

RAISING SKILLS IN SMEs IN THE DIGITAL TRANSFORMATION

A review of policy instruments in Italy



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Foreword

The Italian Government has inserted within its National Reform Programme for 2021-27 the objective to develop a new set of policy measures to support the investment in skills for “smart specialisation, industrial transition and entrepreneurship” of small and medium enterprises (henceforth SMEs). The Italian Ministero dello Sviluppo Economico and INVITALIA requested the technical support of the European Commission’s Structural Reform Support Programme to improve the authorities’ capacity to design policy tools in this direction, in partnership with the OECD. The Project “Incentivising Business Investment in Skills in Italy” aims to orient the definition and the implementation of reforms and processes that can best respond to this objective, including by taking into account good practices of and lessons learned by other countries in addressing similar situations. The Project further aims at improving the extent to which SMEs recruit qualified workforce and provide training to their employees, and at fostering collaboration between different relevant stakeholders. This report is one intermediary output in the framework of such Project, and aims at presenting good policy practices for the support of SMEs’ investment in human capital, as designed by different institutional and non-institutional stakeholders in Italy. The evidence gathered in this report can be used by the Italian authorities to reflect on how to create new policy tools to this end, or to amend existing ones.

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Executive Summary

At a time when the green and digital transitions, globalisation, and demographic change are profoundly affecting the structure of production in OECD countries, investing in skills is more important than ever, to build resilient and inclusive labour markets as well as to provide firms with the right workforce to adjust to an ever-changing world of production.

Human capital contributes to generating new ideas and to identifying and making use of knowledge and technologies that are produced elsewhere. Technology generation and adoption require investments in complementary firm capabilities that rely heavily on the skills of workers, managers and entrepreneurs. These are key to implementing the organisational change that is often associated to the adoption of new technologies.

As not all firms are equally capable to attract, nurture or deploy human capital effectively to improve performance, human capital can represent a fundamental discriminant between firms at the frontier of productivity and firms that lag behind. Micro, small and medium enterprises represent 99.9% of Italian firms and 77% of the employment in the country, but they typically employ fewer skilled workers than large firms. They are also on average less aware of the benefits re- and up-skilling can generate for them, or they simply lack the culture, organisational capability, scale or financial resources to engage in the necessary training activities. This can translate into a lower propensity to produce or absorb innovation, and ultimately into lower competitiveness and survival.

It does not surprise, therefore, that workers in small and medium firms (SMEs) have much lower likelihood to participate to adult learning activities than workers in large firms. According to the OECD Survey of Training in SMEs (STSME in short), a new survey of training and investment behaviour of Italian SMEs that was conducted in the framework of this study between December 2020 and January 2021, 3 out of 4 Italian SMEs trained their workers informally in 2018-19, while only 46% offered a formal or non-formal training activity. Moreover, the share of firms offering more structured forms of training is increasing in size, with 61% of medium firms offering it in 2018-19, as opposed to 38% of micro firms. Third, 50% of innovative firms also invest in formal or non-formal training, as opposed to 33% of non-innovative firms. Among firms that invested in products or technologies that reduce energy consumption or improve the firm's environmental footprint, these shares are very similar (51% for investing firms, 38% for non-investing firms). Informal training is more frequent overall, but once again, the share of training firms is 21 percentage points higher among innovative firms and 11 percentage points higher among firms investing in "greener" technologies. These relationships are stronger among medium-sized firms than among small and micro ones.

Against this backdrop, Governments can play an important role in addressing the misalignment between supply and demand of skills in workers, managers and entrepreneurs, as a means to accompany SMEs in their transition towards a digital and greener way of producing. The present report reviews the wide range of existing initiatives in Italy that can expand the up- and re-skilling efforts of SMEs' workers and entrepreneurs, with a special focus on continuous learning of adults rather than initial vocational training or apprenticeships.

Based on the barriers identified, three main areas of interventions have been identified and will be discussed in depth in each chapter, namely: promoting a learning culture, targeting the right skills, and reducing the cost of up- and re-skilling.

Promoting a learning culture

A first set of measures (**Chapter 2**) addresses the lower capacity of managers and entrepreneurs in SMEs to recognise the value and benefits of human capital and training in particular, and to develop a **learning culture** in the firm. These figures often see training not as an asset but as a cost, and have little awareness of its benefits. This chapter therefore focuses on the training of business leaders (managers and business owners), with the aim of improving their ability to design a learning project and to leverage training.

The main instruments reviewed **are subsidies to expenditure in consulting services, and coaching and mentoring** activities. Consultants, coaches and mentors can support the firm in the adoption of new technologies and, crucially, in modernising the organisation of production to accommodate it. Successful approaches aim to instil trust between instructor and learner, and to create highly tailored solutions to the needs of the firm, an aspect that is best supported through flexible instruments such as vouchers. The quality of the service provision of consultants must be ensured, for instance by imposing strong ex-ante conditionality on the experience of these figures, and by monitoring and evaluating their operations ex-post. The market for these service providers must be competitive and transparent, and strike a good balance between the need to establish fair competition and the need to cater to the specificities of a territory.

Coaching and mentoring are especially valuable for those business leaders who do not think any intervention is needed. Coaches can assist managers and entrepreneurs in the design of a project, where this can be a training an innovation or technology adoption project. Good support practices, however, also follow the project throughout at least part of its life, as an initial assistance on the design of the project does not exclude that serious implementation difficulties can emerge along the project's life.

Firms seeking to develop a training or an investment plan can rely on public resources as a support. Unfortunately, many if not the majority of firms in Italy lack **awareness of the existing policy instruments** in support of firms' investment in training. Efforts already exist in Italy to spread such information to firms and SMEs in particular. A key role is played by the employers' associations, the Chambers of Commerce, and, to a lesser extent, by trusted professionals (e.g. tax accountants, employment consultants). A direct contact with the entrepreneur, which is usually set up in incremental steps (webinar, first conversation, visit, analysis of needs etc.), has proven to be most effective, albeit costly. The design of successful awareness-raising campaigns can envisage accessible instruments such as online "how-to" guidelines, and the participation of well-known figures in the entrepreneurial role.

Figure A. Overview of measures identified in chapter 2

Objective	Programme/ initiative	Main Institution
Strengthen managerial skills	Innovation voucher	MISE
	Smart & Start Italia	Invitalia
	The mentoring programme	Turin Chamber of Commerce
	PMI Academy	Trentino Chamber of Commerce
	Progetto Sud	Fondirgenti

	EXPORT 360°, Digital Temporary Export Manager (D-TEM), Master on Export manager, Digital export lab	Italian trade and investment agency (ICE)
Promote collaboration among firms and raise awareness	Check-up Industry 4.0	Associazione per le Piccole e Medie Imprese (Association for SMEs- API) and SIAM 1838
	Showcase of I4.0 technologies that can be tested by employers	ASTER consortium for technology transfer and innovation

Targeting the right skills

A second set of measures addresses the SMEs' relative inability to understand the **skills gaps and mismatches** that exist between the human capital of the firm's current workforce and the competences required by the fast-evolving world of production (**Chapter 3**). SMEs have more difficulties in attracting and retaining higher qualified people in comparison to larger firms, as they tend to offer less attractive remunerations and career prospects. The high turnover of staff in SMEs, can limit the willingness to invest in the skills development of staff. Managers and business owners in SMEs may fail to perform an appropriate and regular assessment of the skill requirements of their workforce nor on the degree of digital readiness of the firm, and they may be unaware of the support measures that already exist to accompany them in such assessments.

Skills assessment and anticipation (SAA) exercises include a wide range of tools used to generate information on current and future skills needs, often in the labour market as a whole. This information can be leveraged by Training Funds and other entities (e.g. Regions) to orient public calls towards relevant skills needs. While a wide range of SAA exercises exists in Italy, their dissemination is still limited and they are sporadically used in informing education, employment and industrial policies. Firm self-assessment tools, such as Selfie 4.0, have proved to be useful especially for small firms, as they are firm specific and often for free. However, their usefulness remains limited if using firms do not know how to interpret the results of the diagnosis, or how to turn them into action. Self-assessment tools in particular, therefore, should be combined with other instruments of support to activities downstream to the audit.

These instruments can provide an assessment of the firm's needs in both skills and technology. Under the Industria 4.0 Plan, this service (and others) can be sourced from **Punti Impresa Digitale (PID)**, **Digital Innovation Hubs (DIH)** and **Competence Centres**, albeit for projects and learning activities of differing complexity. Unfortunately, a large share of companies ignores the existence of these institutions, too, giving urgency to awareness-raising actions, including through employers' associations and Chambers of Commerce. A dynamic repository of information on Industry 4.0 service providers, such as the recently-created "Atlante 4.0" could also greatly benefit SMEs, as the instruments lowers the firm's fixed cost of sorting through information and matching with the most suitable suppliers.

Labour market shortages and skills mismatches are pervasive in Italy, with 4 adults out of 10 holding a qualification that is misaligned with the needs of the labour market, and almost 2 out of 10 being underskilled or overskilled relative to the requirements of their job (OECD Survey of Adult Skills). One way to address these imbalances is to strengthen the linkages between firms and education institutions. **Istituti Tecnici Superiori (ITS)** are tertiary institutions delivering ISCED-5 technical education that is characterised by strong connection to (local) firms. Firms co-design the curricula and provide instructors, laboratories and internship opportunities.

Despite ITS successes (83% of graduates find a job within one year from graduation), their growth is constrained by limited and sometimes irregular funding, a weak regulatory framework, and the societal stigma that associates technical education to a second-tier education. While extra funding has been made

available recently, action is still needed on the regulatory side. Further investments in students' orientation, awareness-raising and on-the-ground communication campaigns are necessary to raise the appeal of technical education, also at young age. As ITS cannot thrive in territories characterised by sparse industrial base and entrepreneurial capital, ITS are unevenly distributed in the country. Italian policy makers should consider enhancing synergies across ITS, fostering the creation of subsidiaries of performing ITS across Regions, or supporting the temporary mobility of students during internships or laboratory activities.

Lauree Professionalizzanti can also contribute to solve the existing imbalances in technical skills in Italy. Recently created, they are university-based ISCED-6 programmes providing a mix of academic and technical education in certain well-defined professional areas. Curricula envisage both course work and internships in companies. Going forward, these programmes need monitoring and evaluation akin to what provided for the ITS system. As overlaps can arise with the ITS, important progress should be achieved in the integration of ISCED 5 and 6 pathways, both in the design of curricula and in the management of programmes and resources. Reflections on the appropriate design of these integrated pathways are ongoing.

Employing PhD students in firms can strengthen firms' human capital intensity and raise their R&D and innovation propensity as a consequence. "**Innovative industry-oriented PhDs**" are doctoral programs that require students to spend part of their research time in a firm, and part of it abroad. The field of research must be coherent with the smart specialisation strategy of the Region where the university is located. Universities conceive the research project and seek partners for them among firms in the territory. A successful programme, these PhDs can generate and strengthen positive cross-fertilisation between universities and firms. As the PhD scholarships are entirely financed by public resources, all firms, including those with limited spare financial resources, can participate to the programme. It will be important to evaluate, however, whether participating firms are usually a selected group that already knows how to deal with complex innovation or R&D activities, which would likely penalise SMEs over large firms. The firm benefits from the programme can be broadened by involving firms more in the initial definition of the research project or, where this was deemed inadvisable, by focusing projects on "transversal" or "key enabling" technologies, that can find application in a vast range of sectors and productions. PhD students can become the intermediary between firms and universities, thus strengthening the coordination between the two institutions, but they should be equipped with the appropriate skills to do so.

Table B. Overview of measures identified in chapter 3

Objective	Programme/ initiative	Main Institution
Realise Skill Assessment and Anticipation (SAA)	Excelsior survey	Unioncamere
	Syllabus 4.0	MID / MISE
	SELFIE 4.0 and ZOOM 4.0	Unioncamere
	Training Innovation Management Experience programme	Assolombarda, Region
	Observatory of innovative ecosystems	Fondirigenti
	SME development in Lombardy	Confindustria, DIH, Federmanager
Coordinate efforts to promote technology	Punti Impresa Digitale	Unioncamere
	Digital Innovation Hubs	Confindustria
	Competence Centres	MISE
	Atlante Digitale (Atlante i4.0)	Unioncamere and MISE

Match training with labour market needs	Istituti Tecnici Superiori	MI, Regions
	Lauree Professionalizzanti	MUR
	Corporate academies	Firm-based initiatives
	Innovative industry-oriented doctoral programmes	MUR, Regions

Reducing costs

A third and final set of measures deals with the **cost of training provision** in SMEs (**Chapter 4**). The direct cost of providing training is disproportionately higher for SMEs, because fixed training costs are distributed across a smaller number of employees, and because releasing people from revenue-generating activities for training might be especially challenging when the employed workforce is small. Furthermore, SMEs tend to experience higher job turnover, which limits their capacity and willingness to invest in skills development, given the risk that an upskilled employee might leave shortly after training.

Training Funds (*Fondi Paritetici Interprofessionali*) are possibly the most important instrument for the support of continuous training in Italy. A limited share of firms, however, touches their support, and shares are increasing in the firm's size. As per previous OECD recommendations (OECD, 2019^[11]), SMEs could be granted higher reimbursement rates and faster reimbursements, as well as simplified application procedures. The possibility to apply for the additional reimbursement of the indirect cost of training (i.e. the salary of the worker in training) through the *Fondo Nuove Competenze*, is also a welcome recent evolution. Collective accounts in Training Funds, however, remain underused despite being especially suitable to micro and small firms. Calls should be focused on training that is functional to firms' efforts in innovation or technology upgrade and, going forward, training on soft skills and skills related to the green transition. This should translate into more narrowly-defined but more frequent calls, whose processing time can be faster and thus likely better aligned to the needs of SMEs in particular, since these are usually more liquidity constrained than large firms. Given the appropriate resources, Training Funds could expand their support to firms in the skills audit of the workforce, the definition of the training plan, or the validation of its outcomes. Extra resources could be found by: (i) raising the levy, which is quite low in international comparison; (ii) merging Funds among each other, or (iii) fostering mechanisms of collaboration across Funds for the delivery of such complementary services. However, solutions (ii) and (iii) may translate into reduced competition and diversity across Funds.

Important financial resources for the up- and re-skilling of SMEs are made available by the European Structural and Investment Funds (**ESF and ERDF** in particular), usually through public calls issued by national or regional administrations. These calls should support training in line with ambitious industrial policy goals, but be sufficiently broad to allow for flexibility in the choice of technology to adopt and training content and methodology to use. They could contain extra incentives (including higher reimbursement rates or even rates above 100%) for micro and small applicants, first-time applicants, or training activities that require coordination among multiple firms (e.g. in networks). Micro and small firms may benefit of ad-hoc application procedures (for instance, avoiding click-days that are likely to be missed by less-well organised firms) or reimbursement practices (e.g. setting a first tranche of reimbursement as soon as possible, to foster uptake from cash-constrained firms).

The Industria 4.0 reform program has set up a series of policy instruments that can tackle the low level of penetration of digital technologies in the country. The reform recognises that that firms cannot fully benefit from advanced technologies if they do not also have a sufficiently skilled workforce and institutes a **Training Tax Credit 4.0** and reinforces the **tax credit for activities of R&D, innovation, design or investment/software 4.0**. The range of eligible expenses is broad and therefore can adapt well to the company's actual needs. The Training Tax Credit 4.0 further contains special provisions for SMEs,

including the possibility to post expenses sustained by the employer in training. Some SMEs, however, may be reluctant to apply because of the cost of supplying the required documentation.

Another potentially important financial instrument in support of firms' up- and re-skilling efforts in Italy is the recently-introduced **Fondo Nuove Competenze** (FNC). The Fund provides resources for the training of workers in companies that need to reorganise working hours due to the adverse market conditions in which the firm operates. Endowed with 730 million for 2020-21, it finances the cost of labour for workers in training, but not the direct cost of training, which can be sustained by Training Funds. The FNC is an important instrument of active labour market policies and can help spread a culture of learning among employers in Italy. Importantly, the Fund has the ambition to finance training initiatives that meet the firm's needs of reorganisation but that are also personalised to the worker and that must result in a certification. It is not yet clear, however, whether the FNC can foster training in micro and small firms as much as in medium and large ones. The application procedure requires several steps and is less than straightforward, especially if firms have not had previous experience with the design of a training plan, and time to comply with some requirements is short. Furthermore, the Fund's resources are allocated on a first-come, first-served basis (conditional on acceptance), and no funds have been earmarked specifically for SMEs, which may put these at disadvantage, in light of their lower average organisational capabilities.

