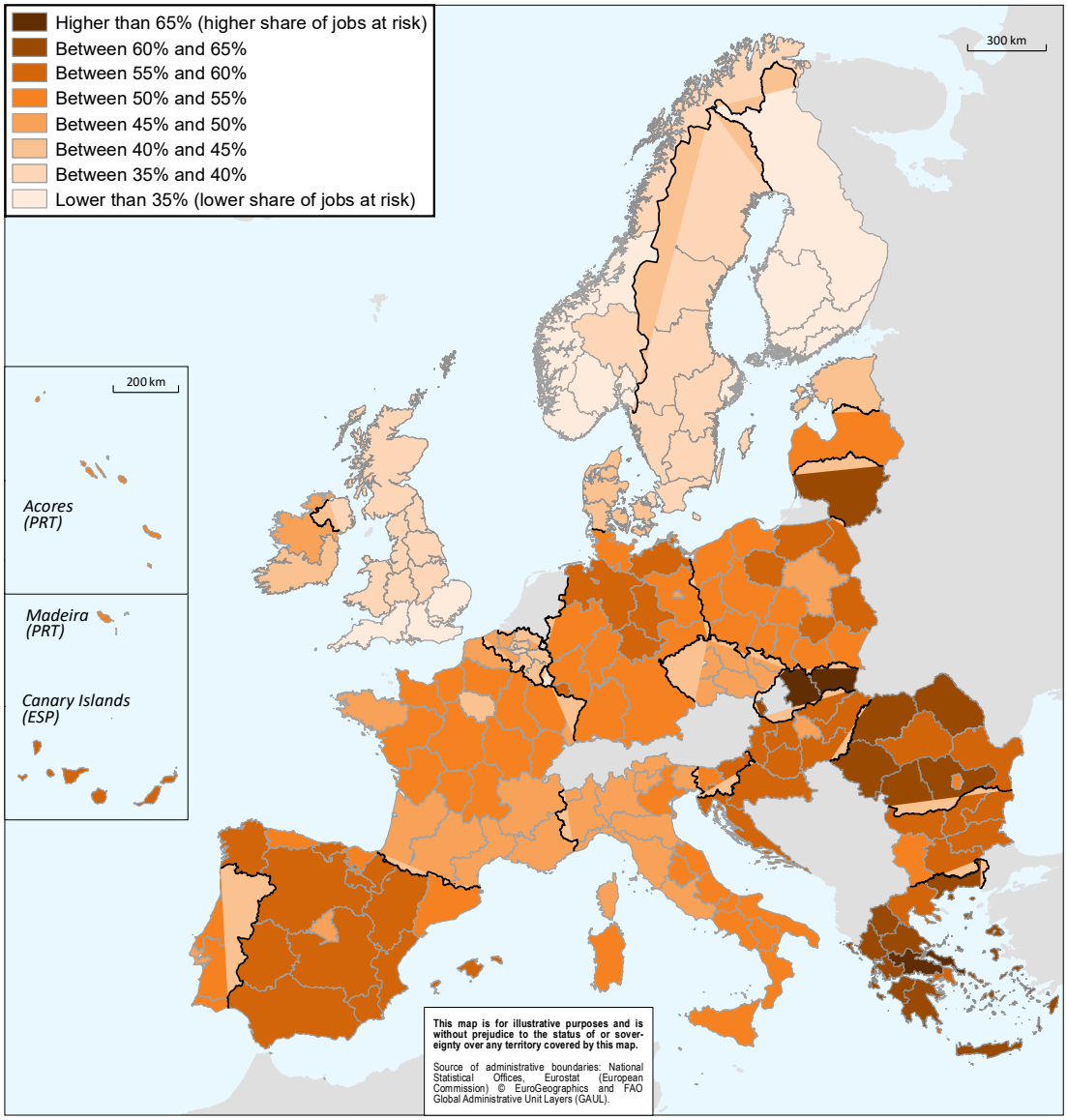
Previous waves of technological breakthroughs have shown that automation does not spread evenly across territories. On the contrary, certain occupations and sectors are more exposed to automatable tasks than others and neither occupations nor sectors are evenly distributed within national borders. The OECD has shown that substantial in-country differences exist when considering the number of jobs at high risk of automation (OECD, 2018a). For instance, the share of workers in jobs with a risk of automation equal to or larger than 50% varies more than two-fold across regions in the OECD countries for which data is available. The share of jobs at risk of automation is as low as 28% in Helsinki and the surrounding region while reaching 70% in Western Slovakia (Figure 2.1).

Regions in industrial transition are likely to be part of those territories that are more, rather than less, affected by automation because they are often home to traditional manufacturing industries with a higher proportion of jobs that rely on routine tasks. This is likely to lead to more disruption than in other places.

The automation of existing jobs means that there is a potential for new jobs to be created and even more jobs will be changed. If managed well, these changes can lead to economic growth via contributions to productivity and higher value-added activities. However, as the jobs of the future will use different skills and may have higher educational requirements, workers may need to switch occupations and acquire new skills. Upskilling and retraining the existing workforce should be high on the agendas of policymakers in these regions in order to prepare workers for the future of work.

Figure 2.1. Risk of automation across European TL2 regions, 2016

Share of regional workers at risk of job automation higher than 50%



Notes: A job is considered to be at risk of automation if it has a 50% or higher probability of being automated. Estimates for the share of workers in jobs at risk of automation/significant likelihood of change are based on estimates that combine the risk of automation for individual tasks with the specific tasks performed in occupations and the distribution of occupations across regions (for the methodology see Nedelkoska and Quintini, 2018). Data that links tasks and occupations come from the OECD Survey of Adult Skills (Programme for the International Assessment of Adult Competencies, PIAAC) and have been regionalised in OECD, 2018a. For countries where PIAAC data and is not available, estimates are based on a weighted average for the occupation-specific risk of automation from the three most similar countries with available data. Similar countries and the weights for the average are based on an iterative matching procedure that considers the industrial, occupation and education structure of OECD countries and regions. See Box 3.1 in OECD (2019b) for further details.

Reference years and territorial level: Reference year 2016. Data from Norway corresponds to the year 2016. Large regions (Territorial Level 2 of the OECD Regional Statistics [Database]), except for Flanders (Belgium), for which sub regions are considered (corresponding to NUTS2 level of the European Classification), as well as for France (regions prior 2016 territorial reform).

Sources: OECD calculations based on Nedelkoska, L and G. Quintini (2018), "Automation, skills use and training", https://doi.org/10.1787/2e2f4eea-en, and National Labour Force Surveys (2016). Published in OECD (2018a), *Job Creation and Local Economic Development 2018: Preparing for the Future of Work*, https://doi.org/10.1787/9789264305342-en.

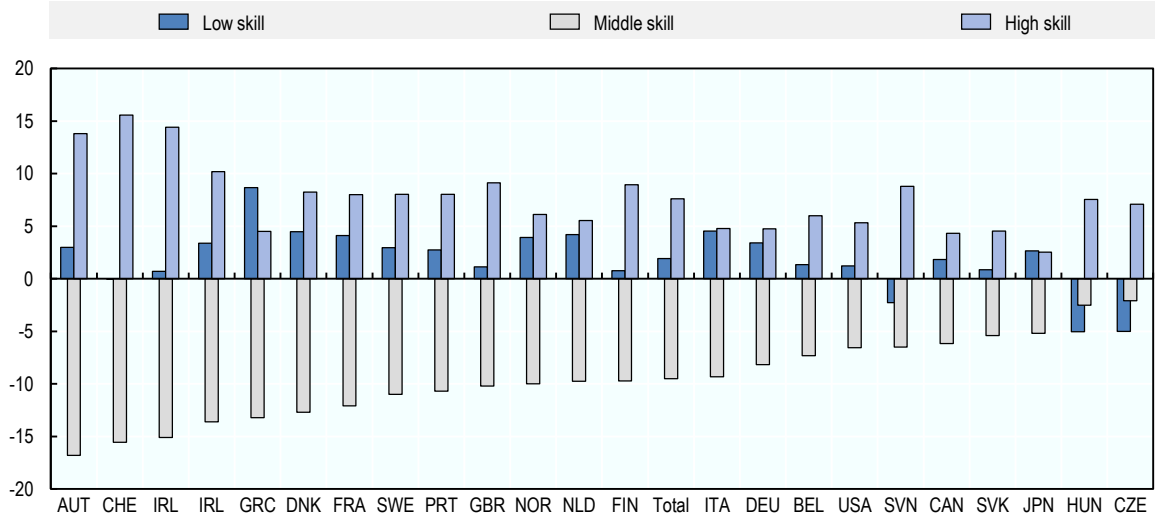
Industrial transition may come with increased job polarisation

Jobs destroyed through automation disproportionately involve routine or repetitive tasks. By contrast, demand has increased for individuals with transversal skills such as making sense of new unstructured information, negotiating and striking deals or caring for others. What these tasks have in common is that they do not follow a precise set of rules and are more difficult to articulate and codify so that a computer can execute them. Because these tasks tend to be associated with either high-skilled or low-skilled occupations, automation is said to bring about a "hollowing-out" of middle-skilled jobs (Autor, 2015; Brynjolfsson and McAfee, 2014; OECD, 2016a).

Over the past two decades, middle-skill and middle-wage employment as a share of the workforce has declined in OECD countries. At the same time, workers who carry out non-routine tasks have increased their share of total employment. These jobs are either high-skilled (e.g. managerial positions) or low-skilled (e.g. basic services). Thus, both ends of the skill-distribution spectrum of jobs have increased while the middle has declined (Figure 2.2).

Figure 2.2. Changes in the share of jobs by skills level

Percentage point change in the share of total employment, 1995-2015



Note: High-skill occupations include jobs classified under the ISCO-88 major groups 1, 2, and 3. Middle-skill occupations include jobs classified under the ISCO-88 major groups 4, 7, and 8. Low-skill occupations include jobs classified under the ISCO-88 major groups 5 and 9. For more details refer to the OECD Employment Outlook 2017.
Source: OECD (2018a), *Job Creation and Local Economic Development 2018: Preparing for the Future of Work*, https://doi.org/10.1787/9789264305342-en.

Selecting a policy approach in the face of an ever more polarised labour market will require a nuanced response by policymakers in regions in industrial transition. Given the rapid pace of technological improvements, shifts in tasks undertaken by humans might occur quickly and even high-skilled workers need to become more flexible to cope with a situation in which tasks are being taken over by machines. Policymakers in affected regions also need to ensure that this does not lead to a situation in which a more polarised labour market leads to higher income inequality and a dual labour market, with one part of the population being significantly better off than the other. Ensuring that the employees in new jobs created have adequate social rights and employment protection is an important part of the story.

Non-standard work might become increasingly prevalent in some regions in industrial transition

Technological progress not only leads to automation, it also promotes the emergence of new forms of employment, including the growth of non-standard work, defined as temporary, part-time and self-employment (Eurofound, 2015). Non-standard work provides job opportunities for many individuals, thanks to greater flexibility. It helps match workers to jobs, integrate those who are marginalised in the labour market and, in certain cases, can offer a better work-life balance. Yet non-standard work can also reduce access to social protection and healthcare benefits. People in non-standard jobs often face lower levels of skills investment than standard employees; evidence shows that this category of jobs may sometimes be an opportunity of last resort rather than a worker's choice. Non-standard work can create a dichotomy in the labour market between individuals with a stable career and those jumping from one non-standard job to the next, and has been rising in most OECD countries since 1985. There are, however, large regional differences within countries. For instance, in Greece, the share of non-standard work as part of total jobs grew by 7% in western Greece while declining by 11% in Epirus.

Focusing on temporary work only, the OECD has shown that the presence of a large pool of low-skilled workers (those with less than secondary education) is associated with a large share of temporary work (OECD, 2018a). This may be related to the lower prevalence of specific skills in low-skilled jobs, which facilitates substituting one worker for another. Furthermore, the regional rate of unemployment is strongly associated with the prevalence of temporary work in a given region. This is because regional labour markets with higher unemployment rates should see more competition for jobs, reducing the bargaining power of individual workers (OECD, 2018a).

OECD analysis at the regional level reveals a complex picture, with some regions contributing more than others to the rise of temporary work. The increase in the share of temporary work could be the consequence of an increasing number of jobs with temporary contracts but also a relatively smaller reduction of temporary contracts compared to permanent jobs. Some regions in industrial transition could experience an increase in non-standard work if traditional manufacturing sectors are restructuring or are ceasing activity. While some of the laid-off workers will be able to transition and upgrade jobs, others will seek alternative, potentially non-standard job routes. The probability of non-standard work will be higher for those workers who did not finish secondary school.

What challenges and opportunities do regions in industrial transition face in preparing for the future of work?

To successfully meet the future of work, regions in industrial transition need to simultaneously reap the benefits and address the risks of automation, in particular greater job polarisation, and a rise in non-standard work. Taking an integrated approach to quality job creation, skills and participation can help regions in industrial transition make structural adjustments and achieve employment and productivity objectives. Complementary investment policies are needed too. Firms should be encouraged to move towards higher value-added activities to reduce the risk of automation for a given occupation. Furthermore, the growth of economic sectors with a low risk of automation should be supported. To do this effectively, policymakers at all levels need to tailor policies to the economic conditions in regions undergoing a transition.

Regions in industrial transition are often confronted with job polarisation and firms in two different stages of development. These regions are frequently home to companies with a large share of highly qualified workers, good digital infrastructure, a high assessment of digital potentials and a priority to train employees.

They also comprise firms – usually small- and medium-sized enterprises (SMEs) – with a low share of highly qualified workers, poor digital infrastructure, a low assessment of digital potential and a low priority to train employees. These two types of firms are often unevenly spread across a region's territory. Highly-skilled workers and productive firms might be geographically concentrated, giving rise to widening inequalities between places of high productivity and a high-skilled workforce, and low productivity and a low-skilled workforce. Such polarisation can widen gaps in competitiveness, employment opportunities and overall well-being, and ultimately increase inequalities within and across regions.

Higher than average youth unemployment is an additional factor that many regions in industrial transition must consider. Young people, as well as other disadvantaged and under-represented groups such as older people or women, are disproportionally affected by long-term unemployment, often driven by a lack of education and limited work experience. Being isolated from the labour market affects several dimensions of youth well-being. It decreases overall life satisfaction and increases the risk of social exclusion and of dropping permanently out of the labour force, while also decreasing optimism about the future (Eurofound, 2017). Policy has an important role in supporting youth in education and employment in order to make sure that youth are able to participate in the labour market and earn their own income (see also Chapter 6 on inclusive growth).

Getting skills development right drives successful transition

Regions in industrial transition are typically home to a large pool of high-skilled labour in traditional fields of industry. Although well trained for their current employment, these workers often possess a homogeneous knowledge base with a lack of future-oriented skills. However, embracing industrial modernisation and technological upgrading requires highly skilled employees, ones able to perform complex tasks that help drive firm competitiveness and productivity growth (OECD, 2016b). Skills development is, therefore, critical, particularly in the context of growing digitalisation and globalisation.