Table C. Overview of identified measures identified in chapter 4

Objective	Programme/ initiative	Main Institution
Reducing the cost of training	Training funds (Fondi Paritetici Interprofessionali)	Training Funds
	Various initiatives in National and Regional Operating Programmes	ESF, ERDF, Regions
	Voucher Digitalizzazione	MISE
	Training Tax Credit 4.0; R&D, Innovation and Design Tax Credit	MISE
	Fondo Nuove Competenze	ANPAL, Regions

Some barriers might coexist

Often the mentioned barriers to the up- and re-skilling of workforce in SMEs are not isolated but coexist. However, some of the reviewed measures, or some features of the policy actions, can also tackle more than one barrier at the same time.

This is the case, for instance, of firm **networks**. Networks enable the sharing not only of costs, but also of information, knowledge and strategic decisions across firms. Importantly, they can only be sustained if firms share a common project, whereas a well-designed (innovation or training) project is often the missing component that prevents SMEs from investing and remaining competitive. Supply-chain relations (*filiera*) produce an important and frequent incentive to create networks. These, however, need not have a territorial or even sectoral dimension any more. In fact, many territories cannot supply the Industry 4.0 inputs that are needed for firms to thrive in the 21st century. Policy makers can support firm networks by allowing these entities to apply for support alongside individual firms, by differentiating the rate of subsidisation for networks, or by earmarking specific resources for networks only. The important ERDF resources invested at the regional level to support firm networks call for a renewed effort of coordination between the central and regional administrations to this goal.

A second such example is the provision of **informal learning**. By definition performed during working hours and while carrying out one's job tasks, informal learning reduces or resets the indirect cost of training,

and often follows automatically the investment in technology adoption. Indeed informal learning often takes the form of learning from suppliers. In this sense, several aspects of the Industria 4.0 plan stimulate the (informal) up- and re-skilling of employees simply by subsidising the uptake of new technologies. Large investments have been made in recent years by the Italian Ministry of Labour and Social Affairs and the Ministries of Education, University and Research to recognise and certify individuals' prior learning, which fosters the returns to informal learning. Financial support to informal learning, however, necessarily goes through a conscious effort by the firm to give a minimum "formalisation" to the learning activity, for example by drawing a learning plan and following up on its achievements.

When it comes to the **cost of compliance** with regulation and paperwork, SMEs are often at disadvantage, as they lack a dedicated HR department/staff that can absorb the fixed cost of managing application procedures. Calls for proposals are probably the most common approach to procuring education and training services, but they are also often characterised by high administrative costs for the beneficiaries (complex rules, delays in reimbursements, multiple simultaneous applications, and the uncertainty in planning when funding is short-term). Numerous mitigating measures are proposed to minimise the cost of compliance in calls (see **Chapter 4**). Other important instruments that can decrease the administrative costs of public support to training are: one-stop shops, to help firms navigate a fragmented system involving different authorities; targeted guidance on how to process the application for funding, e.g. via ad-hoc online pages, F.A.Q., or thematic "road tours", or in partnership with employers' associations; online open public consultations or Business Fora, to intercept and valorise the feedback from the beneficiaries.

A last area of policy actions with crosscutting consequences deals with **coordination between institutions** that have competence or provide funding for investment in human capital in SMEs. The fragmentation of sources of funding and information on this area of policy action emerges clearly from this report, albeit certainly not for the first time (OECD, 2018^[2]). Multiple institutional and non-institutional stakeholders in Italy act to the same goal, but often in an uncoordinated manner, increasing the risk of inconsistent, overlapping or ultimately incomplete approaches. Strengthening synergies and maximising impacts requires further reflection on the most suitable, formalised, mechanism(s) for inter-institutional coordination, and possibly on a common national strategy for up- and re-skilling in SMEs. One concrete example in this direction is coordination between ESIF and Training Funds, which could reduce the overlap of resources and focus Regional resources on populations that can hardly be served with Training Funds. One important area of intervention in this sense is the training of entrepreneurs. These initiatives should be enshrined in the Region's strategic choices for smart specialisation and industrial policy more broadly. A permanent negotiating table between regions, employers' associations, unions and training providers could be set up to foster synergies between European Structural and Investment Funds and Training Funds.

1 Setting the scene

Digitalisation, population aging, globalisation and the green transition are changing jobs and skill needs, in Italy like elsewhere in the OECD. These megatrends will both create and destroy jobs, but not necessarily in the same sectors, occupations or places, and not necessarily characterised by the same skills. The COVID pandemic has likely further increased the speed and the intensity of these megatrends, determining deep changes in labour markets across the OECD. While many high-skilled workers have benefited of the expansion of teleworking, the low-skilled have experienced greater job losses and their working conditions have worsen.¹

Despite the quick policy interventions aimed at supporting firms and freezing redundancies, more than 600 000 jobs have been lost – corresponding to a 2.6% decrease in employment – between the last quarter of 2020 and the same period in 2019. In this context, where cyclical and structural factors demand important adjustments for both workers and firms, employers play a key role, as they can upskill their workforce by promoting adult learning on the workplace. The availability of high quality adult learning is crucial to support workers at this time of transition, and adapt production to the opportunities and challenges of the post-COVID world.

The present study reviews the existing policy initiatives that facilitate, directly or indirectly, the up- and re-skilling of workers in Italian micro, small and medium enterprises (henceforth, for simplicity, SMEs).² It does so under the assumption that better human capital raises the firm's ability to engage in the digital and green transformations, and appropriate the returns of innovation and investment more broadly. In this perspective, the study follows on the indications recently expressed by the European Semester (European Commission, 2020_[3]; European Council, 2019_[4]), and on Italy's strategic objectives in the Programme for New Cohesion Policy 2021-2027 (DIPCOE, 2020_[5]; European Commission, 2019_[6]).

The study's focus on SMEs is justified by the disadvantaged position of SMEs, relative to large firms, vis à vis certain market failures. While SMEs represent 99.9% of Italian companies and 77% of employment, they are on average less productive than larger firms, and while this is not uncommon across OECD countries, such relatively high frequency translates into a more important burden on aggregate productivity in Italy than elsewhere (OECD, 2019_[7]). Furthermore, SMEs are less likely to invest than large firms (80% vs 93% in 2018) and less likely to implement at least one digital technology (38% vs 62%) (EIB, 2019_[8]), and they are less likely to provide training to their staff in comparison to larger firms (INAPP, 2017_[9]). SMEs have (more) imperfect knowledge of the benefits of training, and more limited resources to gather information on the market for new hires or for training; they suffer of greater volatility of the return on the investment in human capital, because both employment turnover and the probability of poaching are

¹ Around 38% of Italian adults have low levels of literacy and/or numeracy proficiency, well above the OECD average of 26%. When narrowing the focus to the employed population, the share shrinks marginally, to 34%, relative to an OECD average of 23%.

² The definition adopted here relies on the number of employed staff only and is therefore simplified relative to the European Commission Recommendation (2003/361/CE) that stipulates size thresholds based on both employment and sales. SMEs are defined as firms with less than 250 employed staff. Among them, micro firms are those with less than 10 employed staff, small firms those with employed staff comprised between 10 and 49 employed staff and medium firms those with 50 employed staff or above.

higher; they are on average more liquidity constrained and enjoy more limited economies of scale (OECD, 2017_[10]).

Based on the evidence presented further below in this section, three main barriers are considered as particularly relevant in the Italian context, and they are analysed in depth in the next sections of this report: the limited learning culture that characterises SMEs in Italy; the inability of many SMEs' to understand their own future skill needs and to find them on the market; and the perception that investing in the workforce's skills is too costly for SMEs.

Public policy can help Italian firms to overcome these barriers to up- and re-skilling. These policies are the main object of interest for the present study, albeit with some caveats. First, the policies reviewed in this report address continuous rather than initial vocational training, and training for employees and entrepreneurs, rather than for the unemployed. While a more encompassing approach could be pursued and could well generate important benefits for SMEs (e.g. by raising the average skill level of the overall working population), this challenge is not addressed in this report.

Moreover, a monitoring, evaluation or a review of users' opinions on these policy measures does not (yet) exist in most cases, hence an assessment can only rely on expert judgement via the perspective of institutional and non-institutional stakeholders. These were collected by semi-structured interviews and written contributions between October 2020 and February 2021, and analysed by the OECD.³ For the same reason, the report does not consistently look at policies from the perspective of the optimal allocation of public resources. It is indeed possible that some of the described measures subsidise the up- or reskilling practices of some firms that would have offered the training even without the subsidy, or that resources end up supporting only the best performing firms. Unfortunately, very little to no evidence exists on the counterfactual outcomes in absence of these policies. Consequently, when considerations are here made on the efficiency of the allocation of public resources to certain measures, they only analyse the policy design itself to assess whether the measure has the potential to affect the outcome of interest (skill investment in SMEs). These considerations can therefore only suggest whether the conditions imposed to touch the public support (where existing) are not so demanding as to exclude a large number of laggard but potentially successful firms.

The remainder of this chapter explores the results of a new survey of Italian SMEs that gathered evidence of firms' investment in their workforce skills and in innovation, with a view to highlight the areas where investment could be bolstered by well-designed policy instruments. Chapter 2 describes existing policies in Italy that can promote a learning culture in SMEs by supporting training to manager and entrepreneurs, strengthening the collaboration among firms and raising awareness of existing public policy instruments. Chapter 3 focuses on skills assessment and anticipation in SMEs and on the matching of workers and firms, including by promoting technical education pathways. Chapter 4 explores how to reduce costs and the administrative burden on SMEs that engage in technology adoption and/or investment in human capital. Chapter 5 summarises main findings from the report and presents the lessons learnt in the first phase of the project.

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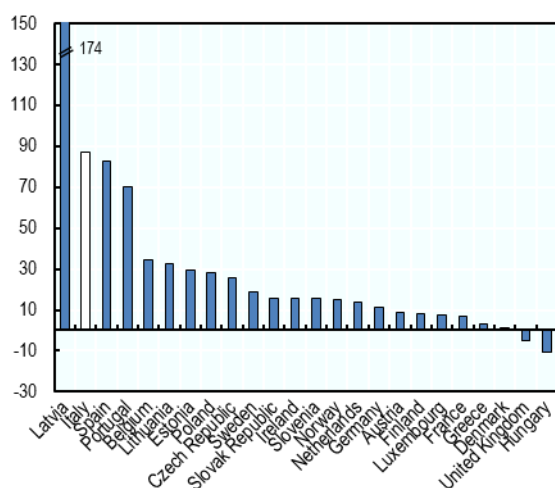
Training in SMEs is still limited

In Italy, firms' provision of training and adults' participation in training have improved considerably in Italy over the past decade, although from a low initial base. According to the Continuing Vocational Training Survey (CVTS), the share of firms providing training to their workers has increased by 87% in Italy between 2005 and 2015, the second highest increase in the (EU27 + UK) after Latvia (see Figure 1.1).

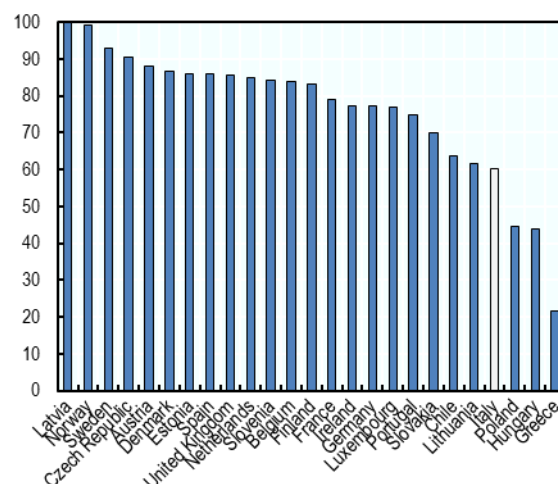
Despite this progress, Italy still lags behind most OECD countries. Many adults still do not participate in adult learning opportunities and a high share of firms continue to provide little or no training to their workers. Indeed, according to the OECD Survey of Adult Skills (PIAAC), only 20.1% of the adult population in Italy participate in job-related training, i.e. half the share at the OECD average (40.4%). While Italian firms could play a major role in upskilling their workforce, data from the CVTS show that only 60.2% of firms with at least 10 employees provide continuous vocational training to their workers. This value is among the lowest across the EU and places Italy at the bottom of the distribution, ranking ahead only of Poland, Hungary and Greece only.

Figure 1.1. In Italy, firms' provision of training is still low but has significantly increased

Panel A. Growth rate of training provision (2005-2015)



Panel B. Share of firms providing training, 2016



Note: For data on firms' provision of training, data for Chile refer to 2014, and 2016 for all other countries.

Source: CVTS; ENCLA for Chile; Basic Survey of Human Resource Development for Japan; Business Operations Survey for New Zealand.

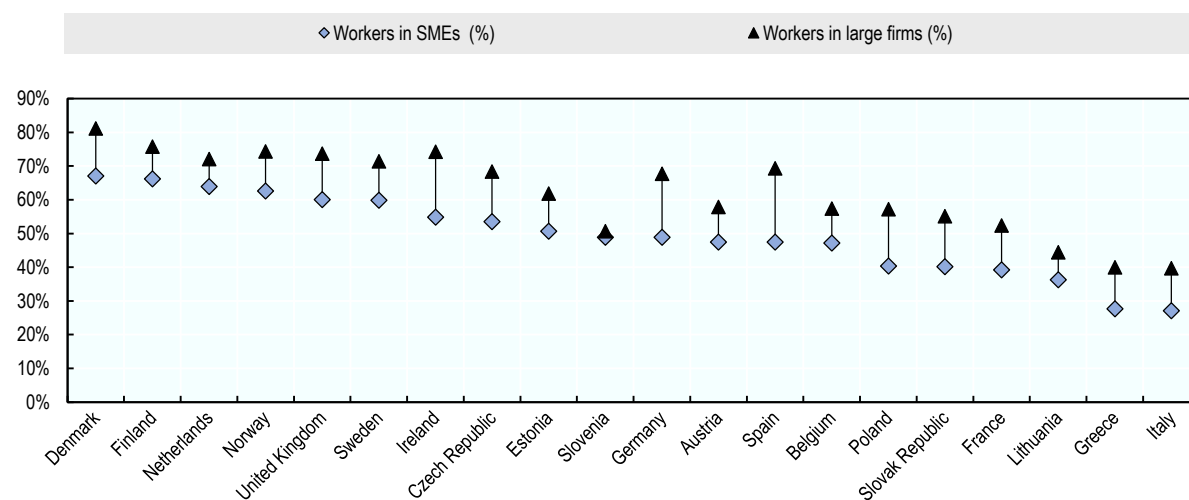
According to the PIAAC Survey, adults who work in larger firms, regardless of other factors, are much more likely to receive employer-supported training than those who work in SMEs (Figure 1.2). This holds true in all EU countries, but the gap is larger in Italy than in all other European (EU27 + UK) countries covered by the survey. In several countries, working in large firms (251 employees or more) is associated with very high probabilities (0.7) of receiving employer-support. Notably, in countries with comparatively high overall rates of participation, workers in small firms (11-50 employees) have probabilities close to or above 50%. In other countries, however, workers in small firms have much lower probabilities of participating ranging between 20 and 40%. In all cases, adults who work in micro-sized firms (1-10 employees) have significantly lower probabilities of participating in adult learning.

These figures refer to individuals engaged in formal and non-formal training, where formal training is institutionalised and planned through public organisations and recognised private bodies, and leads to

formal qualifications, contrary to non-formal training. Up- and re-skilling in micro and small companies is less frequently of the formal and non-formal type, though. Resource-constrained firms cannot sustain the cost of more formalised training activities, or cannot afford key workers to take time off from their job tasks. This is likely to be a particularly important constraint in high-technology sectors, where workers need to update their competencies regularly and to keep pace with rapidly changing technologies.

Figure 1.2. Difference in participation rates between SMEs and large firms

Share of adults participating in formal and non-formal job-related learning



Source: OECD Survey of Adult Skills (2012, 2015).

In 2020, the OECD designed and implemented a survey of Italian SMEs, aimed to collect additional information on Italian SMEs practices in relation to training, innovation and investment. The OECD Survey of Training in SMEs – STSME in short - surveyed a representative sample of 528 SMEs throughout the country, asking for information on the barriers firms encounter in providing training to their workers, and on the firms' knowledge and experience with public policy tools that can help overcome these challenges. More information on the methodology used for the selection of the sample and the implementation of the Survey can be found in the Annex.