Skilled workers typically possess strong cognitive skills (e.g. numeracy, literacy and problem-solving) and management and communication skills. Information and communication technology (ICT) skills are particularly relevant for making use of emerging digital technologies, such as cloud computing, the Internet of Things or Big Data (OECD, 2017b). However, companies also need workers who not only have strong cognitive skills but also emotional and communication skills, and a readiness to learn (Grundke et al., 2017).

While regions in industrial transition tend to lack a sufficient number of highly-skilled workers for future-oriented and technology-rich environments, they are not the only ones. Across the OECD, two-thirds of adults are unsuitably skilled to participate in technology-rich environments. For workers without tertiary education, this changing environment leads to greater difficulty in finding employment given the higher demand for workers with technical expertise (OECD, 2017b).

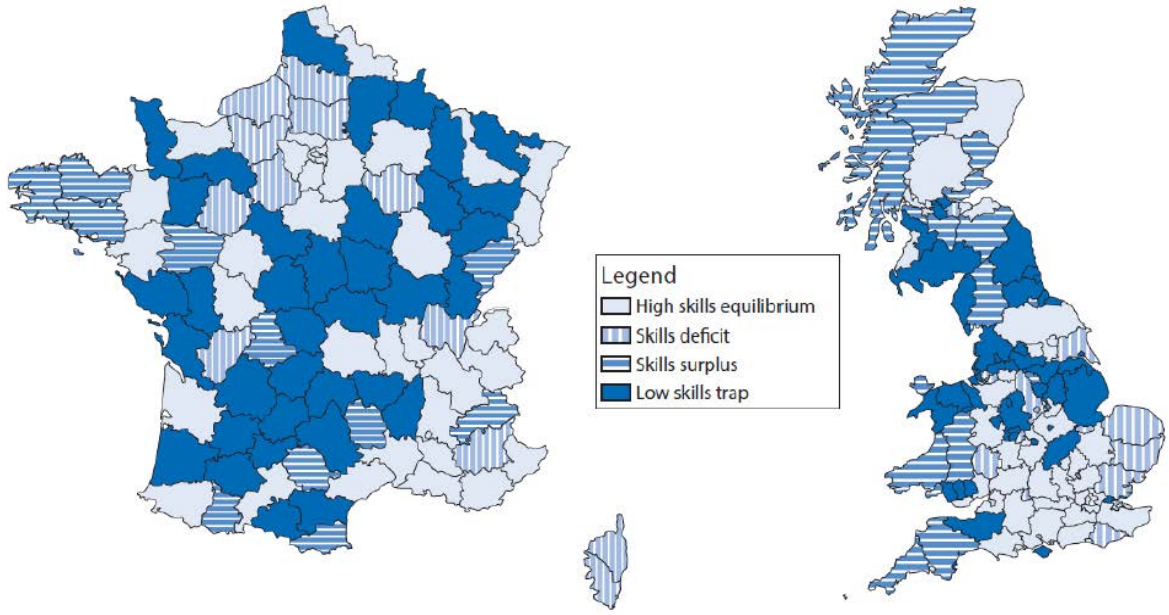
Regions in industrial transition need to avoid falling into a "low-skills equilibrium"

If the skill supply does not match the type or level of skills that employers demand or if the supply is not aligned with how local employers use available skills, then skills mismatches arise. Skills mismatches and shortages have multiple sources. Often, students, workers, employers or training institutions lack information on the skills required in the short-, medium- and long-term, driving mismatches. In addition, co-ordination failures can occur, for example, when the firms are not able to adapt their processes to the available skills stock (OECD, 2016b).

Assessing the relationship between the levels of skills of the current workforce (the supply) and the level of skills needed for available jobs (the demand) can provide important information on the potential for local

job creation. The OECD has developed a diagnostic tool that classifies subnational areas into four categories based on their relationship between the supply and demand of skills relative to other subnational areas within the same country. For example, when considering France and the United Kingdom, the supply and demand of skills within local economies varies greatly (Figure 2.3). In France, about one-third of all subregions were in a “high skills equilibrium”, with both a relatively high supply of and demand for skills. Another group of subregions were in a “low-skills trap”. Here, both the supply of skills and the demand for skills were relatively low; some of these subregions may find it hard to move to higher-skilled, higher-value-added products and services. The remaining subregions were in a position of imbalance, with a relatively high supply of skills and low demand for skills (skills surplus) or vice versa (skills deficit). In the UK, 45 subregions were in a “high skills equilibrium", with both a relatively high supply of and demand for skills. Another 45 subregions were in a “low-skills trap” (relatively low supply of and demand for skills) and the remaining subregions were in a position of imbalance, with a relatively high supply of skills and low demand for skills (skills surplus) or vice versa (skills deficit).

Figure 2.3. Combining skills supply and skills demand at the regional level in French (2012) and UK subregions (2013)



Source: OECD (2016c), *Job Creation and Local Economic Development 2016*, https://doi.org/10.1787/9789264261976-en.

The example highlights considerable variation in the supply and demand for skills at the regional level. Some areas are characterised by low-skilled, low-quality and poorly productive jobs. Such areas can fall into a “low-skills equilibrium”, where it does not pay for individuals to invest in building or upgrading their skills if they are not valued by local employers (OECD, 2016c). Local employers, in turn, have little incentive to move to higher-skilled production and services, knowing that the local workforce does not have the required skills level to fill these types of jobs. Retaining and attracting talent can be an additional challenge for areas faced with a low-skills trap. Because regions in industrial transition often have a lower than average skilled workforce and are home to traditional industries, they risk being trapped in a low-skills equilibrium.

Finding the right entry point to break this cycle is challenging. Structural adjustments to achieve national employment and productivity objectives will likely require an integrated approach to skills. In some cases, this can mean actively working with firms to help increase product development and marketing strategies, or providing training to workers in order to increase the intensity of the skills of local production processes, for example.

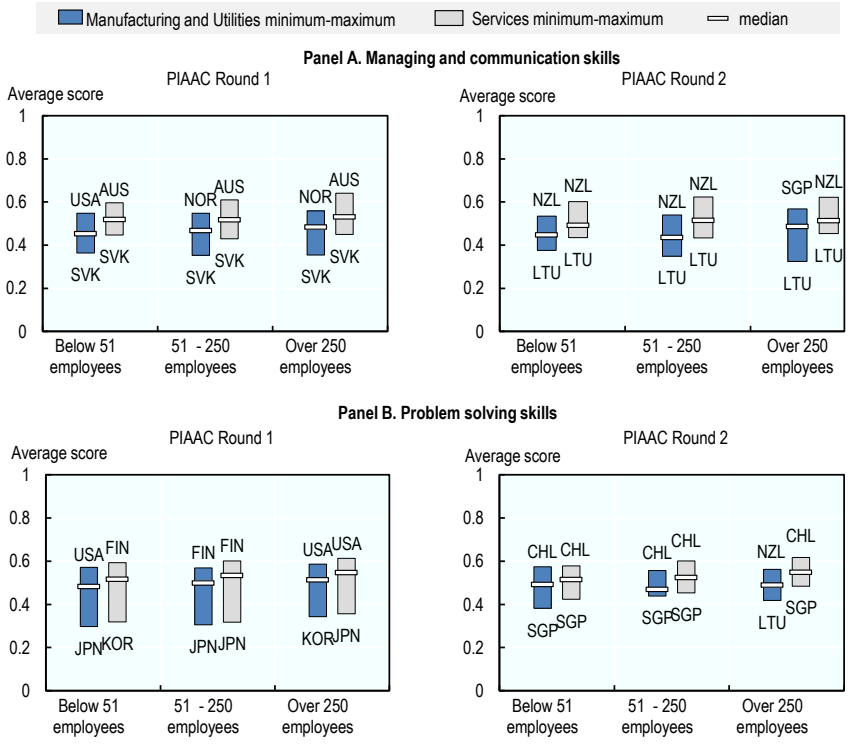
SMEs often lack soft skills for innovation

Employees of SMEs are more likely to face difficulties in adapting to a changing industrial and employment environment. This is often attributed to a lack of specific skills that are particularly relevant for increasing firm performance and innovation, including cognitive skills and soft skills, such as communication, creativity, problem-solving and interpersonal interaction.

Evidence suggests that employees in large firms are more likely to have innovation-related transversal skills than their counterparts in SMEs. Results from the OECD Survey of Adult Skills (PIAAC) show that workers in large firms have higher scores on management and communication skills than employees in small firms (Figure 2.4, Panel A). The survey also shows how skills related to readiness to learn and problem-solving are more concentred in larger firms rather than in SMEs, Panel B).

Figure 2.4. Smaller firms lack soft skills for innovation

Distribution of skills across countries by firm size and sector



Note: PIAAC tests the cognitive skills of adults on different dimensions (literacy, numeracy and problem-solving in technology-rich environments) as well as the type of tasks they frequently perform. PIAAC Round 1 was conducted in 2008-13 and Round 2 was conducted in 2012-16.
Source: Grundke, R. et al. (2017), "Skills and global value chains: A characterisation", https://doi.org/10.1787/cdb5de9b-en, based on OECD PIAAC data.

Policy challenges for regions in industrial transition centre on how to best support skills development in SMEs, how to deliver training to local SMEs and how to attract talented individuals to local SMEs instead of large firms.

Upgrading skills is critical but how can it be done?

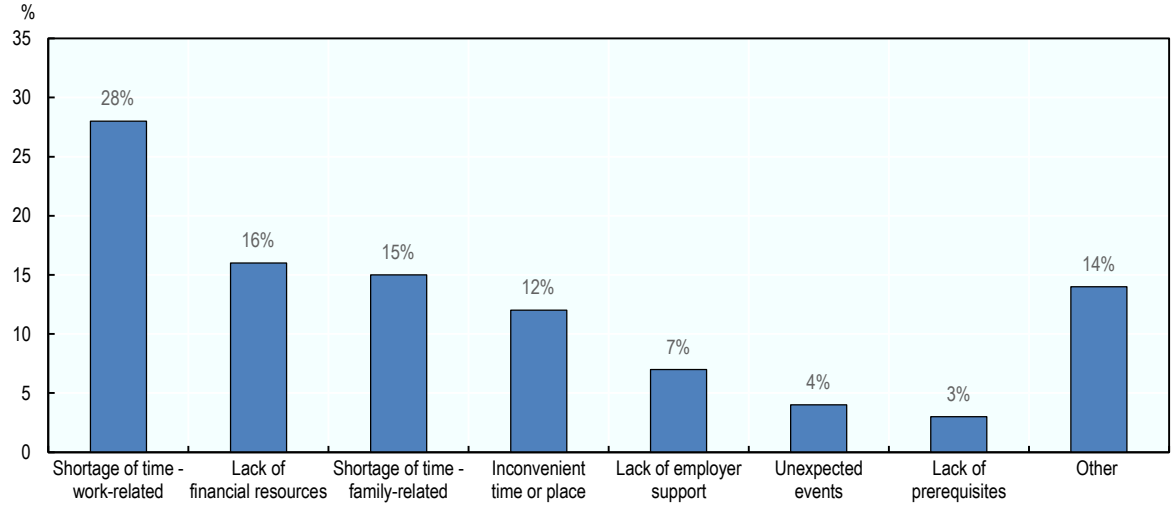
Regions undergoing a shift in their industrial base often face an increased skills shortage in new and emerging areas of activity. They are also confronted with decreasing employment of skilled workers in traditional occupations. This leads to a situation where more and better jobs with attractive remuneration and working conditions may be available but a lack of skilled employees results in a large number of unfilled vacancies. In order to fill these jobs, skilled workers from traditional occupations need to be retrained and upskilled in order to ensure that the labour force corresponds to the demanded skillset.

Across the OECD, only 41% of adults participate in formal or non-formal job-related training in a given year (OECD, 2019a). Moreover, the adults who are most vulnerable in the labour market, such as those with few qualifications, the long-term unemployed and those with skills at high risk of job automation are least likely to participate in training. Engaging those who do not participate in education or training is a fundamental task for regions in industrial transition in order to prepare their workforce to meet changing skills needs.

Many workers in regions in industrial transition and beyond want to take-up lifelong learning opportunities but face a variety of obstacles in doing so. One of the leading barriers to participation in training programmes is a lack of time, while paradoxically a lack of employer support is one of the least cited reasons (OECD, 2019a) (Figure 2.5).

Figure 2.5. Barriers to participation in training programmes in OECD countries

Reasons for non-participation (% of adults who wanted to participate but did not)



Note: Average of OECD countries participating in PIAAC.
Source: OECD 2019a, based on PIAAC data (2012, 2015).

A second challenge that regions in industrial transition face is the supply of the right training content to prepare for future skills needs. Good quality data on skills supply and demand often lacks at a regional

level. In addition, local employer engagement can be low and it may also not always be clear how to involve key stakeholders. Questions arise such as "Should universities focus predominantly on world-class research or follow the demands of local employers?" and "Should regional governments play a stronger role skills training, for example in leadership and entrepreneurship?". The answers are often not an "either/or" and so solutions are not mutually exclusive, but they may take time to be constructed and implemented.

Third, the margin for manoeuvre by regional governments is often limited when it comes to education or training policy. In many countries, changes in the educational system are a national-level responsibility. Thus, effective multi-level governance practices and frameworks are needed for regional and national governments to work together, including to identify, implement and support effective regionally led interventions in skills and education. Governments may also need to work more closely with the private sector to deliver appropriate training.

Fourth, ensuring adequate and sustainable financing for upskilling and retraining is often a challenge for regions in industrial transition that operate with tight budgetary constraints. As demand for training is likely to increase in the current context of megatrends (e.g. automation and digitalisation), additional financial resources will need to be devoted to adult learning in the near future.

What can policy do (better) to support a successful transition into the future of work?

Regions in industrial transition are often home to skilled and well-trained labour force in core industries. In addition, some transition regions are starting to build a labour force in future-oriented and digital occupations. In order to successfully modernise their local industrial base, it is critical for transition regions to upgrade the skills and production capabilities of existing industries while simultaneously promoting the diversification of the local economy. Major changes to existing industries can come through new technologies, new business models and organisational innovation. A key element to support innovation is appropriate human capital. Strengthening the skills and competencies of local actors in relation to future emerging technologies and industries is one key to regional growth.

Successfully transitioning into the future of work requires tailoring employment and skills development policies to local labour market conditions. At the same time, the supply of skills needs to be matched with skills demand. For regions in industrial transition, this means that education and labour market policies need to be well co-ordinated with investment policies in order to connect people to jobs. Better anticipating future skills needs and appropriate retraining and upskilling of workers need to be combined with policies that stimulate investment in new sources of employment and productivity growth.