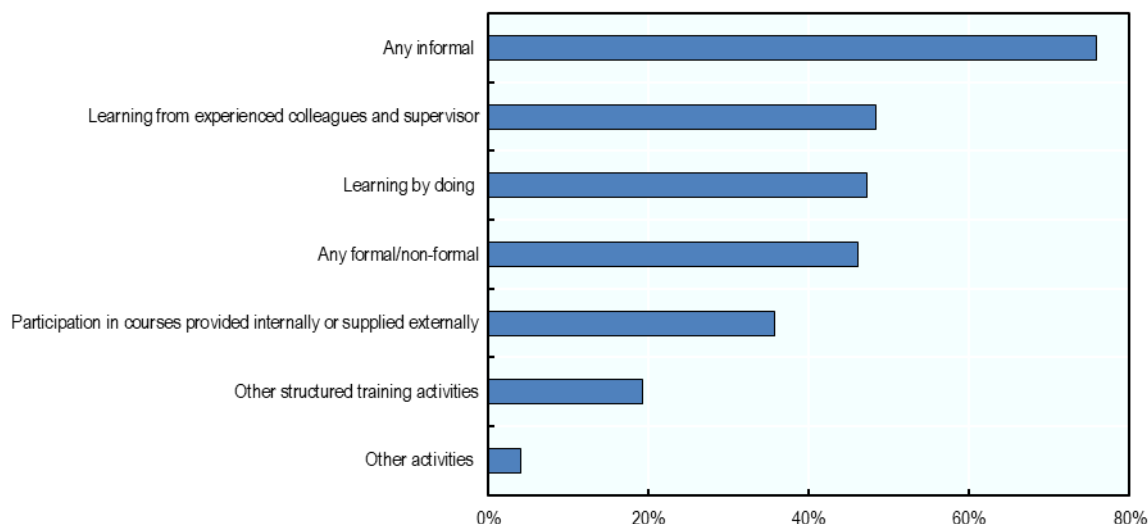
In line with existing evidence, the OECD STSME shows that SMEs tend to have informal channels to improve the skills of their staff. Informal learning is an intentional but non-structured form of learning from experienced colleagues or supervisors, or of learning while performing the tasks of one's job (learning by doing). In particular, the OECD STSME highlights that more than three out of four Italian SMEs trained their workers informally (albeit not necessarily *only* so) in 2018-19, but only 46% offered a formal or non-formal training activity.

Figure 1.3 breaks this percentage down to its two components: learning from colleagues or supervisors (48% of surveyed firms), and learning by doing (47%) for informal training, and courses (37%) and other structured training activities such as job rotations or study visits (20%) for formal or non-formal training. These results are in line with findings from the PIAAC Survey, which reports that 64% of respondents participate in an informal learning activity at least once per week, on average across OECD countries. As such, informal learning occurs much more frequently and more intensively than the other forms of learning (Fialho, Quintini and Vandeweyer, 2019^[11]). This is especially important in the context of SMEs, which may

not always find financial resources and time to organise more structured learning activities. Not unexpectedly, the share of firms offering more structured forms of training is increasing in size, with 61% of medium firms offering it in 2018-19, as opposed to 38% of micro firms.

Figure 1.3. Learning activities are mainly informal in SMEs

Ways of improving skills among staff (%)



Note: Informal learning is learning from colleagues and supervisors, and learning by doing.

Source: OECD Survey of Training in SMEs.

In many instances, this informal training is delivered by the company that has supplied new software or equipment to a purchasing firm. In these instances, representatives of the supplying company show how the new technology works to the personnel of the purchasing company, and remain available for “assistance” when necessary. These extra services enshrined in the technology purchase contract are in fact forms of learning by doing or learning from peers, but both employers and policy makers may fail to acknowledge them as such. The reality of supplier-led innovation certainly has its limits, as it mostly only allows for small incremental advances, but such piecemeal approach is certainly in line with real processes taking place in SMEs. In a 2017 survey conducted by Fondazione Nord Est on a sample of SMEs that had implemented Industry 4.0 (I4.0) solutions, 72% of respondents reported having innovated through their suppliers, mainly replacing existing machinery with new ones (Banca IFIS and Fondazione Nord Est, 2016⁽¹²⁾).

Box 1.1. Differences exist among SMEs of different sizes

Micro firms represent the bulk of many EU national economies, including Italy, where they represent 95% of firms and employ nearly eight million people, corresponding to 45% of the total employees (i.e. *addetti*). While the literature generally compares micro, small and medium-sized firms to larger firms, significant differences exist also among SMEs of different sizes, and in particular, between micro and small firms vs other firms. In micro and small firms, for instance, the manager and the entrepreneur may be the same person, thus creating agency and span-of-control issues, which may depress training provision and technology adoption. Micro and small firms may also invest relatively less in their workforce development because they face both stronger external (e.g. access to finance and availability of suitable training courses) and internal barriers (e.g. lack of a long-term vision, human and financial resources) to training. Furthermore, in these firms training is disproportionately of the informal type.

This report presents new evidence from the OECD STSME on how micro, small and medium enterprises differ in relation to their propensity to invest in skills and to innovate, and highlights which public instruments could be most suitable to respond to the specific needs of micro enterprises (see chapter 5 for a summary).

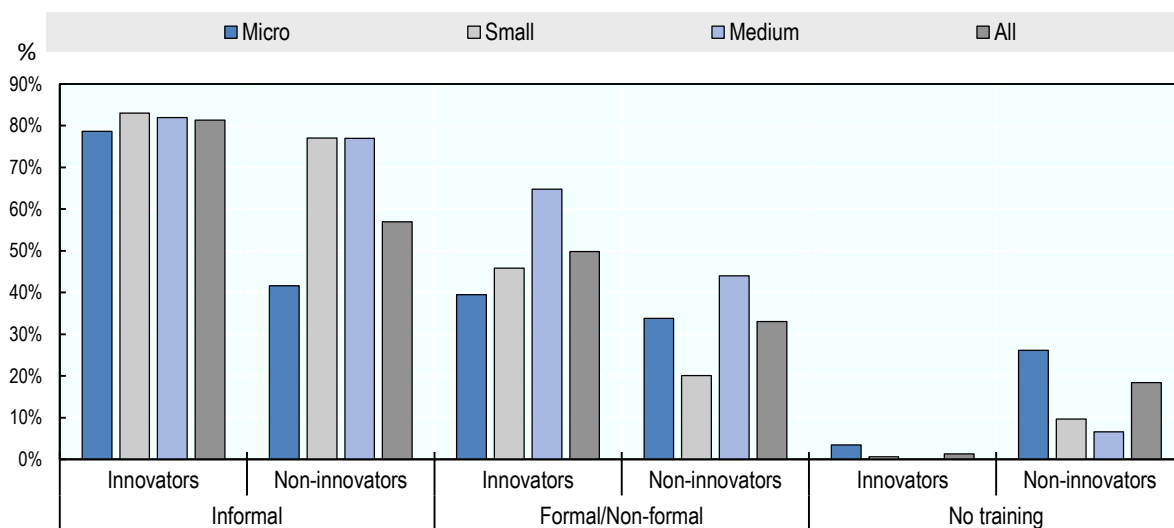
This complementarity between human capital and innovative output is not new in the economic literature of firm dynamics (Vandenbussche, Aghion and Meghir, 2006^[13]), and the same can be said for training and innovation (Dostie, 2018^[14]) (Eurofound and Cedefop, 2020^[15]). An even larger number of studies established the role of human capital and training in sustaining firms' productivity growth and their convergence to the productivity frontier (Griffith, Redding and Van Reenen, 2004^[16]; Konings and Vanormelingen, 2015^[17]; Black and Lynch, 1996^[18]), including in the Italian context (Conti, 2005^[19]; Colombo and Stanca, 2014^[20]; Dosi et al., 2019^[21]; Iranzo, Schivardi and Tosetti, 2008^[22]; ISTAT, 2018^[23]). Human capital contributes to generating new ideas (e.g. R&D personnel) and to identifying and making use of knowledge and technologies that are produced elsewhere, including through spillovers from other firms. Indeed diffusion of innovation does not happen instantaneously and ubiquitously, as technology adoption requires investments in complementary capabilities, many of which are underpinned by human capital. As not all firms are equally capable to attract and nurture human capital, nor to deploy it effectively to improve performance, human capital can represent a fundamental discriminant between firms at the frontier of productivity and firms that lag behind (Berlingieri et al., 2020^[24]). Firms at the bottom of the productivity frontier in OECD countries are on average smaller (Berlingieri et al., 2020^[24]).

The Survey further confirms that firms introducing innovative products and processes are also more likely to offer training to their workforce: 50% of innovative firms also invest in formal or non-formal training, as opposed to 33% of non-innovative firms. Among firms that invested in products or technologies that reduce energy consumption or improve the firm's environmental footprint, these shares are very similar (51% for investing firms, 38% for non-investing firms). Informal training is more frequent overall, but once again the share of firms offering it is 21 percentage points higher among innovative firms than non-innovative firms (83% vs 62%), and 11 percentage points higher among firms investing in "greener" technologies (83% vs 72%). Further evidence from the OECD STSME confirms the expectations that the provision of formal and non-formal training is increasing in the firms' size also when the innovation status of firms is further accounted for (Figure 1.4). For informal learning, this size-dependent regularity applies only among non-innovators, while an almost equal share of micro, small and medium firms report to have engaged workers in informal learning activities in 2018-19. The co-occurrence of investment in innovation and training is less striking for informal than non-formal or formal learning, except among micro-firms, which engage in informal learning twice as much if innovating than if not innovating. Overall, virtually all innovators offered some form of training, contrary to non-innovators. Non-innovative micro firms in particular micro firms are significantly less likely to offer both structured and unstructured training than innovative ones, and indeed

eight times more likely to offer no training at all.

Figure 1.4. Type of training by firm size and propensity to innovate

100 = Number of firms in the size and innovation category that offered that type of training in 2018-2019.



Note: “Innovators” are firms that report to have introduced a product or process that is new for the firm or for the market in 2018-19.

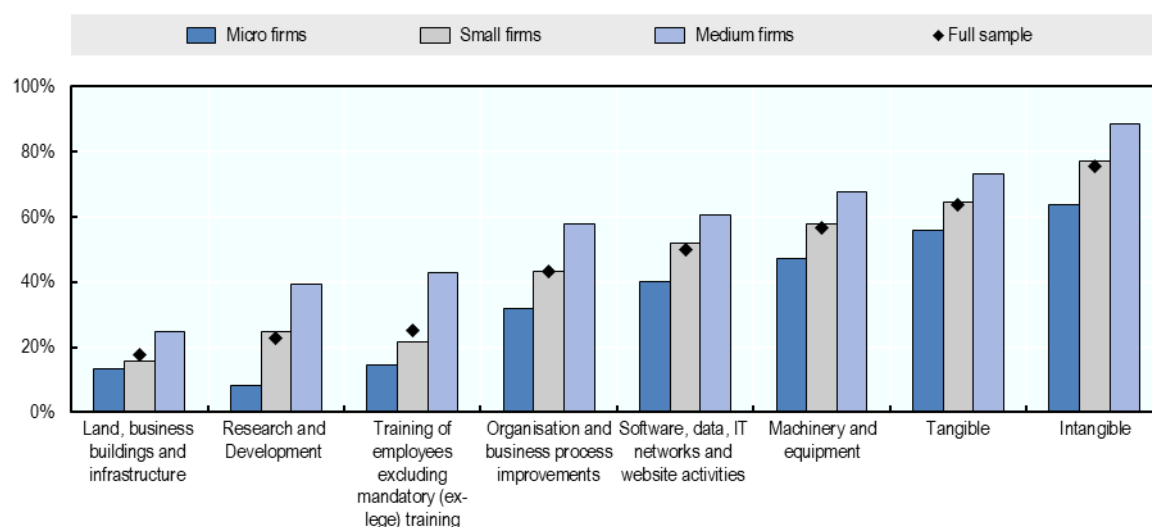
Source: OECD Survey of Training in SMEs.

In addition, firms can invest in other types of assets besides their workforce’s skills. Evidence from the STSME shows that more than half of the firms taking part in the STSME invested in new machinery in 2018-19 (Figure 1.5). This is the single asset type with the highest incidence among all types of investments surveyed, followed by investment in software (50% of all firms). Overall, however, more firms have invested in at least one intangible asset than in one tangible asset (76% vs 64%). Importantly, the proportion of investing firms is always higher among medium firms than micro and small firms, no matter the asset category.⁴

⁴ In light of the nature of the STSME, comparisons on the intensive margin of investment could not be performed.

Figure 1.5. Investment made in 2018-2019 to maintain or increase company's future earnings

Percentage of firms in the size class reporting investment in the given asset category



Note: Tangible investments include investment in buildings or machinery; intangible investments include investment in R&D, continuous training, software, or organisational capital.

Source: OECD Survey of Training in SMEs.

Barriers to training

As mentioned, even under positive economic conditions, SMEs face a number of barriers that prevent them from providing the same amount (and type) of training as large firms. Often these barriers are not isolated but coexist, lowering the propensity to train further. Important barriers include the lack of an internal human resource department or a specific person in charge of coordinating training, low levels of managerial skills, the lack of capacity to assess and anticipate skills needs (OECD, 2019^[25]). In addition, financial costs of tailored training are relatively high for SMEs because fixed training costs are distributed across a smaller number of employees, and because releasing people from revenue-generating activities for training might be especially challenging when the workforce is small. Furthermore, SMEs tend to experience higher job turnover, which limits their capacity and willingness to invest in skills development, given the risk that an upskilled employee might leave shortly after training (OECD, 2017^[26]).

In addition to the barriers that are in common to other OECD countries, Italian SMEs face additional challenges. First, training is not considered as an asset but is generally associated to an activity for the unemployed or for people who have left the education system too early. In addition, SMEs have little awareness of the benefits of training, possibly because of the lack of systematic impact evaluation of training, and because of a general perception that sponsored-training is a poor fit to the firms' needs and as such not very useful (OECD, 2019^[11]).

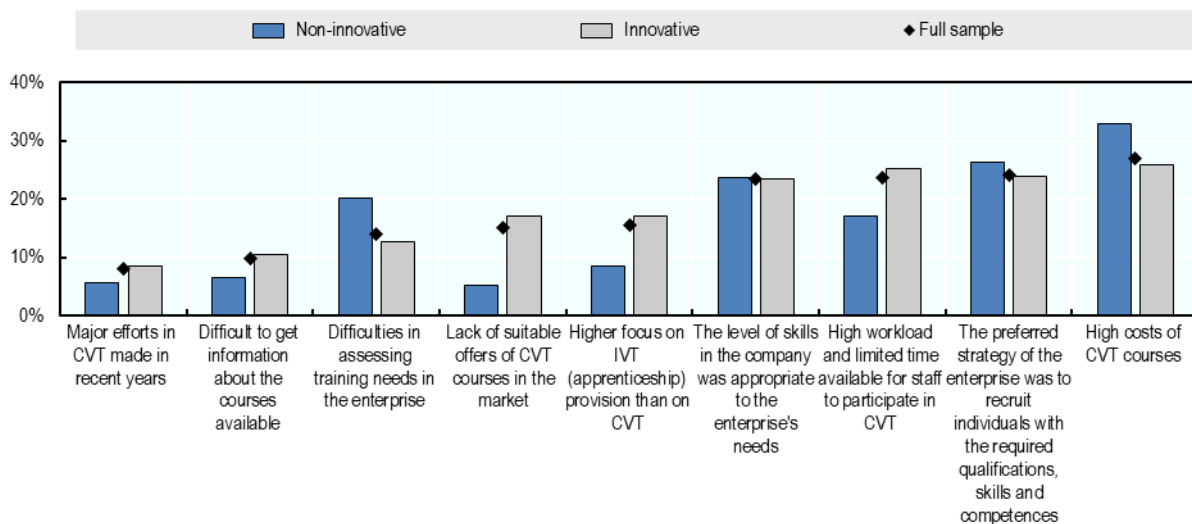
The OECD Survey of Training in SMEs captures some of these aspects. In particular, data shows that the reasons why a firm has provided limited structured training in the reference year varies in relation to firms' innovation capacity. About 24% of respondents that provided formal or non-formal training in 2018-2019 reported that they preferred recruiting a skilled person on the market rather than providing extra training. This figure is similar for innovative firms but it is two percentage points higher for non-innovative firms.