Supplying the right skills for new and emerging activities

Although a certain level of skills shortages and mismatches is inevitable in a dynamic and constantly changing labour market, several policy instruments exist to reduce their incidence. These can include improved career guidance services, better co-ordination between the labour market and the education system, more offers for work-based training and addressing rigid wage-setting and employment protection legislation that prevents workers and firms from adjusting to mismatches (OECD, 2016b).

Table 2.1. Supplying the right skills for new and emerging activities: Policy issues, instruments and rationales

Policy issue	Policy response	Potential suite of implementation mechanism	Rationale/additional benefits
Lack of skilled workers to move into new and emerging activities	Better anticipate skills needs for industrial transition	• Foresight, skills mapping • Workforce Intelligence Networks • Expert Groups on Future Skills Needs	Informs policymaking Avoids skills shortages and skills mismatches
	Strengthen the capacity of firms to address their human resource needs internally	• Strengthen human resources (HR) management capacity of SMEs • Link with SME support policies with education and training policies • Strengthen links between firms, universities and research bodies	Improves responsiveness of training provision to market needs
			Strengthens co-ordination between different policy areas
	Involve local stakeholders in the planning and design of regional skills initiatives	• Participation in employers' councils • Collaborations and partnerships with vocational schools, universities and small and large firms	Targeted training in new technologies and sectors of strategic importance
			Anchors local employers in regional economic development

Better anticipating skills needs supports industrial transition

Skills anticipation and assessment exercises (e.g. skill needs assessments, forecast and foresight exercises) can provide information to more effectively tailor the offer of education and training programmes to local needs. In principle, such exercises provide evidence bases for regions in industrial transition to design policies in accordance with projected labour-market trends by sector, local area and/or occupation, thereby helping generate more successful transition outcomes. In Wallonia, Belgium, the Public Employment Service is undergoing an extensive exercise to identify skills needed in specific business sectors (Box 2.1).

Box 2.1. Industry and skills mapping by the Public Employment Service in Wallonia

Wallonia's Public Employment Service (PES) is undertaking a prospective analysis – the *Le Forem* Study – to identify local skills needs in specific sectors. The objective of the exercise is to develop appropriate training offerings for the Wallonia's competitive and business clusters and to communicate the identified skill needs to relevant audiences. The analysis first classifies future occupations and associated core skills in eight sectors. It then identifies a set of related or secondary skills that could subsequently arise from developing the sectors. The approach follows a five-step qualitative process:

1. Analytical staff from the PES produce reports by sector.
2. A panel of experts answers to a set of questions that are then included in the sector reports. The objective is to check the sectoral trends and particularly to detect the effects that these trends may have on occupations.
3. The reports are then produced and disseminated.
4. A method called Abilitic2Perform is used to identify the skills required for each occupation or skills group. Four expert workshops, organised by occupation, identify key evolution factors and the potential evolution scenarios. They then select the most likely (or desired) scenario, identifying also the associated skills needs.

5. The local training department receives the results of the analysis in order to start designing appropriate training programmes. The results are also published on the Internet and sent to the education authorities.

The sectors and associated industries value the programme since they themselves do not have the capacity or resources to undertake such an extensive study.

Source: Wallonia (2018), "Peer Learning in Regions in industrial transition: Workshops good practice template", Le Forem, the Public Employment Service, Prepared for the Peer Learning in Regions in Industrial Transition Workshop "Preparing Jobs of the Future", 8-9 March 2018, Brussels, Belgium, Unpublished.

Engaging local employers in regional skills development initiatives

OECD research highlights the importance of better engaging employers in skills development programmes to ensure that training programmes are well aligned to the needs of industry (OECD/ILO, 2017b). For regions in industrial transition, focusing on apprenticeship programmes that combine both on- and off-the-job training to smooth the transition from school to work or help apprentices obtain tertiary level diplomas can be valuable. Apprenticeship programmes are especially useful for young people entering the labour market as these provide workplace experience and establish a solid foundation for future labour market attachment. Subnational leadership can play a critical role in reaching out to employers to promote awareness and participation in apprenticeship training. The region of Piemonte, Italy, is actively promoting apprenticeships as a means to create stronger ties between academia and business while also helping apprentices obtain tertiary education degrees (Box 2.2).

Box 2.2. Apprenticeships for higher education and research

Piemonte's "Apprenticeship for Higher Education and Research" is a pilot project dedicated to helping apprentices obtain tertiary level diplomas (technical or academic) or doctorate degrees with the help of an apprenticeship contract. Each individual training programme is based on an employer's need and includes "internal" training in the company and "external" training at the education institution. Through the programme, apprentices gain specialised and rapidly employable competencies. At the end of the apprenticeship, the company can confirm whether the apprentice receives a job contract.

The initiative has been well received by participating companies, and as of March 2018, 350 apprentices had received employment contracts. The programme also aims to increase innovation processes and technology transfers by supporting the placement of young researchers and highly specialised professionals as apprentices in regional firms. Initially established for large firms, Piemonte intends to incorporate SMEs into the programme as well.

Source: Piemonte (2018b), "Peer learning in regions in industrial transition: Workshops good practice template", Apprenticeship for Higher Education and Research, Prepared for the Peer Learning in Regions in Industrial Transition Workshop "Preparing Jobs of the Future", 8-9 March 2018, Brussels, Belgium, Unpublished.

In addition to supporting apprenticeships, there is a large potential in supporting employer-led training initiatives. Given the strong presence of small firms in regions in industrial transition, it is important to involve SMEs in skills planning. This can take the form of encouraging their participation in regional employer councils or in co-designing and co-delivering training initiatives with vocational and training

colleges, universities and large firms. Such networks also help foster trust-based relationships among firms, knowledge sharing and generate opportunities to pool training costs and resources.

Supporting workers in transition

An important element in managing industrial transition is to help workers affected by lay-offs phase out of previously dominant industries and into new ones. New jobs might not appear where old jobs have been lost. If new jobs are created in distant regions, then workers are faced with a decision to leave their communities for employment, which can have potentially destabilising effects on family and community life. Some workers may refuse to move and decide to transition into unemployment. Using transition support to protect and support such workers to find new jobs without having to relocate is an important element of successfully managing industrial transition.

Policies aimed at improving the probability of finding jobs thanks to improved skillsets and helping make the match between the newly skilled and job vacancies can help regions in industrial transition support structural adjustments. Policy responses to temporary unemployment arising from transition include redesigning and strengthening local public employment services (PES) and providing workforce and management training for workers. Special attention needs to be paid to the integration of under-represented and disadvantaged groups, such as women, youth and older people, in the labour market (Table 2.2).

Table 2.2. Protecting vulnerable workers in transition: Policy issues, instruments and rationales

Policy issue	Policy response	Potential suite of implementation mechanism	Rationale/additional benefits
Spatially concentrated lack of job opportunities for low- and middle-skilled workers	Support vulnerable workers during the period of industrial transition	• Redesign local employment services • Use the Internet as a channel of delivery	Provides the unemployed with new job opportunities
			Ensures job opportunities across territories
	Provide workforce and management development for start-ups and scale-ups through training and upskilling programmes	• Training subsidies and vouchers, training leave allowances, tax incentives • Personal Training Accounts	Workers gain highly specialised competencies needed by firms
			Managers gain additional knowledge
	Foster the integration of youth, women and older people in the labour market	• Dedicated training initiatives and courses, provision of role models	Retains human capital
			Reduces gaps in labour market participation

Supporting vulnerable workers transition to new jobs

Public employment services play a fundamental role in responding to structural adjustments and assisting workers in job transitions. The changing nature of work means that employment services in regions in industrial transition will need to focus not only on placing individuals in a job but also on ensuring that these individuals are equipped with a good range of generic and basic skills to remain resilient in the workplace. This requires good job matching and transition support schemes to help potentially displaced workers find new employment.

Local employment services can support implementing strategies to re-structure and respond to the future of work but success depends on their flexibility and ability to take a strong leadership role. The *OECD Reviews on Local Job Creation* series has shown that giving local employment services more room to

respond to changes in local labour markets must be accompanied by guarantees regarding the accountability of decision-making and the efficiency of service delivery. Front-line staff needs to have good local labour market information as well as strong contacts with employers so they can become quickly aware of new employment opportunities as they arise.

Digitalisation and automation also provide opportunities to improve the delivery of job brokering services. Online technologies can be used for standardised procedures such as initial registration and posting job vacancies, personalised interactions between PES staff and clients, casework counselling functions, and skills training and development. In a number of OECD countries, online vacancy databases are the most used vacancy platforms as measured by the proportion of all vacancies in the economy being notified to the PES database. For example, in Germany, approximately 50% of all vacancies are reported to the PES (Bundesagentur für Arbeit, 2015). In many OECD countries, public employment services are now using online apps to enable workers and employers to connect in a more efficient manner. This technology provides more robust and accessible labour market information to potential workers on available job opportunities, expected wages as well as the required education and training for employment (OECD, 2016c).

Strengthening public employment services goes hand-in-hand with an ability to better identify upcoming skills needs. The foresight analysis undertaken by the region of East and North Finland is an example of how examining skills needs helps re-skill workers, enabling them to participate in the changing economy (Box 2.3).

Box 2.3. Regional foresight in East and North Finland

In East and North Finland, regional foresight co-ordination is a statutory responsibility of regional councils, and duties related to it are set in the Act on Regional Development (1651/2009). The objective of the regional foresight work is to monitor the regional operating environment, changes in industry sectors, the needs of the labour force and its existing skills and expertise. Region-specific operational foresight platforms are guiding the foresight work in each region.

A key success factor of regional foresight in Finland is close co-operation among different foresight actors in order to create a shared understanding of future challenges in the region, a shared vision around future development objectives and means to reach set targets. Each region has launched place-specific regional foresight models and produced local analysis reports that feed into the support of regional policy strategies and programmes.

Source: North and East Finland (2018), "Peer learning in regions in industrial transition: Workshops good practice template", Regional Foresight, Prepared for the Peer Learning in Regions in Industrial Transition Workshop "Preparing Jobs of the Future", 15-16 May 2018, Brussels, Belgium, Unpublished.

Engaging firms in training and education

More actively engaging firms in training and education can help boost productivity and ultimately enhancing the contribution of local firms to industrial modernisation. Common mechanisms to support workforce development in existing firms include financial incentives such as training subsidies, training vouchers and tax incentives to encourage employees to take training or for employers to provide training. Training measures include support to handle digital technologies or helping firm managers to better identify training needs in their company.

In the context of the future of work, Individual Training Accounts (or Lifelong Learning Accounts) can also help workers better manage their labour-market future. The overarching purpose of these accounts is for workers to invest in training at any point in their careers by using these funds – either to help career advancement or to adjust to a new job as resulting from job change. In France, for example, every employee has a personal training account that can be accessed online and is valid throughout their entire career (OECD, 2017a).

Another option to raise awareness for training is to leverage local employer networks to promote skills upgrading in firms. Collaboration across firms supports knowledge sharing and pooled investment in training. Innovative diffusion in regional supply chains can also help firms integrate into global value chains (GVCs), thereby reducing regional vulnerability to automation (OECD, 2018d). Singapore's SkillsFuture programme provides a platform offering workplace learning and guidance for firms in areas of emerging skills (Box 2.4).

Box 2.4. Singapore's SkillsFuture Programme

In 2018, Singapore established the National Centre of Excellence for Workplace Learning to help companies set up on-the-job training structures. SkillsFuture targets skills training for early- and mid-career professionals recognising that technology and globalisation are changing the nature of jobs at a rapid pace. As part of the programme, all Singaporeans aged 25 and above receive an opening credit of USD 500 to use towards lifelong learning and training. Companies can apply for grants from SkillsFuture Singapore and SMEs can receive up to 90% of the cost of training in-house trainers. It is expected to help more than 1 000 companies, especially SMEs, in the 5 years from its introduction. The programme also offers guidance on industry-relevant training programmes that focus particularly on emerging skills: i) data analytics; ii) finance; iii) tech-enabled services; iv) digital media; v) cybersecurity; vi) entrepreneurship; vii) advanced manufacturing; and viii) urban solutions.

Source: SkillsFuture Singapore (n.d.), About SkillsFuture, http://www.skillsfuture.sg/AboutSkillsFuture.

Fostering the integration of under-represented and disadvantaged groups

Firm restructuring and reallocation in industrial transition often leads to job losses. Being laid off can have catastrophic implications in the short-run for individuals and places when large employers suddenly shed a high number of jobs. Public policy can support displaced workers to transition into other jobs. Regional policymakers play a large role in supporting laid-off workers: they can put together support packages for concrete cases of large firm restructuring, prolonged unemployment or poor working conditions.

Age and gender may represent further challenges to industrial transition because youth, older people and women might be disproportionately affected by the new world of work. Younger workers might find it more difficult to break into existing labour markets due to a lack of education or work experience. Older workers with abundant experience in one area might find it difficult to find new employment due to shifting skill demands. Female entrepreneurs and business owners might face additional barriers to enter the labour market. Public policy can help overcome these barriers in a number of ways. Information campaigns can begin removing negative perceptions of age and gender. For older workers, certain OECD countries move to reduce labour costs associated with this cohort by introducing age-specific wage subsidies or labour-tax reductions. Meanwhile, programmes stimulating decent working conditions, such as the one in Saxony, Germany (Box 2.5) help promote attractive jobs for disadvantaged and under-represented groups in the labour market.

Box 2.5. The "Decent Work for Saxony" programme

Saxony's "Decent Work for Saxony" programme aims to promote better jobs with attractive pay and working conditions in the region, as well as boost collective bargaining capabilities. The programme offers training and skills upgrading, and supports reinforced health and safety regulations. It offers firms bonus funding for those enterprises with a union presence. Overall, the programme provides a comprehensive strategy to help protect workers' rights while also acquiring skills needed for technologically driven changes in the economy.

Source: Sachen Freistaat (2018), "Sachen", PowerPoint Presentation for the Peer Learning in Regions in Industrial Transition Workshop "Preparing Jobs of the Future", 8-9 March 2018, Brussels, Belgium, Unpublished.

Investing in new and emerging sources of growth and employment

Tapping into new and emerging sources of growth and employment can help regions in industrial transition prevent being locked-in to old industries and create job opportunities that increase productivity, wages and ultimately prosperity. Public support entails investing in technology and ICT training provisions, and actively encouraging the private sector (especially SMEs) to invest in new technologies and business models. A range of policy instruments exist to support new growth and employment opportunities for regions in industrial transition (Table 2.3). These include support for firms to become more innovative, make better use of skills in the workplace and encourage knowledge exchange and co-operation (see also Chapters 3 and 4).