Around 23% of firms, regardless of their innovative capacity, did not provide more training to their workers because they considered that their staff already had the right skills (Figure 1.6). This may not be an

appropriate assessment, though, as the managers or employers do not perceive their workforce skills as something evolving that needs to be updated (see Ch.2 henceforth). Respondents may also fail to see the actual training requirements of their staff, for instance if a system of skill assessment is not in place in the company (see Ch.3). This also affects the reported incidence of another barrier, i.e. the difficulty to assess the training needs of the workforce. According to the STSME, 13% of innovative firms and 20% of non-innovative firms having provided formal or non-formal training in 2018-2019 experience such difficulties, but many more firms may actually fail at this assessment and not realise it.⁵ Innovative firms also experience challenges in finding suitable courses in the market, which represents a barrier for 17% of them compared to only 5% of non-innovative firms. Nevertheless, two other barriers to the provision of training emerge quite clearly from the STSME: high direct costs of training provision (26% of innovative firms vs. 32% of non-innovative firms), and limited time availability for training (25% of innovative firms vs. 17% of non-innovative firms), which is itself a proxy for the indirect cost of training (i.e. the cost incurred if the worker cannot fulfil her job tasks). Public policies aiming to reduce the cost of training in SMEs are discussed in Chapter 4 here below.

Figure 1.6. Reasons to limit the provision of continuous training in the firm, 2019

Shares among firms that have provided continuous training by innovation capacity (%)



Note: Shares are computed only for firms having provided formal training.
 Source: OECD Survey of training in SMEs.

Training provision in the time of COVID-19

The COVID-19 pandemic has struck Italian firms especially hard. During the first lockdown (9 March - 4 May 2020), 45% of firms with more than three employees, representing 27.5% of total employment and 18% of the total turnover, suspended their activity (ISTAT, 2020^[27]). The impact differed across regions, sectors and firm size classes, with the highest shares of firms with suspended activity being micro and small enterprises. The financial impact of the pandemic was greater for smaller firms, with nearly six out of ten micro firms registering a loss of more than 50% of revenue compared to around five in ten small

⁵ According to the CVTS, in 2015 18% of Italian SMEs with more than 10 employees did not perform such an assessment at all, and another 55% performed it in an irregular and unstructured way.

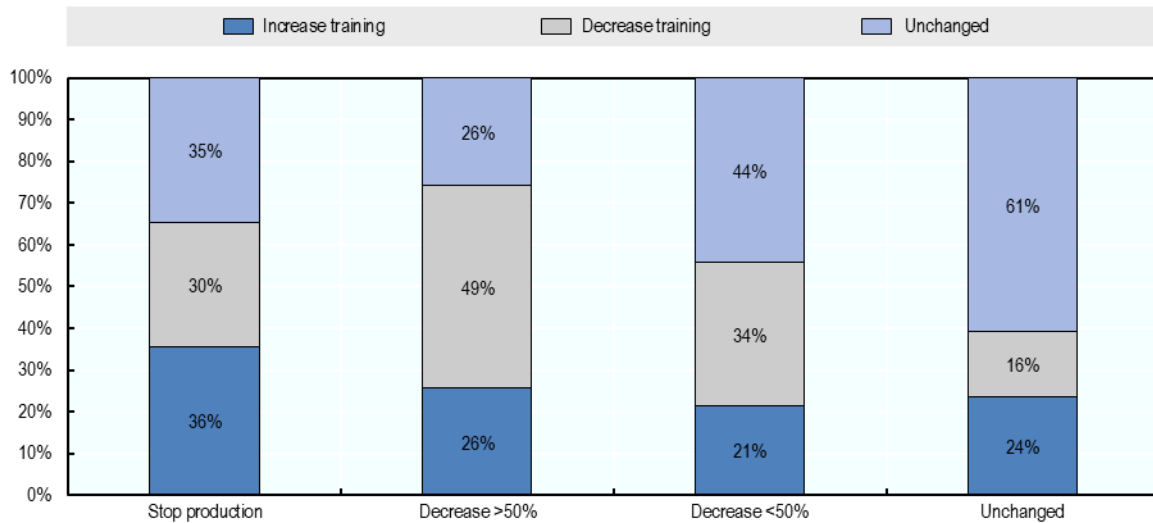
firms and less than three in ten among big firms, among which the majority saw a decrease of revenue between 10% and 50%.

Because of the pandemic, firms that did not suspend their activity had to change their work organisation and production, often by investing in the adoption of new technologies. Thanks to the widespread availability of connectivity, most firms have incremented digital services to their clients. Around 13% of firms, across size classes, invested in the creation or improvement of their websites. The proportion of firms making use of cloud servers increased by 17 percentage points (to 27% of all firms), while that of firms using specialised software for project management by 13 points (to 19%). These figures were mostly driven by firms that did not have previous experience of teleworking. Indeed teleworking mostly increased gaps that already existed across firms, as the negative effects of teleworking on productivity, technology adoption and operational costs are concentrated among small and low-productive firms (ISTAT, 2020^[27]). According to a study by Confartigianato, during the COVID-19 crisis one in five SMEs introduced or intensified at-distance work, and slightly less than one in three used alternative sales channels, intensifying the use of digital channels. In 2020, digital service companies have grown by +3.3%, against the -0.4% observed for the overall population of firms. This anti-cyclical growth can clearly be traced back to the opportunities offered by the new demand for digital services (Confartigianato, 2020^[28]). Social distancing measures and the important penetration of teleworking in many sectors have fostered the diffusion of online or hybrid (online and in-person) training courses, albeit evidence on their occurrence is still limited (ref. Box 1.2).

In the context of the COVID-19 pandemic, the differences in the propensity to offer digital training and in the rate of investment in advanced technologies more broadly may have translated in different degrees of firm resilience to the economic shock. This, in turn, affects firms' propensity to invest in staff training. According to the STSME, the incidence of firms reporting that the pandemic has decreased their propensity to offer training is highest among firms that were worst hit by the crisis, i.e. those that saw their production decrease by more than 50% in 2020 (Figure 1.7). Conversely, firms that did not see significant changes in their production mostly report that their propensity to invest in training is also unchanged. Among firms that stopped producing in 2020, approximately as many respondents intend to step up the offer of training to their staff as those who intend to decrease it or leave it unchanged. This can be explained by the fact that these firms may have stopped producing only temporarily. According to ISTAT, 55% of firms that stopped their activity during the first lockdown were planning to restart their activity during 2020, while only 3% were not going to go back to their activity (ISTAT, 2020^[27]).

Figure 1.7. The impact of COVID-19 on production and training

Propensity to training in relation to changes in production (%)



Source: OECD Survey of Training in SMEs.

Box 1.2. Online training

The sharp increase of teleworking and the social distancing measures imposed by the pandemic has led firms to reinvent their training strategies and workers to adapt to these changing conditions. Online learning can help to overcome the usual barriers to training by allowing learners to choose a time, rhythm and place compatible with work and family responsibilities.

In 2020, most training offered in firms happened in the form of online courses. This type of training is more flexible and reaches a greater number of participants with limited financial investment, however it tends to be less inclusive than traditional face-to-face training. However, lower skilled people, or those with limited digital skills or poor equipment and connectivity, are more likely to be excluded from upskilling and reskilling opportunities.

The content of training courses has also been adapted. Not all types of training, initially planned in classroom, can be performed at distance and firms needed to make a selection of their learning offer. In this context, the role of managers is extremely important as they can orient and plan the most relevant training for their staff. In addition, in order to ensure participation and completion, the quality of the online courses and their careful planning is key, even more than for classroom training. Overall, work in smaller groups, shorter sessions and interactive activities are considered characteristics for success.

Source: Fondirigenti (2021^[29]) McKinsey & Company (2020^[30]) OECD (2020^[31])

2 Promoting a learning culture

Firms can adopt different strategies to expand and maintain the skills of their workforce. Regardless of whether they prefer recruiting new people or providing training to their current staff, fostering a learning culture within the workplace can be a source of competitive advantage, as it can reduce staff turnover and enhance firms' innovation capacity. While there is no shared definition of learning culture, some common characteristics can be identified, namely: i) the promotion of learning activities among staff; ii) the willingness to learn at different levels of the hierarchy; iii) the possibility to influence changes within firms thanks to the newly acquired skills (CIPD, 2020^[32]; Kearns and Papadopoulos, 2000^[33])

This chapter considers three forces shaping the learning culture in SMEs, and what policies can influence them: good management practices and managerial skills; effective collaboration across firms; and sound awareness of existing support measures aimed at promoting technology adoption and human resource development.

Strengthening managerial capabilities

Managers and entrepreneurs play a key role in promoting a learning culture in SMEs: by using the workforce's skill effectively and acknowledging the benefits of human capital development for the firm's productivity and competitiveness, they disseminate the idea that employee's skills are an asset for the company, akin to a new software or an R&D laboratory. Investing in the competences of managers and entrepreneurs, and their ability to understand human capital as a productive investment, can therefore enhance SMEs' growth and survival.

The linkages between management practices and firm productivity has been broadly documented in the academic literature and supported by an increasing number of country specific and cross-country firm surveys. As an example, the World Management Survey, which is conducted since 2004 in more than 30 countries, shows that management practices account for around 30% of total factor productivity (TFP) in the manufacturing sector, both across and within countries (Bloom, Sadun and Van Reenen, 2016^[34]). A recent study focusing on Southern European firms shows that worse management practices limit productivity gains from technology adoption (Schivardi and Schmitz, 2018^[35]), while loyalty-based management is associated to persistently low-productivity growth in Italy (Pellegrino and Zingales, 2017^[36]). In several instances, family ownership compounds the problem: managerial quality is lower in firms which are fully managed by the owning family (Bloom, Sadun and Van Reenen, 2016^[34]), and family management is negatively associated to firm performance, on average across country (Bloom and Van Reenen, 2007^[37]). In Italy, 66% of the family-owned companies not only the CEO but also the majority of the management is related to the family, contrary to France (26%), Germany (28%), Spain (36%) or the UK (10%), and family-owned firms in Italy are found to evaluate managers' performance on the basis of loyalty to the family and the company more than according to actual outcomes (Bandiera et al., 2018^[38]).

While good managerial practices and skilled managers are two distinct aspects of firms' managerial capabilities, the association of good managerial practices to firm productivity is largely explained by the human capital of managers (Bender et al., 2018^[39]). Yet, a recent paper on Italian firms shows the existing complementarity between managers' educational attainments and their capacity to adopt effective managerial practices (Baltrunaite, Bovini and Mocetti, 2021^[40]). Improving management practices passes

through changes in both the supply of and the demand for managers. In Italy, workers are often mismatched relative to the requirements of their job and firms – and especially the smallest ones – are not fully aware of the value that better managers could bring to them. According to Osservatorio 4.manager (2019_[40]), approximately half of the firm owners interviewed by the expresses the willingness to hire for managerial positions over the next three years, a higher proportion than in 2017. Almost 90% of firms, however, report difficulties in finding people with the right skills for managerial positions. Shortages are especially large for soft skills, such as leadership skills, motivation, knowledge of foreign languages and capacity to innovate and adapt to a fast changing economic and labour market landscape (Osservatorio 4.manager, 2019_[40]). Soft skills are seen as especially important for SMEs, where managers are expected to have more proximity and stronger collaboration with their staff (OECD/European Union, 2019_[41]).

Box 2.1. Soft skills in the digital transformation

A recent research conducted by Excelsior-Unioncamere, focusing on the linkages between technology adoption and human capital development, highlighted the importance of soft skills in the workplaces. Yet, these skills make people more adaptable to a fast changing work environment, while also contributing to the enhancement of firms' competitiveness. The current pandemic has exacerbated the need for soft skills, which are considered fundamental to keep people's motivation high and to ensure firms' growth when interaction among staff is limited.

Data on the skills sought by firms showed that soft skills have become increasingly complementary to digital skills. For example, while around 80% of firms will require problem solving skills in their future job openings, this share rises to 93% when also digital skills are required and to 94% when mathematical and computer skills are deemed necessary, and 95% if it is the ability to manage innovative solutions is in demand. Similar patterns exist also in relation to other soft skills, such as team work and the capacity to work independently. While soft skills tend to be required in all job positions, the demand is higher for managers, intellectual, scientific and highly specialised professions as well as technical professions.

Considering the complementarity of hard and soft skills, developing these competencies in a combined way is crucial. However, the report suggests that existing training models in Italy struggle to achieve this objective. Technology could be leveraged to train soft skills, since digital skills are generally used to solve problems and require both a certain degree of autonomy in finding solutions, and the ability to collaborate and communicate with the team.

Source: Unioncamere (2019_[42])

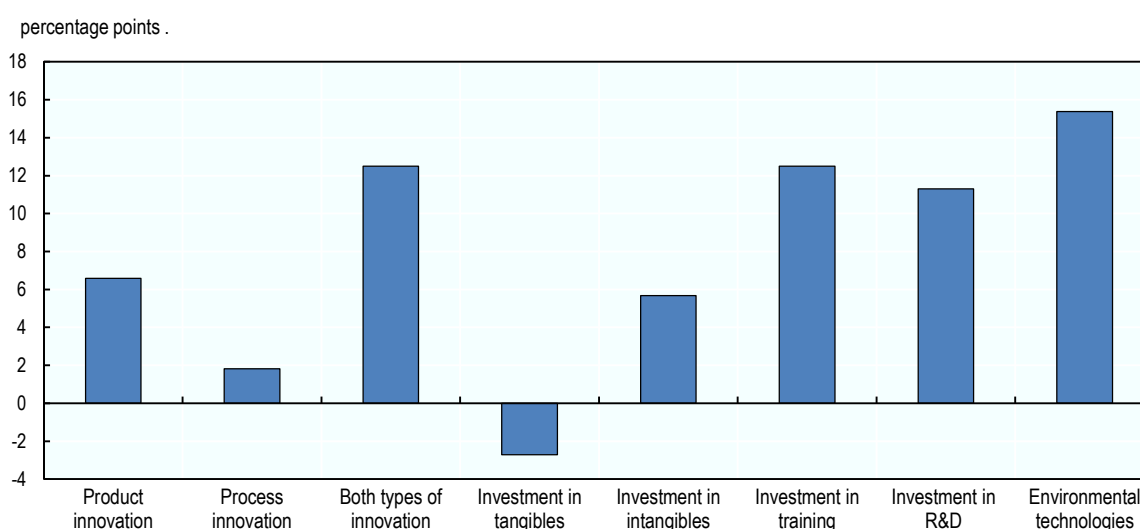
The average educational attainment of adults is lower in Italy than in other OECD countries. Indeed, almost 4 in 10 adults in Italy have not completed an upper secondary degree, nearly double the OECD average. This is reflected in the qualifications of managers, and represents a limit in making optimal corporate decisions, including the uptake of both training and innovation in Italian SMEs (Baltrunaite, Bovini and Mocetti, 2021_[43]).

Data from the STSME show that the share of firms offering non-formal or formal training is 12.5 percentage points higher among firms with a tertiary educated CEO (31% of these firms) than among firms with a less educated CEO (19%) (See Figure 2.1). In addition, training at least 50% of their workers in 2018-2019 was a more frequent occurrence among firms with a tertiary-educated CEO (45% of them) than among firms with a CEO that has at most an upper-secondary degree (37%). The gap is even larger for firms providing training in *digital skills* to at least 50% of their employees (73% vs 42%).

The occurrence of innovation, too, is higher among firms with a tertiary-educated CEO than among firms with a less educated CEO. This is all the more true for the simultaneous introduction of product and a process innovation, and for investments in intangible assets (R&D, continuous training, organisational capabilities, software). Differences in the propensity to adopt environmental-friendly new technologies follow the same pattern.⁶ These results are coherent with a recent analysis of the population of Italian SMEs finding that firms with a more educated employer also display a more educated workforce, even after accounting for the firm's size, sector, location and age. Furthermore, the employer's educational attainment is positively related to the firm's survival and productivity (De Panizza and De Santis, 2018^[43]).

Figure 2.1. Firms with more educated CEOs are more likely to invest or innovate

Difference in the incidence of investing/ innovating between firms with a tertiary educated vs non-tertiary educated CEO



Note: A 5 percentage-point positive difference indicates that the share of firms with a tertiary-educated CEO or general administrator that are investing/innovating is 5 percentage points higher than the share of investing/innovating firms among firms with a non-tertiary-educated CEO or general administrator. A tertiary-educated CEO has attained a university or post-university degree; a non-tertiary educated CEO has attained at most an upper-secondary degree. The type of investment or innovation performed is specified on the x-axis. Tangible investments include investment in buildings or machinery; intangible investments include investment in R&D, continuous training, software, or organisational capital. "Environmental technologies" stand for investment in products or technologies that reduce the firm's energy consumption or improve the environmental impact of production.