Table 2.3. Providing investment for new sources of growth: Policy issues, instruments and rationales

Policy issue	Policy response	Potential suite of implementation mechanism	Rationale/additional benefits
Limited investment in new sources of employment and productivity growth	Provide support for firms to become more innovative and adjust from "traditional" sectors to new technologies	• ICT training and technology extension programmes • Human Resource Development Consortia at the sectoral level	Facilitates access to and benefit from global value chains
			Support for transversal skills to manage innovation and technological change
	Assist firms in better using skills in the workplace	• Workplace Leadership Centres, Local Employer Networks • Workplace Challenge programmes	Enhances cross-industry innovation
	Encourage knowledge exchange and co-operation between larger and/or newer firms with smaller and/or older firms	• SME participation in employer networks, foster industry clusters, create regional brands, enhance product market strategies, company learning networks	Creates an attractive innovation ecosystem

Using technology extension services to improve innovation outcomes

Technology extension services can be an interesting policy instrument to support industrial sectors with relatively low competitiveness in regions in industrial transition or to promote the restructuring and diversification of industries in crisis. The first observed use of this instrument was in 19th-century Ireland.

After the potato famine, agricultural advisors funded by the government-supported Irish potato farmers to successfully diversify into different food crops (Shapira, Youtie and Kay, 2011).

Technology extension services are often provided by a network of trained specialists (e.g. engineers) who can proactively reach out to companies and visit firms in the region. These services can target individual firms or a group of companies in need of advice and training on similar challenges. Technology extension services usually start with an assessment of the firm's current level of operation. Based on the initial assessment, an improvement plan is developed and accompanied by assistance. Services can include providing information on how to improve existing technologies, advising in quality management and certification, and training company staff in effectively using more advanced technologies. The first stages of review and diagnosis are generally free of charge, more intensive projects often require co-financing by the firm, although at lower than market prices for more traditional consulting services.

Making better use of skills in the workplace

Most traditional approaches to skills development are supply-side focused. This means that regional and national initiatives tend to focus on increasing the number of people with post-secondary or vocational education qualifications. However, increasing job polarisation, as well as limited productivity growth in regions in industrial transition, require stronger efforts to optimise the use of skills in the workplace.

Improving the use of skills in the workplace has several benefits for workers, firms and the local economy as a whole (Table 2.4). From the worker perspective, improving skills use can result in greater job satisfaction and higher wages. For employers, better skills use can improve the retention of workers, reduce turnover and ultimately improve the productivity of the firm. From a local economic development perspective, workers that use their skills in the workplace, especially in non-routine tasks, are less vulnerable to potential offshoring of economic production (OECD/ILO, 2017a). Improving skills use can also result in potential gains in aggregate productivity at the national level across many OECD countries (McGowan and Andrews, 2015).

Table 2.4. The benefits of better using skills

Individuals	Job-related well-being and satisfaction Increased job quality Higher wages
Firms	Improved retention of workers Higher productivity Greater employee engagement and improved relations between management and workers
Local economies	Gains in aggregate productivity Better investment climate

Source: OECD/ILO (2017a), *Better Use of Skills in the Workplace: Why It Matters for Productivity and Local Jobs*, https://doi.org/10.1787/9789264281394-en.

Regions in industrial transition can use employment, skills and managerial training policies to improve skills utilisation, thereby improving productivity and job quality. Local employment services can identify firms with an abnormal turnover rate, which may signal a low degree of skills utilisation. Training programmes can be particularly useful when designed to provide workers and managers with the skills needed to reorganise their structures to enhance adaptability and flexibility to fast-changing technologies and environments

Depending on the local context, training to strengthen management capacities can be organised by public organisations, colleges and universities, or private sector consultants.

OECD research highlights the importance of raising awareness and recognising employers that create and sustain high-performance workplaces (OECD/ILO, 2017a). This research also underscores the importance of providing specific support to help employers re-shape their workplaces. For example, in northern Italy's Rivera del Brenta industrial district, a local employers' association helped raise productivity and skills utilisation in local footwear firms by pooling investment in training provision and helping firms to collectively upgrade their product market strategies. Anchor institutions, such as universities, vocational education and training institutions, chambers of commerce or major local employers, can reach out to employers to support changes in the workplace. These institutions usually act as brokers and often require a specific skillset to guide, facilitate and deliver training and other services dedicated to enhancing the demand for skills. In addition, creating or leveraging local employer networks, as seen with the Skillnet Programme in Ireland, can also be effective in promoting programmes supporting better use of skills in the workplace (Box 2.6).

Box 2.6. The Skillnet programme in Ireland

Established in 1999, Ireland's Skillnet programme actively supports and works with businesses to identify and address their skills needs. It also works with the unemployed to train and upskill workers. The programme funds 65 training networks, supporting over 14 000 companies and 50 000 trainees. Member companies determine their training needs and how and where the training is offered. Programmes are optimised to suit the needs of already employed learners through formal and informal learning that ranges from further education to higher education provision. The Skillnet networks support enterprise networking and offer businesses a flexible, agile way to respond to changing skill demands. They help companies achieve economies of scale and greater efficiency in the provision of staff training. Programmes include the Finuas Networks Programme, targeting the international financial services sector, the Future Skills Needs Programme, which designs innovative training to address future skill needs; a workplace activation initiative to help job seekers obtain employment, and a programme for management development, which supports SME owner-managers. Skillnet is funded through the National Training Fund, associated with Ireland's Department of Education and Skills.

Source: Skillnet (n.d.), *Skillnet Statement of Strategy*, https://www.skillnetireland.ie/publication/statement-of-strategy-2016-2019-summary/.

Encouraging knowledge exchange and co-operation

A firm's innovation capacity is related to learning and the ability of the surrounding region to catch up on knowledge (Tödtling and Trippl, 2005). Firms, research institutes, universities and other higher education institutes, as well as government and non-governmental organisations belong to regional innovation environments. Their geographic proximity, shared culture and mutual trust strengthen their ties within local networks.

Enhanced knowledge sharing is fundamental to economic development and industrial modernisation. Nurturing the development of knowledge hubs around future-oriented activities that build on regional strengths and involve a large range of local stakeholders can foster innovation networks in regions in industrial transition. These hubs – be they formal or informal – bring together policymakers, practitioners, companies, universities and civil society around specific issues.

Creating adequate co-ordination and financing mechanisms

Redesigning education and skills systems to fit the new world of work is a complex task, requiring policies to pursue a variety of objectives and reach across different target groups. Responsibility for this lies with regional policymakers but also with national ministries and employment agencies and is often split across stakeholders. In this context, good co-ordination mechanisms are essential to ensure that policies reinforce rather than duplicate each other. This is true with respect to financing as well. Given the number of actors – from government, to private sector, academia and civil society, as well as workers – effective co-ordination is essential to administer separate budgets and be sensitive to different financial capacities. Creating and implementing effective co-ordination mechanisms and better encouraging firms and individuals to help finance training is key for regions in industrial transition to succeed in industrial modernisation (Table 2.5).

Table 2.5. Creating adequate co-ordination and financing mechanisms: Policy issues, instruments and rationales

Policy issue	Policy response	Potential suite of implementation mechanism	Rationale/additional benefits
Lack of co-ordination and financing mechanisms	Implement effective multi-level partnerships	• Increasing stakeholder participation in local skills ecosystems, better co-ordination arrangements, capacity-building initiatives	Coherent development of transition policies across levels of government
			Improved policy effectiveness and efficiency
	Ensure sufficient and well-targeted financing and investment	• Tax incentives and subsidies, paid training leave, loans, personal training accounts	Stimulation of private sector engagement in the provision of training

Implementing effective multi-stakeholder partnerships

Strategic partnerships help regional governments adapt employment and skills programmes to the changing nature of work at the local level. Local partnerships can define local problems and needs, as well as identify and implement potential solutions. An effective partnership between public authorities and regional employers will leverage knowledge and resources and help remove barriers to employment by enhancing workforce skills.

Local networking among public agencies is a critical source of social capital. Local and regional contexts are the settings where “coalitions of purpose” can be effectively built across the public, private and not-for-profit sectors in order to respond to structural changes in the local economy. Examples of important governance instruments are effectively designed monitoring and evaluation systems, better co-ordination arrangements, strengthened capacity-building initiatives and increased cross-sector co-operation.

Effective partnerships among different levels of government are equally important for regions in industrial transition, particularly as transition policies can be simultaneously implemented at the national, regional and local levels. Introducing appropriate incentive mechanisms for co-operation and/or creating working groups across programmes, sectors and/or among different levels of government can provide coherence and provide overall performance.

Ensuring adequate and sustainable financing

Education and skills systems need adequate and sustainable financing from companies and individuals. Regional governments can encourage greater investment in training through financial incentives for individuals and/or employers (Table 2.6). While financial incentives for individuals/firms exist in all education areas beyond compulsory schooling, they are particularly important for adult learning, which is more often delivered by private training providers and thus more costly. Virtually all OECD countries use financial incentives to encourage firms to provide training and financially contribute to adult learning. This also helps individuals to reduce the direct cost of learning.

Table 2.6. Financial incentives for individuals and employers

	Individuals	Employers
Reduce cost of training	Subsidies Tax incentives	Subsidies Tax incentives
Decrease opportunity cost of training	Paid training leave Allowance for unemployed/job seekers	Job rotation
Tackle temporary liquidity constraints	Loans	Loans
Set resources aside for future training	Savings and asset building mechanisms	Training levy/fund

Source: OECD, 2019a.

Key considerations and conclusions

Successfully managing industrial transitions means balancing the need to support innovation-led-growth as a driver of productivity growth while preparing the workforce for potential job losses and reorienting skills profiles. In particular, older industrial regions with a long heritage in industrial manufacturing are confronted with a situation in which workers and firms need support to successfully manage the transition from old and traditional industries to new fields of activity. Often, these regions have the capacity and knowledge necessary to reorient to modern and emerging industries, but they are unable to make full use of this potential. Barriers to benefitting from the unfolding industry changes often lie in insufficient investment and a lack of local industry innovation.

Counteracting such developments requires an integrated policy approach that can connect people to jobs. Policymakers, employers and individuals in regions in industrial transition could consider the following points when starting to address the growing need for training and investment.

Engaging a broad range of local stakeholders in skills dialogue is important

Building stakeholder dialogue can help manage change processes through mutual learning and co-operation. In the context of preparing for the future of work, actively engaging with stakeholders can help regions in industrial transition identify future skills needs and upcoming new business activities in the region by bringing in the resources and expertise of local employers, training associations, universities, VET providers and civil society. Successful dialogue also increases local capacity to find solutions and the willingness of all actors to commit to a shared vision of future economic development. Successful skills dialogue among stakeholders requires that regional policymakers take an active leadership role. Policymakers must be able to convince local employers of the need for change, to be prepared for

differences in opinion, and to allocate sufficient time, human and financial resources to build up contacts and generate trust among all parties involved.

Education and skills systems should be more inclusive

In a changing world of work, firms must have access to the skills necessary to stay competitive. For example, across the OECD, the participation in training by adults with low skill levels is 23 percentage points lower than among those with medium and higher skills. This has implications for regions in industrial transition. In the context of rising skill demands, failing to engage these workers in training could translate in constantly higher rates of long-term unemployment.

Taking an integrated approach to local job creation requires investment

New jobs are created when industries expand and new firms start up and grow. Encouraging skills is important for job creation in regions in industrial transition. However, skills and education policies need to be complemented with investments in innovation, technology and business development. In order for new jobs to be created, businesses need access to resources, including skilled people, business networks, finance and space to start up and grow. Policymakers must develop integrated approaches to addressing the future of work, approaches that maximise employment opportunities and help to tackle inequalities and social exclusion. This requires greater co-ordination between investment, innovation and labour market policies at a regional level.

Good governance mechanisms must be in place

Redesigning education and employment systems is challenging for regions in industrial transition. For example, responsibilities may split across different types of actors at different levels of government and industry. In this context, good co-ordination mechanisms are essential to ensure that policies reinforce rather than duplicate each other. Moreover, policies aiming to support the labour market in the face of industrial transition should be sufficiently adaptable to specific regional contexts since the challenges faced may vary significantly from one region to the next.

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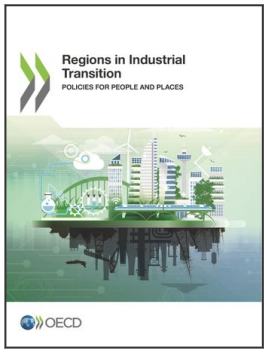
Annex 2.A. Overview of policy issues and responses in preparing for the future of work

Annex Table 2.A.1. Overview of policy issues, implementation mechanisms and rationales in preparing for the future of work in regions in industrial transition

Policy issue	Policy response	Potential suite of implementation mechanism	Rationale/additional benefits
Lack of skilled workers to move into new and emerging activities	Better anticipate skills needs for industrial transition	• Foresight, skills mapping • Workforce Intelligence Networks • Expert Groups on Future Skills Needs	Informs policymaking Avoids skills shortages and skills mismatches
	Strengthen capacity of firms to address their human resource needs internally	• Strengthen HR management capacity of SMEs • Link with SME support policies with education and training policies • Strengthen links between firms, universities and research bodies	Improves responsiveness of training provision to market needs
			Strengthens co-ordination between different policy areas
	Involve local stakeholders in the planning and design of regional skills initiatives	• Participation in employers' councils • Collaborations and partnerships with vocational schools, universities and small and large firms	Targeted training in new technologies and sectors of strategic importance
			Anchors local employers in regional economic development
Spatially concentrated lack of job opportunities for low- and middle-skilled workers	Support vulnerable workers during the period of industrial transition	• Redesign local employment services • Use the Internet as a channel of delivery	Provides the unemployed with new job opportunities
			Ensures job opportunities across territories
	Provide workforce and management development for start-ups and scale-ups through training and upskilling programmes	• Training subsidies and vouchers, training leave allowances, tax incentives • Personal Training Accounts	Workers gain highly specialised competencies needed by firms
			Managers gain additional knowledge
	Foster the integration of youth, women and older people in the labour market	• Dedicated training initiatives and courses, provision of role models	Retains human capital
			Reduces gaps in labour market participation
Limited investment in new sources of employment and productivity growth	Provide support for firms to become more innovative and adjust from "traditional" sectors to new technologies	• ICT training and technology extension programmes • Human Resource Development Consortia at the sectoral level	Facilitates access to and benefit from global value chains
			Support for transversal skills to manage innovation and technological change
	Assist firms in better using skills at the workplace	• Workplace Leadership Centres, Local Employer Networks • Workplace Challenge programmes	Enhances cross-industry innovation

Policy issue	Policy response	Potential suite of implementation mechanism	Rationale/additional benefits
	Encourage knowledge exchange and co-operation between larger and/or newer firms with smaller and/or older firms	• SME participation in employer networks, foster industry clusters, create regional brands, enhance product market strategies, company learning networks	Creates an attractive innovation ecosystem
Lack of co-ordination and financing mechanisms	Implement effective multi-level partnerships	• Increasing stakeholder participation in local skills ecosystems, better co-ordination arrangements, capacity-building initiatives	Coherent development of transition policies across levels of government
			Improved policy effectiveness and efficiency
	Ensure sufficient and well-targeted financing and investment	• Tax incentives and subsidies, paid training leave, loans, personal training accounts	Stimulation of private sector engagement in the provision of training



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