Source: OECD Survey of Training in SMEs.

The policy environment

The availability of skilled managers and of well-designed management policies is therefore key to raising the human capital intensity of firms. Changing the learning culture in companies can therefore leverage instruments that convince managers and business owners of the desirability of a skills-intensive production and of workplace development strategies.

Entrepreneurs have a central role to play in understanding the need of the company and its workers, and in designing and implementing change. Among SMEs, this is especially important for micro and small

⁶ Due to the descriptive nature of this evidence, it cannot be excluded that other firm-specific factors jointly determine the CEO's educational attainment and the firm's propensity to innovate or invest. One such dimension, for instance, is the age of the CEO, which is unfortunately, not recorded in the STSME.

enterprises, where knowledge and control are centred in the entrepreneur. Many entrepreneurs, however, may not see the need for up- and re-skilling initiatives, as they are not used to continuous learning themselves. In Italy, entrepreneurship training is still limited and is mainly focused on young people (through initial education) or jobseekers (through the public employment services), with limited continuous training opportunities for established entrepreneurs. The 2021 Budget Law (*Legge di Bilancio*) contribute to fill this gap by introducing a tax credit for public and private entities that donate resources to training initiatives aimed at the development and acquisition of managerial skills. These initiatives must be promoted by universities, advanced training institutes or public and private managerial training schools. The tax credit cannot exceed EUR 100 000 and can cover at most 80% of the donation by large firms, 90% of that of medium firms, and 100% of that by micro and small firms (Gazzetta Ufficiale, 2020^[44]).⁷ The use of Training Funds is also limited, as by law they can solely target staff, both non-managerial employees and employed managers (see Chapter 4 for more on this point). Training Funds have implemented a number of isolated initiatives to offer training to entrepreneurs by complementing the Funds' resources with additional contributions (OECD, 2019^[1]).

Across Europe, the last decade was characterised by a shift from financial support schemes to coaching programmes targeted to specific occupational profiles in SMEs (Sutkus and Gennari, 2016^[45]). **Coaching and mentoring** are fundamental tools to train entrepreneurs and top managers, as they contribute to the development of both hard and soft skills. Successful coaching and mentoring happen in small groups (or even solely between the instructor and the business leader), and they require the active involvement of the trainee. Building a relationship of trust and mutual understanding between instructor and learner is therefore fundamental. Evidence shows that trust also has an impact on future decisions of hiring a coach (O'Neill, 2007^[46]). In addition, for changes to last in the long term, the lessons learnt should be shared within the firm (Harel, Schwartz and Kaufmann, 2020^[47]). However, this still represents a challenge in a number of SMEs. Knowledge sharing activities should therefore become part of the strategy of the SMEs that requires support for the hiring of a coach, to ensure that newly-acquired skills are fully integrated and can translate into innovation. Tools to support knowledge sharing activities may be developed with the coach herself, who can help the firm develop guidelines, which formalise what has been learnt and identifies formal and informal opportunities to train the staff. In alternative, public support to coaching activities could also envisage follow-up meetings between the firm and the coach, so that the coach can provide expertise in multiple moments over the life of the project.

Providing public support to SMEs by introducing an external consultant or coach is important because firms, and especially SMEs, often lack a strategic and long-term vision and are not fully aware of their needs in terms of technology, business planning, organisation or investment in their workforce. Even if aware of their needs, SMEs more than large firms lack the financial resources to cover the cost of consultants or coaches as offered by private consulting companies. The concrete support given by the coach or a consultant to the SME has proven successful. Coaching in particular helps CEOs or owners gain a longer term vision, develop a positive attitude towards risk, engage in restructuring, and increase motivation among the staff (OECD, 2017^[48]). However, a number of challenges exist in Italy in this respect. For example, very small family-owned businesses, such as the vast majority of Italian firms, can be reluctant to accept the presence of an external figure (Del Gatto et al., 2019^[49]) and prefer to entrust managerial roles to people from their family or a member of the company board (CERVED, 2019^[50]). In addition, the overlap between the two figures of firm owner and manager can be detrimental to firms' performance, as the skills of required by these two positions are not the same (Fondirigenti, 2020^[51]).

⁷ See Legge di Bilancio 2021, Section I, comma 536, 537 and 538.

Box 2.2. Investing in innovation in the time of COVID

The Agency for Innovation Sardegna Ricerche has launched the Microincentivi per l'Innovazione initiative with the goal of promoting innovation of products and processes by providing incentives for the purchase of advanced consulting services. The measure, funded with ERDF funds (TO 1, action 1.3.2) is addressed to local micro and SMEs, including self-employed persons and professionals, and supports ready-to-go innovation, with a concrete economic impact of the region and related to at least one of the technological trajectories of the Regional Intelligent Specialisation Strategy (S3).

In the 2020 edition of the measure, the aid intensity is 100% for projects that propose technological solutions that address and manage, in the short/medium term, the risks associated with COVID or that exploit industrial property titles (patents, designs and trademarks).

Projects undergo an evaluation process, managed by Sardegna Ricerche and a committee assessing the quality of the proposal and their technical validity, innovativeness and also the competences of the suppliers involved; extra points are provided for projects that take into account the environmental impact and gender equality. In addition, an award is given to Covid-19 related projects the results of which are released as open source, for the benefit of public or private entities operating in Sardinia, in order to allow a wider implementation of the developed solutions.

In the 2020 edition, 158 applications were received, a significant increase in comparison to the 104 applications received in 2017. In previous years, the measure mainly supported micro and small enterprises operating in the services, manufacturing, retail and tourism sectors.

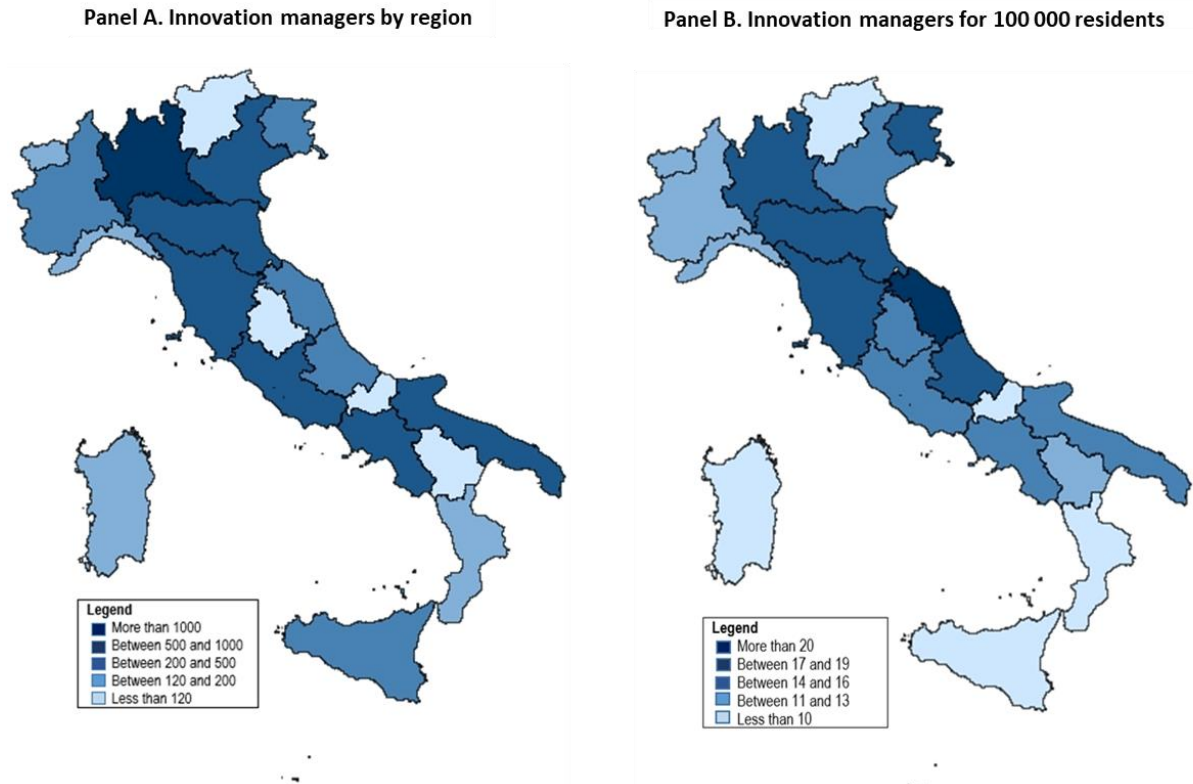
The strengths of this measure lie in its simple, agile yet strategically focused structure. It is not an automatic measure, as it implies an evaluation process, nor it is a 360° innovation measure, as investments must fit certain guidelines. In addition, while this type of measures provide relatively limited resources (up to 15 000 Euros), they can support SMEs in developing and testing innovation prototypes before more substantial investments, thus lowering risks and uncertainties and concentrating resources on the deployment of innovation, including skills upgrading.

Source: <https://www.sardegnaimpresa.eu/it/agevolazioni/microincentivi-linnovazione-iii-edizione>

In the framework of the Piano Nazionale “Impresa 4.0”, the Italian Government has implemented the **voucher per la consulenza in innovazione** in order to support innovation adoption in SMEs or in firm networks. The voucher covers the cost of an external consultant – the innovation manager – that can provide support in adopting “Industry 4.0” technologies, thus boosting innovation and the digitalisation of production in the firm. Critically, the consultant also helps the firm modernise its organisation and management by improving technological adoption. The innovation manager is an independent consultant registered in a list prepared by the Ministry for Economic Development, or a person with comparable skills. The financial support of this measure is 75 million Euros for the 2019-2021 period.

Regional differences exist in the distribution of the innovation managers included in the national directory. As shown in Figure 2.2 **Error! Reference source not found.**, in absolute terms Lombardy has the highest number of innovation managers (1 863), followed by Emilia Romagna, Lazio and Campania which have between 800 and 900 innovation managers. The picture is slightly different when looking at the number of managers per 100 000 residents, with Marche being at the top (30), followed by Lombardy, Emilia Romagna and Tuscany. With the exception of Aosta Valley, all regions with less than 10 innovation managers per 100 000 residents are in the South of the country (Calabria, Sicily, Sardinia and Molise), marking a striking geographical disparity in the availability of complementary capabilities to technology adoption.

Figure 2.2. The territorial distribution of innovation managers



Source: [MISE](#)

One way to move beyond the lack of trust in an external “consulting” figure is to spread best-practice approaches and highlight successes, and let competition work from there. This stresses the importance of well-designed information campaigns, especially if these are carried out by actors that are already known to the entrepreneur (e.g. professionals with a personal relationship to the company, representatives of employers’ associations, other business leaders) – see next section in this chapter.

Another way is to ensure that consultants and coaches only offer very high-quality services, which requires both ex-ante conditionality on the experience of these figures, and ex-post monitoring or evaluation of the quality of the services provided. These figures, moreover, must recognise that working with SMEs requires a difference approach than working with large companies. The market for these service providers must be competitive and transparent, and strike a good balance between the need to establish fair competition and the need to cater to the specificities of a territory. While in many cases these service providers are professionals, they often fail to keep up with the challenges of production in the fourth industrial revolution (Fondazione Nazionale dei Commercialisti, 2019^[52]). The policy maker can therefore consider actions that support the aggregation of professional practices, within and across specialisations, with an eye to raise the quality of the consulting expertise provided to SMEs. Professionals could also be leveraged to provide greater information and even ad-hoc training on Industry 4.0 policy instruments, with the aim to increase the awareness of these tools among their clients. Lastly, it should be noted that professionals are already subject to ex-lege mandatory training for 60 hours per year, a portion of which can be allocated to a topic of the professional’s choice. The Training Fund “Fondo Professioni” is specialised in allocating resources for the training of professionals in professional practices, and some training could focus on the use of existing Industry 4.0 policy instruments.

Box 2.3. The mentoring programme of the Turin Chamber of Commerce

The Turin Chamber of commerce runs a **mentoring** programme that encourages the exchange of managerial experiences across international markets with business leaders with personal or professional ties to the Piedmont region. The programme consists in a voluntary relationship between a business professional with well-recognized work experience (mentor) and a new entrepreneur (mentee), where the mentor facilitates the professional development of his/her mentees. The program is open to business owners as well as to high-ranked managerial positions.

Mentors are Italian professionals living abroad, with ties with Piedmont by origin, study or work and must have more than 10 years of proved experience in the field of management and business development. Mentees are mostly company executives or managers of companies based in Piedmont that work towards the international growth of their company.

Both parties engage in the relationship on a voluntary, non-paid basis within ethical guidelines.

The Mentoring lasts at least 8 months with the aim to improve the internationalisation process of the companies and sharing good practice experiences. The project starts with a kick off meeting, in person, with mentors meeting potential mentees, facilitating the right matching.

Mentors and mentees interested in the program has rapidly increased, with applicants going from 76 (1st edition) to 130 (3rd edition). 90% of the applicants are satisfied with the Program, gaining new strategic plans to grow internationally, new marketing and communication strategies, business plans, organisational changes, development of international contacts. The programme has the potential to help mentees enter a new international market and acquire new contacts and networks.

The main reported challenges are linked to finding the right matches and ensuring that the mentoring relationship is not interrupted.

The Mentoring program is easily replicable in other regions, as it is mainly based on the networking capabilities of the Chamber of Commerce, both through the mentors and the mentees. The programme is funded through the ERDF.

Source: [Interreg](#) database of good practices.

Initiatives to enhance managerial skills can be also promoted by the regional Chambers of Commerce. An example is the PMI Academy, which is addressed to SMEs managers in the Trentino region. The Academy organises training around four thematic areas: marketing, strategy, financial aspects and, organisation and HR management. In recognition of the (perceived) lack of time for training of managers, training takes place mainly during the weekend and participants can chose whether to participate or not in all the four parts. Webinars are also effective tools, as they provide just the right amount of information for business leaders to understand whether the topic is of relevance for their reality, and explore the matter further if the case. A different type of support is offered by the Chambers of Commerce of Rome and South East Sicily, which provide a voucher to support innovation that can be used also to promote the skills development of existing staff or to hire a new staff.

Fondirigenti has been a pioneer in providing continuous training to managers. In 2017-2018 Fondirigenti conducted more than 20 activities addressed to managers and owners in nine Italian regions, mainly in the Central and Northern part of the country. The initiatives aimed to strengthen the adoption of digital technologies in SMEs by raising awareness of these technologies' benefits, and by creating more dynamic innovation ecosystems (Fondirigenti, 2019^[53]).

Another relevant research performed by Fondirigenti in six regions in the South of Italy (Sicilia, Calabria, Basilicata, Puglia, Campania and Sardinia) – *Progetto Sud* - shows that low innovation adoption can be

explained at least partially by managers' quality, as well as by the limited collaboration across firms and between firms and other institutions, including research centres, academia and local stakeholders. The study highlights a number of actions that would be beneficial for improving the local managerial culture, namely targeted training on strategic thinking and business development, incentives to innovate, support to firms' growth and promotion of firm networks (Fondirigenti, 2020^[54]).

Box 2.4. Targeted programmes for start-ups

While the start-up ecosystem is a minor element of the country's economy, its role in an open innovation driven environment is vital for raising the skills stock and a positive attitude towards innovation among traditional SMEs. The last ten years have seen a growing interest in start-ups by the Italian policy makers. In 2012, the government engaged in the creation of a coherent legislation package to promote the creation and the growth of new innovative enterprises with high technological value. There are currently more than 12 000 innovative start-ups operating in Italy that might become innovative SMEs 6 years after their creation. Entrepreneurial skills and a positive attitude towards change and innovation are recognised as a vital element for the organizational well-being of companies and territories at every level. Where rates of entrepreneurship are particularly high and widespread, so are resilience and a positive and proactive attitude towards innovation and change.

Supporting innovative firms is also a component of the thematic objective 3 in the European Regional Development Fund (ERDF) regional operational programme. Priorities under this objective aim at fostering the competitiveness of SMEs, from encouraging the creation of new companies to sustaining their market presence, to supporting their products and services innovation. One of the investment priorities covers the actions aimed at fostering entrepreneurship and the creation of new companies, through incentives and incubating structures. A reference to the start-up ecosystem and support new companies' creation is explicitly mentioned in Tuscany, for example. By operating within the key sectors identified by the regional Smart Specialization Strategy, these new companies might have a positive impact in raising the general quality and innovation of the offer and positively influencing existing companies, especially in traditional sectors. Within the same investment priority, ERDF supports companies' investments in ICT technologies, with particular reference to e-commerce, cloud computing and cybersecurity, open data and big data for industrial use. As stated in National Operational Programme "Firms and Competitiveness" such actions are directed to SMEs in Southern regions, in response to the negative results in terms of penetration of digital technologies highlighted in the DESI Index.

Among the incentives to innovative start-ups, *Smart & Start Italia*, promoted by Invitalia, provides support to innovative start-ups in their creation and growth phase. The programme's strength is that, in addition to providing funds, it also includes a phase of mentoring for start-ups that were created less than a year before. The goal is to provide tailored technical and managerial support to new entrepreneurs with a focus their specific needs. At the end of 2020, more than 3 000 business plans have been presented and more than 1 000 start-ups have received financial support. The initiative provides additional funding to under-represented groups such as young people under 36 or women and for start-ups based in the southern part of the country.

More recently, in the framework of the "Rilancio" Decree, the Ministry of Economic Development has launched the *Smart Money* initiative aimed at supporting innovative start-ups that are at the beginning of their operations or have been strongly hit during the pandemic. Support can be provided in the following situations: i) the incurrence, by innovative start-ups, of expenses related to the realisation of a business plan, which is carried out together with other actors in the innovation ecosystem, i.e. certified

incubators, Digital Innovation Hubs, research centres, business angels and qualified investors; ii) the participation of these actors of the ecosystem of innovation in the risk capital of the innovative start-ups.

Support to managers can be given also in fields that indirectly contribute to their digitalisation capacity and growth. An example is by providing them with additional skills in relation to the access to new markets, which is seen as a key element to enhance SMEs development (Confindustria, 2019^[55]). This will be even more important in the post-COVID period (Deloitte, 2020^[56]). While **internationalization processes** might not be digital intensive, it requires a similar amount of new competences within companies, thus entrepreneurs willing to expand their markets need to invest in skills.

Recent evidence shows that during the last few months, some SMEs have invested in buying new equipment to improve their online services as a first step to expand their access to markets (OECD, 2020^[57]). However if this investment does not go hand in hand with competences development, it may fail to reach its target. In this context, training to managers in relation to internationalisation becomes fundamental. Hence, supporting SMEs investments in e-commerce could be instrumental in boosting their digital investments, consequently improving their skills stock. Under the thematic objective 3 of the ERDF, two sets of actions aim at supporting investments in modernization of SMEs and local productive districts, mainly through digital technologies. Digital investments could be a response to industrial crises (TO 3, IP 3b, action 3.2.1), or pre-emptive measures enhancing the competitiveness of local productive districts in order to avoid such crises (TO 3, IP 3b, action 3.3.1), also by boosting the up-skilling and re-skilling of local companies.

A recent study shows that, while most export managers are currently concentrated in the North of the country – Lombardy and North East – the demand for this type of profile has been growing throughout the country (4.Manager, 2020^[58]). In particular, the digital export manager is in high demand to expand exports through digital channels. Conscious of this need, the Italian trade and investment agency (ICE) has promoted in recent years a number of initiatives that promote digitalisation adoption through internalisation. Relevant initiatives include:

- EXPORT 360° project, promoted by ICE-Agenzia e SACE-SIMEST (Gruppo CDP), which supports managers in the internationalisation of their firms by improving the use of digital tools. The activities offered include firm assessment, training and meeting with experts, discussions around international markets and online updates. Between October 2018 and June 2019, the initiative involved 680 SMEs.
- Courses for Digital Temporary Export Manager (D-TEM), which were created to provide new skills related to internationalisation, with a focus on digital skills. The courses were addressed to 100 professionals that after completion could assist Italian firms in developing innovative digital tools, including digital marketing, management of social media, cyber security and blockchain.
- A five-month Master on Export manager to train Temporary Export Manager (TEM), who then obtains a certified qualification and can provide support to firms in their internationalisation strategy. The Master included training and 2 months in a firm, including SMEs and firms networks.

In addition, in the framework of Piano Export Sud 2, the ICE launched the *digital export lab*, which is targeted to managers in less developed and ‘in transition’ regions. In addition to traditional face-to-face training, the initiative provides tailored support after the completion of the course, which includes the assessment of the internationalisation potential of the firm and the set-up of a business plan. This is followed by a phase of incubation abroad through the ICE network. An important element of this initiative is the support provided to firms’ owners throughout the different phases of the internationalisation project, which is something that could be replicated also in other initiatives in order to ensure that investment in training leads to a real change in the company.

Lessons learnt (1): Training of business leaders

- All the measures described in this section share important common features:
- They recognise that training business leaders (managers or owners) requires ad-hoc efforts that set them apart from other employees. This will be a recurring theme also in other chapters of this study. Involving the business owner is a key step for many SMEs, where knowledge and control are centred in the entrepreneur.
- These measures all envisage a highly tailored approach: by culture (every entrepreneur feels its company is a world apart from all others) or as a consequence of the realities of production, business leaders privilege training that is highly specific to their territory, sector and ultimately company. This requires a set of training instruments that emphasises such tailored and often personalised approach: vouchers, coaching, mentoring.
- Successful measures often require the creation of trust between instructor and learner, and the overcoming of the idea that business leaders “always know their company best”. One way to achieve this is to spread the word of the effectiveness of some coaching or consultancy services, and let imitation or simply competition raise the number of users. Another way is through mentoring programs, where a business leader recognises the value of another’s experience, and accepts to learn from her.
- A third way is to ensure that consultants and coaches only offer very high-quality services, which requires both ex-ante conditionality on the experience of these figures, and ex-post monitoring or evaluation of the quality of the services offered. The market for these service providers must be competitive and transparent, and strike a good balance between the need to establish fair competition and the need to cater to the specificities of a territory.
- A key success factor of these measures for SMEs is focusing the support on the ability of managers and entrepreneurs to design a project, where this can be a training project per se, or an innovation or technology adoption project that subsequently requires an up- or re-skilling effort in the company. A welcome by-product of this approach can be a change in the manager’s or entrepreneur’s perspective on learning, fostering engagement in the activity in the longer term and flexibility when facing a change in the economic context.
- The definition of the project can start from an analysis of the company’s needs, which can be an exercise of self-discovery in itself. The up- and re-skilling project can originate from a project whose primary goal is the internationalisation of the company, or technology or innovation adoption. Coaching and mentoring are especially valuable for those business leaders who do not think any intervention is needed.
- Good support practices follow the (digitalisation, internationalisation, or learning) project throughout at least part of its life. An initial assistance on the design of the project does not exclude that serious implementation difficulties can emerge along the project’s life, which can make the initial support irrelevant.

Promoting collaboration across firms

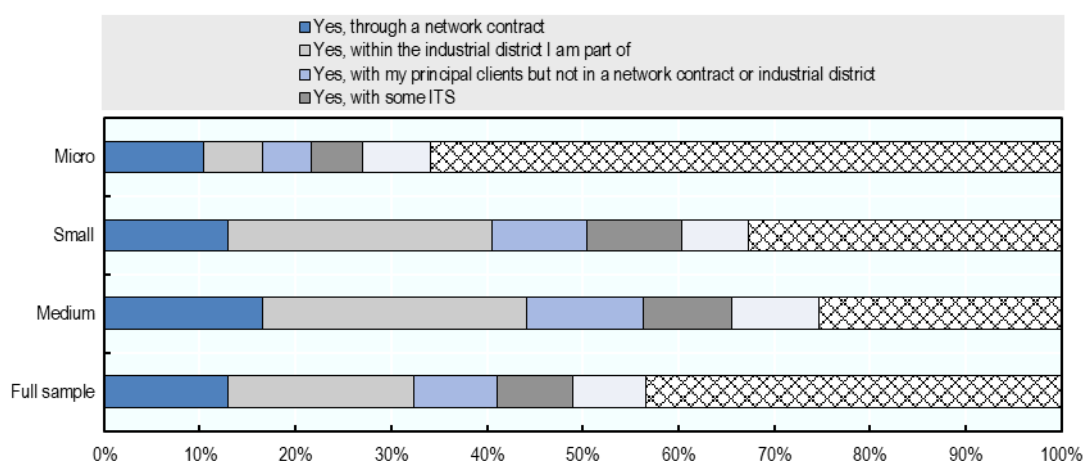
The success of businesses in innovating or adopting new technologies also depends on the collaboration among firms, through employers networks and associations, which can be beneficial for firms of different sizes (OECD, 2019^[25]). This exchange has an impact on a number of aspects including awareness raising,

skills transfer and development, access to new markets and innovation adoption. Supply chain relationships, often built around a major employer, are also a means of driving skill formation, in terms of both motivation and practical aspects such as the cost and quality of training. Thanks to the support of larger firms, small firms can strengthen training and knowledge sharing activities and less productive firms that can be oriented in their restructuring process (4.Manager, 2020^[58]) (UKCES, 2010^[59]). Therefore, this is an area where, by influencing one construct (the network), policy makers can address two important barriers to human capital formation, i.e. costs and the limited ability to draw a meaningful training plan. Furthermore, once created, the network can support more than one project, and projects that go beyond training as well.

In Italy, business networks (*reti d'impresa*) that are formally registered through network contracts (*contratti di rete*) keep increasing in number and scope (Retimpresa, 2020^[60]). At the beginning of 2021, they involved more than 38 thousands firms, organised in around 6700 networks (Camere di Commercio, 2021^[61]). Firms which are part of a business network formalise a collaboration that goes beyond the territorial dimension and the industrial specialisation, which were the pillars of the industrial districts. Two thirds of networks have firms operating in different industries and around one thousands networks are interregional. The objective of the networks is to increase competitiveness by sharing costs, developing new products and exchange services and knowledge. This helps realise activities that individual firms would not be able to perform alone. Recent data show that being part of a network increases firms' performance and growth (Osservatorio Nazionale sulle reti d'impresa, 2020^[62]). However, the skills of managers can affect the performance of the network and the growth prospects. Yet, only networks that are well organised, with a long-term vision and good coordination are the best performers (Retimpresa, 2020^[60]).

Findings from the STSME show that collaboration among firms is tightly linked to their size, with medium-sized firms being more likely to collaborate than the smallest ones (Figure 2.3). The gap is 40 percentage points, with only around a third of micro firms collaborating vs. three quarters of medium firms. Among firms that have some type of collaboration, the two main channels for collaboration are through a network contract or by being part of an industrial district. The former form of collaboration is the most common for micro firms, the latter for small and medium-sized enterprises.

Figure 2.3. Collaboration in implementing training or screening/ hiring new staff is still limited especially for micro firms



Source: OECD Survey of Training in SMEs.

During the COVID-19 crisis, the need to operate in networks has become even more important for SMEs, as the smallest firms were especially hit (ISTAT, 2020^[27]). With this awareness, the Italian government introduced a new typology of network based on solidarity across firms (*Contratto di rete con causale di solidarietà*)⁸ with the objective of maintaining employment in the most affected sectors, and making it easier to share projects and staff across firms.

Policy measure can support firm networks by allowing these entities to apply for support alongside individual firms. Regions further provide substantial funding to build and expand networks through the ERDF. A recent study shows that Regions can provide funds specifically addressed to networks and can target sectors that are less likely to receive public incentives. Therefore, it is important to effectively coordinate regional and national efforts to promote and incentivise networks of firms (Retimpresa, 2017^[63]).

Across the OECD, examples of collaboration across firms also exist in relation to their participation in apprenticeship schemes and in training provision for apprentices. In Germany for example, SMEs that are not equipped to offer full training contents can share apprentices among them. In Australia and Norway, collective training offices organise training for groups of SMEs in order to reduce costs for individual firms. These organisations act as intermediaries between firms and the government and help reduce the administrative burden for SMEs. They directly employ the apprentice, respond to his/her needs, and provide support in the hiring process. This is a win-win situation in which SMEs raise their skills base without dealing with the institutional challenges associated with hiring a new person (OECD/ILO, 2017^[64]).

Other examples of firm collaboration include incubators and accelerators, which are popular tools to promote innovation in ICT start-ups and small and medium-sized enterprises. While the objective of the two instruments is the same, their approach is different. They both operate in synergy with a network of firms, promote learning exchange and some form of mentorship. In addition, accelerators provide intensive education (OECD, 2017^[65]). In Italy, the Ministry of Economic Development has defined the characteristics of “certified incubators” that, in exchange of their support to growth and innovation for innovative start-ups, can benefit from a number of fiscal concessions (Ministero dello Sviluppo Economico, 2020^[66]).

Lessons learnt (2): Leveraging networks of firms

- The number and scope of firms’ networks is on the rise. Networks allow for the sharing of costs, knowledge and strategic assets across firms, including resources for the analysis of skill gaps and the deployment of training. This is especially important for SMEs, which often operate with low margins and are therefore more sensitive to cost increases. One of these costs can be that of up- or re-skilling of staff, or the hiring of appropriately skilled staff.
- The COVID-19 crisis, by threatening the survival of many SMEs and raising the importance of digitalising production and of a skilled workforce, may provide further incentives to network creation.
- Business networks can formalise a collaboration that goes beyond the territorial dimension and the industrial specialisation. This is useful especially for territories that cannot supply the Industry 4.0 (goods and service) inputs that are needed for firms to thrive in the 21st century.
- Supply-chain relations (*filiere*), however, remain an important and frequent component of networks. Indeed firms in a supply-chain relationship tend to pursue the same goals, which counterbalances the natural forces of market competition and the “do-it-by-yourself” entrepreneurial culture characterising many Italian SMEs.

⁸ Law decree n. 34 of 19 May 2020 and the ensuing law n. 77 of July 2020.

- Successful networks therefore ask for a common, long-term vision. More short-lived, typically horizontal networks can also succeed, if they have a well-defined and time-bound project to carry out. Good national and international examples exist for partnerships aimed at innovation or technology adoption, or at the joint training or hiring of staff.
- Policy makers can support firm networks by allowing these entities to apply for support alongside individual firms. Moreover, they can earmark specific resources for firm networks only. Public support can also differentiate rate of subsidisation for different objectives pursued by the network, including giving priority to up- and re-skilling initiatives.
- The important ERDF resources invested at the regional level to support networks call for a renewed effort of coordination between the central and regional administrations to this goal.

Raising awareness of support measures

Business leaders may fail to understand their company's weaknesses, and the areas where intervention is needed. This is true in particular for SMEs, that generally do not have an HR department and a long-term vision that helps planning future investments in terms of technology adoption and human resource development. In this perspective, most often training in SMEs is provided to staff only to respond to ad hoc needs and training expenses are perceived as a cost rather than an investment (Osservatorio 4.manager, 2019_[40]).

Interestingly, a recent study shows that even those Italian SMEs that have not been gravely hit by the COVID-19 crisis, are now better aware of the importance of change to survive or thrive (Deloitte, 2020_[56]). The study, based on a survey of 6 000 SMEs, shows that 6 in 10 firms would like to change their strategy by exploring other markets or introducing new products, and 7 in 10 express the need of reskilling and upskilling their workforce through targeted training.

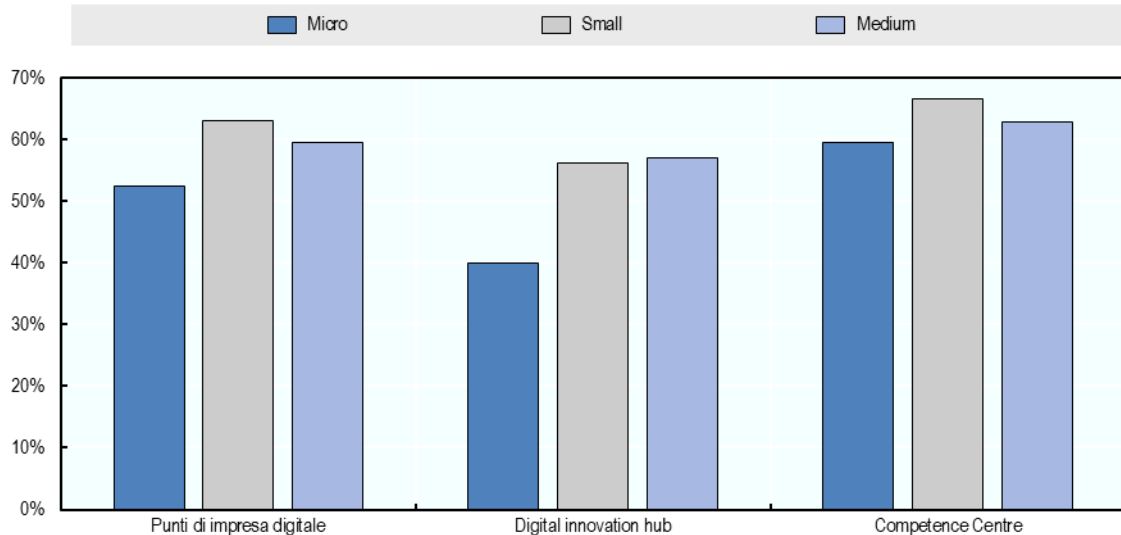
COVID-19 has therefore raised the entrepreneurs' and top management's awareness of the need to invest in change. This should be complemented by a sound awareness of the availability of public support in the form of funds or of complementary services. For some firms, the availability of public support is a necessary condition to be able to provide training to employees (OECD, 2020_[67]).

As an example, slightly more than two thirds of respondents in the STSME know at least one of the three structures recently implemented in the framework of the Piano Nazionale Industria 4.0, namely the Punti di Impresa Digitale (PID), the Digital innovation Hubs (DIH) and the Competence Centres. However, 38% of respondents still ignore the existence of the Competence Centres, compared to 42% being not aware of the PID and 50% of the DIH. Moreover, as shown in Figure 2.4, micro firms are less likely to know the three structures than larger firms.

A recent survey by ISTAT further reveals that in 2020, more than 50% of companies report to be unaware of the existence of Industry 4.0 measures; more than 40% of the incentives, or other public resources supporting technology transfer, digitalisation or firm's internationalisation; more than 30% report that they are not informed about the presence of measures to strengthen the equity of SMEs and training (ISTAT, 2020_[27]).

Figure 2.4. Firms' knowledge of Punti di Impresa Digitale, Digital innovation Hubs and Competence Centres

Share of firms by size



Source: OECD Survey of Training in SMEs.

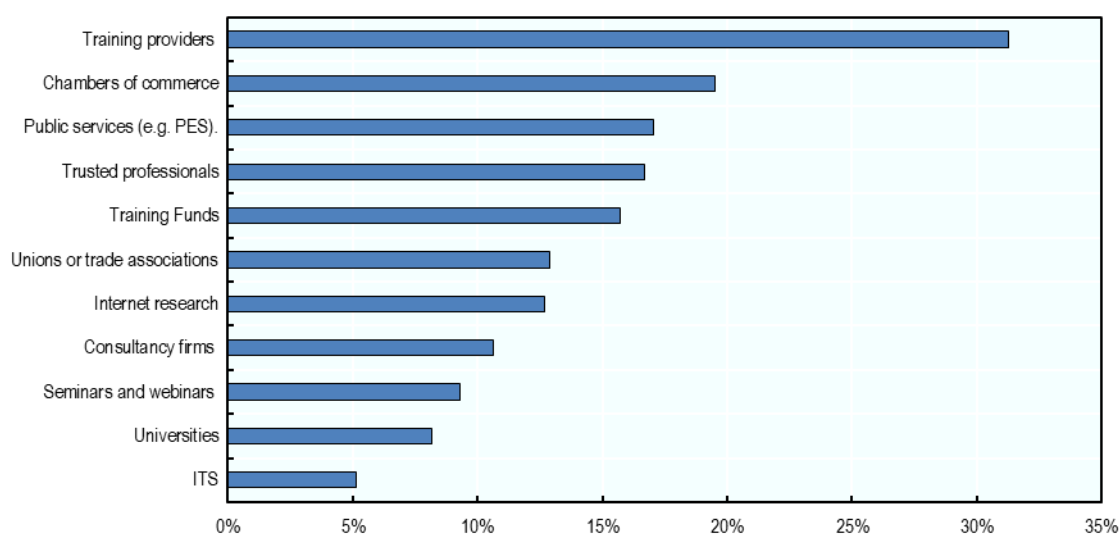
This is reflected in the STSME as well. 23% of SMEs that did not leverage external resources to finance their non-formal or formal training activities were not aware that a public support mechanism existed. If one considers only the subset of firms that would have needed the support, however, this proportion more than doubles (47%).

Results from the STSME also show that nearly a third of firms gather information about available training directly by contacting training providers Figure 2.5. More than one in six firms collect information through the chambers of commerce, the PES (i.e. *Centri per l'impiego*) and trusted professionals (labour adviser, accountants). While Training Funds have a huge potential in promoting and increasing participation in training, their use as a source of knowledge about training appears to be still limited.

To face the lack of information on existing instruments, policies can also act as catalysts in raising awareness among SMEs. In the framework of the Industry 4.0, the Ministry for Economic Development (MISE) has designed an 'Awareness' plan aiming at informing employers (especially those of SMEs) about the use and potential productive returns of new ICT technologies applied to manufacturing. Tailored demonstrations, informative sessions and discussions on the productive and enhancing potential of new technologies are at the core of the plan (OECD, 2017^[68]). By promoting a new learning culture, policies can contribute to the creation of an innovative ecosystem, based on stronger collaboration between public and private research organisations (Berlingieri et al., 2020^[24]).

Figure 2.5. Most firms gather information about training directly through training providers

Share of firms



Source: OECD Survey of Training in SMEs.

Awareness raising activities in Italy have been also promoted by the Associazione per le Piccole e Medie Imprese (Association for SMEs- API) and SIAM 1838, a well-established VET provider, through the “*check-up Industry 4.0*” initiative. This initiative aims at contacting firms all over the Italian territory to show the potential use and the returns of new technologies applied to their local context. It offers a one-day training targeted to firms that are potentially interested in digitalising part of their production processes. At the end of the training, a survey assesses firm’s skill needs and help them identify the best way to tackle future skill imbalances and challenges. More broadly, an incremental and personalised approach has proven effective in engaging especially those employers that would not otherwise engage in training under such incremental approach. These efforts are costly in time and resources.

Another relevant example is the ASTER consortium for technology transfer and innovation, in the framework of the Vanguard Initiative in Emilia Romagna. It promotes Industry 4.0 measures through the creation of infrastructures where some I4.0 technologies are showcased and employers can easily gauge on the real effectiveness of new technologies applied to production. It has been argued, that part of the technological gap experienced by small firms is due to the hesitations of managers in small firms that do not see the economic return of investing in the new technology. While these “demonstration plants” can be fundamental in increasing awareness of the returns of different technologies, they are relatively expensive, especially when these are designed to satisfy the needs of different types of firms (OECD, 2018^[2]).

Lessons learnt (3): Raising the awareness of support measures

- Many if not the majority of firms lack awareness of the existence of public instruments in support of firms’ investment in training.
- In the framework of Industry 4.0, some institutions (PID, DIH, Competence Centres) have been entrusted with the task of spreading information on opportunities and public policies

related to the 4th Industrial Revolution. Unfortunately, a large share of companies ignores the existence of these institutions, too.

- Efforts already exist in Italy to spread such information to firms and SMEs in particular. A key role is played by the employers' associations and by the Chambers of Commerce, and, to a lesser extent, by trusted professionals (e.g. tax accountants, employment consultants). A direct contact with the entrepreneur, and one that proceeds in incremental steps (webinar, first conversation, visit, analysis of needs etc.), has proven to be most effective, albeit costly.
- Awareness raising campaigns can be designed by the public authorities or by employers' associations. The design of these campaigns can envisage accessible instruments such as online "how-to" guidelines, and the participation of well-known figures in the entrepreneurial role.

3 Targeting the right skills

Technological change, population ageing and globalisation have been changing the geography of jobs and the characteristics of the labour force. The impact of the COVID-19 pandemic could further increase the speed of change brought about by these megatrends. In this context, the identification of skills needs and the development of tailor-made interventions to increase firms' productivity and competitiveness are vital. Adequate human capital is a prerequisite for the success of any innovation related policies.

SMEs have more difficulties in attracting and retaining higher qualified people in comparison to larger firms, as they tend to offer less attractive remunerations and career prospects. The high turnover of staff in SMEs, can limit the willingness to invest in the skills development of staff and firms' owners can prefer to recruit new staff or externalise some services that they are not able to perform in-house. As shown in chapter 1, one in four firms participating in the STSME stated that they prefer to recruit new staff with the skills needed than provide training to their current staff. In order to promote firms' investment in the right skills, it is important to organise flexible and modular training that can respond to the needs of both the firm and the employees who are taking part to the training activity. This requires an assessment of the skills of the workforce, both before and after the training (Fondimpresa, INAPP, 2019_[69]). This would contribute to raise awareness among staff of the benefits of improving their skills and would motivate them to participate in future training opportunities.

Skills assessment and anticipation

As mentioned, the Italian labour market is characterised by extensive misallocation of talent. This mismatch slows productivity and technological change, as human capital is not fully used. The dissemination of information on current and future skills needs in the economy is an important instrument to address this mismatch.

Skills assessment and anticipation (SAA) exercises include a wide range of tools used to generate information on current and future skill needs and are useful in identifying what are the skills most demanded in the labour market (OECD, 2016_[70]). In Italy, there exists a wide range of SAA exercises, which were developed by different institutions. While they provide different types of skills-related information, they are overall not well known and are used only sporadically to inform education, employment or industrial policies.

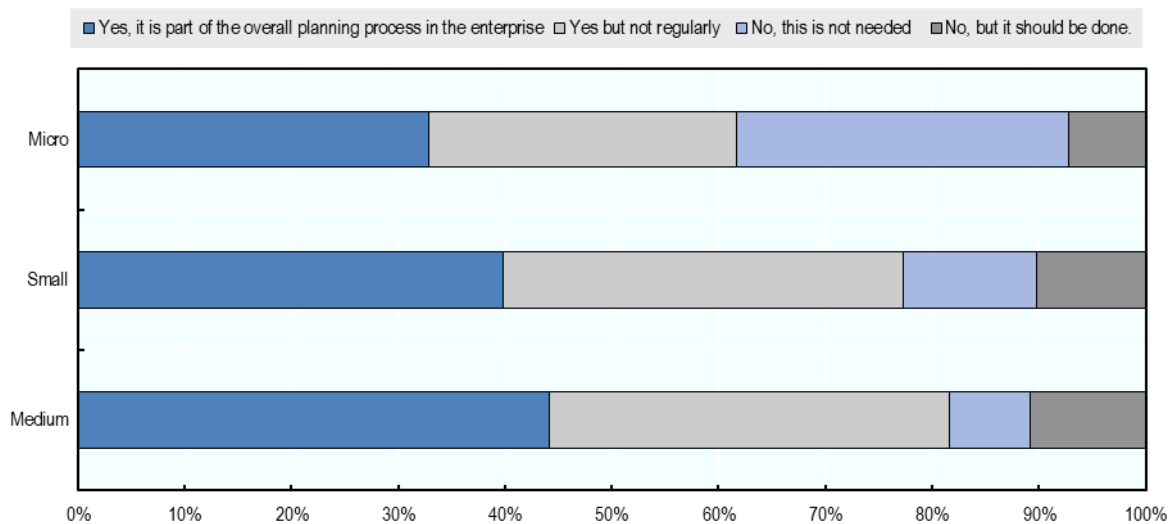
One of the main skills assessment and anticipation exercises in Italy is conducted by Unioncamere through the Excelsior survey. **Excelsior-Unioncamere** collects monthly information on the professional profiles and the skills sought by Italian firms. The data help identify work opportunities for the following quarter and identify challenges faced by job seekers. The analysis includes a specific focus on opportunities for young people (i.e. younger than 30), as the skills of this sub-group are perceived as most elastic to changes in labour market needs. In addition, the identification of growing sectors can orient training provision and ensure a better matching between skills supply and firms' real needs (Unioncamere, 2020_[71]).

Italian firms, and especially the smallest ones, are not always aware of the skills they need and do not have a long-term vision that orient their training planning. This is at least partly due to the lack of a human resource department or specialised staff that could help better inform managers and entrepreneurs about

training opportunities, identify the available type of financial support for training, and guide their choices in relation to their specific needs.

Skills assessment internal to firms remain rare across the OECD (OECD, 2016^[70]). Among participants in the STSME, skill assessment is conducted in seven out of ten firms, and this exercise is part of the planning process in slightly more than half of them. However, as shown in Figure 3.1, firms with more than 20 employees are more likely to conduct it on a regular basis, and three in ten micro-firms (i.e. with less than 10 employees) believe that skill assessment is not needed. The capacity of SMEs to develop internal skills assessments might be linked to the vision of their management in relation to skills development, which in turn is influenced by the managers' qualifications. Findings from the STSME show that 43% of firms where the CEO has a tertiary education level or above conduct a skills assessment on a regular basis, versus only 33% of firms with a CEO having achieved a lower educational attainment.

Figure 3.1. Smaller firms are less likely to conduct skills assessment as part of their planning



Source: OECD Survey of Training in SMEs.

Training Funds could help firms identify their training strategies by disseminating information among firms and strengthening their requirements in SAA as a condition to allocate funds in public calls. While some funds use existing sectoral or regional SAA information to develop public calls, others consider that the information is not sufficiently up-to-date or geographically disaggregated to be exploited (OECD, 2019^[11]). This is in line with recent findings from the OECD Skills Strategy for Italy, that highlighted the importance of further developing these tools by using new data to produce real time assessments, better assess soft skills, improve the level of granularity of a number of SAA information and provide longer term estimates to orient future planning (OECD, 2018^[2]).

In 2012, Assolombarda, in collaboration with ECOLE (Enti Confindustriali Lombardi per l'Education), an association of regional employer organisations aimed at promoting and coordinating training and professional development, implemented the **T.I.M.E.** pilot programme (Training Innovation Management Experience). Funded via regional resources, the programme targeted SMEs providing personalised counselling services to their managers in order to guide them through the steps needed for an effective identification of their company skill needs and to plan adequate skill development programmes. In addition to training activities for managers, the programme supported a skill mapping of the territory and within the companies involved. It also built and tested a tool for SMEs' SAA, to empower SMEs to monitor their skill needs consistently.

The tool was based on a skill needs grid where different types of skills and qualifications are inputted based on the observation of skill needs in similar companies, sectors and industries. SME participating in the programme then used this generic grid to identify their specific needs. Once identified, T.I.M.E. provided suggestions on training and tailored up-skilling programmes. The grid was experimented with 30 companies in the region, with semi-structured interviews carried out to identify challenges of SMEs in carrying out SAA. Training activities of about 24 hours were arranged in 20 companies, focusing on concrete examples and business challenges identified by the companies themselves. Companies involved were positive about the intervention, considering the grid a useful starting point for carrying out SAA. Today ECOLE provides consulting services for SMEs in order to conduct SAA and select the most relevant training and funding options (OECD, 2017^[72]).

Skills assessment can be performed also with a specific focus on digital readiness of firms. Fondirigenti promotes and funds a number of initiatives for small and medium size enterprises in the manufacturing sector to support their digital transformation and to explore the competences of managers in relation to the internalisation process of their firms. The initiatives also include an analysis of skill needs in managerial positions to plan future interventions.

Skills and digital maturity assessment can be conducted at the sub-national level with a focus on specific local needs. An example is the Observatory of the innovative ecosystem (***Osservatorio dell'ecosistema innovativo***) in the provinces of Chieti and Pescara (Abruzzo region), which is promoted by Fondirigenti helps firms assess their innovation performance in relation to their peers, their capacity to attract new investments and their managerial skills. These elements are monitored and assessed by an online platform that would help explore possible areas for collaboration with other firms in the region. In a similar vein, in Lombardy, Confindustria, the Digital Innovation Hub and Federmanager have launched the “SME development” (***Sviluppo PMI***) project which includes the assessment and the identification of strengths and weaknesses of the firm, followed by the implementation of innovative projects under the guidance of qualified managers in 100 SMEs in the region.

Any SAA exercise benefits from a well-defined characterisation and classification of skills, which can be used in the collection of data. The classification can also be leveraged after the SAA exercise, to design learning pathways. A welcome initiative in this sense is the **Syllabus 4.0**, i.e. a collection of skills needed to use Industry 4.0-like technologies. The project will be coordinated by the Ministry of Economic Development and will involve both public and private stakeholders. The initiative is part of the Operational Plan of the National Strategy for Digital Skills (see next section), which is currently being drafted by the Ministry for Technological Innovation (MID).

Firms' self-assessment

Any assessment increases in accuracy with the amount of detailed and proprietary information available, which external SAA providers cannot access. Consequently, and because of SMEs lack of time, financial and human resources, self-assessment tools have become relatively popular across OECD countries. For example, the UK Be the Business self-assessment tool for SMEs that aims at helping them improve their performance. The tool measures current level of productivity relative to peers and provides practical guidance around six dimensions: business model, employees, finance, leadership, suppliers and technology. Based on the outcomes of the assessment, it directs firms to other services and more targeted support. The Canadian Development Bank also provides this type of online tools addressed to firms' owners to assess where they stand in terms of digital maturity, how they compare to similar firms and what areas need to be improved.

In Italy, one of the most successful self-assessment tools is **SELF4.0**, which was launched by Unioncamere in 2018 and operates through the PID. SELF4.0 helps firms evaluate their digital readiness, their capacity to introduce innovations and to modify their business model. Thanks to the tool, firms are classified in five categories: beginners, apprentices, specialists, experts, champions. In addition, it helps

identify the technologies that best match the firm's needs. After conducting the self-assessment through an online survey, the firm receives a report, which includes the evaluation based on the responses as well as a benchmarking exercise with firms that operate in the same sector. Firms are then oriented towards more specialised structures and services to develop the next steps of the project. This tool was used by around 16 000 firms and proved very effective, as it is quick, it is free of charge and can be performed online.

Another assessment tool promoted by Unioncamere through the PID is **ZOOM4.0**. A digital promoter is tasked to conduct a more in depth analysis of the firm's production process and to provide more targeted guidance on the digital innovations needed in the SMEs. A detailed report is then given to the company after the assessment, with an indication of the level of digitalisation and a number of recommended solutions. This instrument aims at making up for the most evident shortcomings of the self-assessment tools by themselves, i.e. that the self-evaluation may not be objective, as it may reflect the biases and opinions of the respondent, and that the result of the assessment may be hard to interpret or operationalise.

A new tool introduced by the PID is the **Digital Skill Voyager**, which is open to people both within and outside companies. The website is interactive and allows the assessment of competences along five dimensions: basic digitalisation, communication, computational thinking and coding, digital technologies and sustainable innovation. This tool can be useful for managers to get a sense of the technological skills of their staff and can guide the implementation of targeted training.

Lessons learnt (1): Assessing skills to provide targeted training

- In order to identify the right training courses, firms need to assess the skills of their workforce, using both external and internal resources.
- Skills assessment and anticipation (SAA) exercises include a wide range of tools used to generate information on current and future skills needs, often in the labour market as a whole. This information can be leveraged by Training Funds and other entities (e.g. Regions) to orient public calls towards relevant skills needs.
- Aggregate SAA exercises could benefit of more timely and granular data, be it at the sectoral, geographical or skill type level.
- While a wide range of SAA exercises exists in Italy, their dissemination is still limited and they are sporadically used in informing education, employment and industrial policies.
- Firm self-assessment tools, such as Selfie 4.0, proved to be useful especially for small firms, as they are flexible and for free.
- Firms often need support to interpret the results of a SAA exercise, and to turn them into action. This is especially important in the case of self-assessments, which could lack a degree of objectivity.
- Assessment tools can be designed to combine inquiries on the firm's skills and technology needs. The appropriate design of a SAA tool requires careful reflection on the questions to be asked, striking the right balance between depth and ease of access.

Coordinated efforts to promote technology

In the framework of the National plan Industry 4.0, actions to promote innovation are organised in a coordinated way through a network composed of three main entities: i) the Punti Impresa Digitale, ii) the Digital Innovation hubs, and iii) the Competence centres. They all share a common final goal, which is a broader diffusion of these technologies among Italian firms. To this goal, they provide both financial support and information to firms. On the information side, they present firms with concrete actions and solutions in relation to skill development.

The main activities offered by the PID include: training on technology 4.0, assessing digital readiness, mentoring, financial support for activities related to industry 4.0, and orientation towards more specialised structures, including the Digital Innovation Hubs and the Competence Centres. They serve SMEs in all industrial sectors both in physical presence and through online services such as forums and community exchanges. The first three years of activity of the PID (2017/2019), showed that it is possible to digital knowledge of firms at scale: 60 thousands firms have taken part in training, 17 thousands firms have used the digital vouchers and more than four thousands have been directed towards other services in the Network Impresa 4.0.

The Digital Innovation Hubs are implemented by Confindustria and provide three main types of support to firms: i) awareness raising and training, through the implementation of seminars and one-to-one meetings with enterprises; ii) support in the use of digital maturity self-assessment tools; iii) orientation towards structures of the innovation ecosystem. Thanks to their proximity to firms, the DIH represent the main focal point for technology adoption. The DIH generally operate at the regional level and establish technological networks with other institutions (e.g. universities, research centres, local authorities) operating in the area. While this type of collaboration can be a strength of the DIH, more should be done to foster collaboration across DIH with different specialisations. Successful examples of structured collaboration at the sectoral or regional level exist for example in Tuscany, Friuli Venezia Giulia, Emilia Romagna, Veneto and Lombardy.

Competence Centres aim to raise the skills levels of the adult population and to promote technology adoption in firms, especially SMEs. They support SMEs by providing three main types of services: i) guidance and digital assessment; ii) high-level technological training; and iii) support for the implementation of innovative projects. They are public-private partnerships that involve a wide range of universities and research centres of excellence, but also private companies. They are all hosted by universities in the North and Centre of the country with the exception of the University of Napoli Federico II. Also thanks to their tight linkages to universities, Competence Centres are highly specialised and offer services to companies with advanced technological needs.

In order to maximise the benefits of the different structures, in April 2020 DIHs and Competence Centres entered a formal collaboration (i.e. the Italian network of Innovation 4.0), that aims at fostering technology adoption in production. The Italian Network of Innovation 4.0 wants to optimise the strengths of each structure: the DIH's territorial proximity to firms, and the Competence Centres' technical specialisation and innovation capacity.

Box 3.1. Centralise information to enhance technology adoption

Atlante Digitale (Atlante i4.0), an initiative promoted by Unioncamere and the Ministry of Economic Development, is the first online platform in Italy that maps and provides information of about the more than 600 different entities and institutions that offer services to support technology adoption and the digital transformation of firms.

They include, among others, the Competence Centres, the PID, the DIH, the Digital Ecosystem for Innovation (EDI), the certified incubators for innovative start-ups and the ITS. The functions of the portal have been further improved at the beginning of 2021 with the inclusion of a new section on advanced technologies.

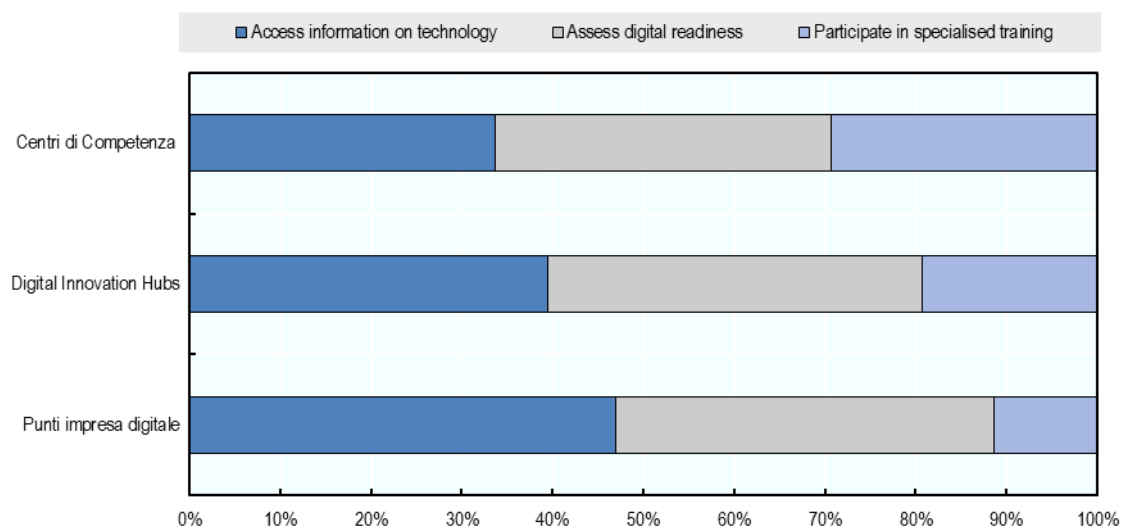
The Atlante can orient firms intending to adopt new technologies, and can be particularly useful for micro and small enterprises, which may find it harder to source appropriate information.

Source: [MISE](#); [Unioncamere](#).

Among the firms participating in the OECD STSME, nearly half of those having used the services provided by the PID, did so with the aim of gathering information on technology and, to a lesser extent, to assess their digital readiness (Figure 3.2). The latter is instead the main reason, among the specified ones, why firms have used both Digital Innovation Hubs and Competence Centres. The use of these structures for specialised training is less common among respondents, but it is still relevant for a third of firms having used the competence centres. Overall, micro firms are less likely to use the three structures and they do so especially to access information on technology. For small and medium size enterprises, the main reason to approach PID and DIH is to assess their digital readiness.

Figure 3.2. Main reason for consulting Competence Centres, Digital Innovation Hubs and Punti di Impresa Digitale

Share of firms reporting to have used each structure for the given reason, by type of structure, (%)



Note: Values are based on firms that have used at least one of the three structures.

Source: OECD Survey of Training in SMEs.

The activities conducted by the above mentioned structures in collaboration with a wide range of stakeholders could contribute to increase firms' collaboration with higher education institutions and research centres or could foster the engagement in international forms of collaboration (OECD, 2018^[2]). This would translate into an upskilling of the workforce and an increase of technology adoption in firms. Aware of the benefits of collaboration and partnerships, the Ministry of Technological innovation has launched a National strategy for Digital Skills to ensure greater coordination across different public policy initiatives aimed at accelerating innovation adoption. Its overall objective is to reduce the digital gap across regions in the country and between Italy and other European countries. The strategy has identified four areas of intervention: the improvement of the higher education system (Ministry of Education); the development of digital skills of the active labour force (Ministry of Economic development and Ministry of the Public Administration) and of all citizens (Ministry of Technological innovation); and the development of technical ICT skills (Ministry of University and Research and Ministry of Economic development). The strategy is complemented by an operational plan that help identify relevant initiatives planned or already in place that would contribute to the enhancement of digital skills.

Box 3.2. Strengthening partnerships to support digital training

The partnership between Unioncamere and Google, started in 2013, have had a strong focus on the development of digital skills in Italian firms, through awareness raising campaigns, training and improvement of the online presence of firms. The *Italia in Digitale* initiative is targeted to SMEs and includes a number of activities including training, support and partnership aimed at strengthen digital adoption in firms.

Another relevant initiative born from this partnership is *Eccellenze in digitale* (Excellence in digital) promote digital training in order to increase the competitiveness of firms at the national level and abroad. The activities will be organised with the local Punti Impresa Digitale, and are free of charge. They envisage seminars and webinars on how to use the web to promote the activities and expand the network of clients, on web market strategies and on how to manage online activities. Participants can choose their training, based on what is relevant for their job. The 2020-2021 edition of the initiative is focused on strategies needed to respond to the current crisis, in particular related to the tourism and catering sectors, and Made in Italy supply chain. The objective is to provide training to more than 30 thousands people, at all levels of the hierarchy, ranging from managers to blue-collar workers. This will contribute to improve digital skills of firms as well as provide people with new skills that would enable them grow in their jobs.

Source: <https://www.eccellenzeindigitale.it/home> ; <https://www.unioncamere.gov.it/P42A4508C189S123/-italia-in-digitale--google-parte-dalle-esperienze-con-unioncamere-e-investe-900-milioni-di-dollari-per-la-digital-trasformation-del-nostro-paese%EF%BF%BD.htm>

Lessons learnt (2): Coordinated efforts to promote technology

- The efforts to create a network composed of PID, DIH and Competence Centres that provide guidance, training and concrete solutions to SMEs is welcome. However, an awareness campaign to promote the different services provided to firms could be useful to improve their use. The initiative "Atlante i4.0" is seen as a positive initiative.

- Collaboration between firms and institutions, such as universities and research centres, as well as larger firms is fundamental to foster technology adoption and upskill the workforce of SMEs.
- Innovation adoption can be accelerated through better coordination among the initiatives promoted by different public institutions. The National Strategy for Digital Skills launched by the Ministry of Technological Innovation (MID), which has identified four areas of interventions under the responsibility of six different ministries, goes in this direction.

Matching training with labour market needs

As pointed out in the introduction, the Italian labour market is characterised by an important misalignment between supply and demand of competences. About 3 million workers have competences in excess to those usually required by their job (overskilling), and 1.5 million workers have display a skills deficit (underskilling) (OECD, 2013^[73]). Furthermore, approximately 4 adults out of 10 further hold a qualification that is misaligned with the needs of the labour market (overqualification and underqualification). This has potentially dire consequences both for workers' salaries and career prospects, and for firms' productivity and innovation capabilities. In a fast-digitalising world, demand for skilled workers will likely keep on increasing, potentially making mismatches more costly for the economy.

Adult learning policies have a large role to play to realign supply and demand for skills, albeit they remain only one part of the picture, together with education, labour market, and industrial policies (OECD, 2018^[2]). Education policies in particular can foster the exchange of knowledge between education institutions (schools and universities) and firms (OECD/European Union, 2019^[41]; Assolombarda and Confindustria Canavese, 2020^[74]). While a comprehensive review of such instruments is beyond the scope of the present study, some of them are important to increase the intensity of human capital in SMEs.

Istituti Tecnici Superiori

The Istituti Tecnici Superiori (ITS – “Higher Technical Institutions”) offer short-cycle tertiary education with a vocational orientation, resulting in an ISCED Level 5 degree. The 2-year (sometimes, 3-year) curriculum includes classroom-based learning, laboratory-based learning (on average 14% of total hours for courses ending in 2018), and an internship at a company (at least 30% of the hours, 43% on average), but ITS have important autonomy in defining this mix.⁹ Approximately 4 600 individuals were enrolled in one of the courses ending in 2018 across the 84 monitored ITS. 12 430 individuals graduated from the ITS system between 2013 and 2018 (INDIRE, 2020^[75]).

ITS provide technical education in fields of study that are especially useful for production in manufacturing and its related service sectors. As such, ITS courses equip students with the skills of the future, linked to technological and digital innovation, including some key soft skills. Didactics are also adapted to the technological field of reference, and can feature the use of frontier technologies such as virtual reality, artificial intelligence or big data analytics (Aiello et al., 2019^[76]).

Several aspects of the ITS curriculum responds to the skills demanded by the labour market. Part of the learning takes place in laboratories, which allows for trial-and-error learning and for the simulation of actual production contexts. Furthermore, as mentioned, internships represent a substantial part of the coursework. They introduce students to the world of work and allow firms to evaluate students' performance and eventually recruit them. They happen mostly in SMEs: 41% of the total in micro firms (1-9 employees), 32% in small firms (10-49) and 20% in medium-sized firms. Furthermore, ITS are configured

⁹ The 2020 INDIRE ITS Monitor covers 84 out of the 104 existing ITS and all courses activated there that ended in 2018.

as non-profit public-private foundations that involve firms directly, together with education institutions, training providers, universities and R&D labs, and local public administrations. Firms take part in the design of curricula and assessment strategies, which therefore offer great flexibility and adaptability, and define teaching based on in-demand competences. In some instances, curricula reflect actual skills foresight analyses performed by the participating companies. Lastly, in 2018, 70% of instructors in the monitored ITS worked mostly in the private sector (professionals, workers, or entrepreneurs).

This effort in aligning school and market is reflected in the successful labour market outcomes of ITS graduates: according to the 2020 Monitor, 83% of graduates found a job within one year from graduation, 92% of them within the graduate's actual field of study.¹⁰

Despite these favourable numbers, the ITS system suffers of its limited scale, and not only in comparison to short-cycle university graduates in STEM fields,¹¹ but also relative to the demand expressed by the market: in 2018, for every ITS graduate, the labour market sought 7 similar technical figures, with more severe imbalances emerging at the sectoral level (Unioncamere-ANPAL, 2019^[77]).

This is partly the result of the scale of available resources. Regional administrations are the main contributor to the ITS system, often via the European Structural and Investment Funds and a system of public calls, followed by centralised funding from the Ministry of Education and, more recently, the Ministry of Economic Development. Recent provisions have already expanded the size of centralised resources, and extra funds are foreseen in the current draft of the National Recovery and Resilience Plan. This is expected to strengthen the institutes' growth, but also their stability and their appeal to the population, since limited resources have caused the discontinuation of otherwise attractive curricula in the past. Consolidating the number of ITS can also lead to the same positive outcomes, especially in those territories where there are many ITS with important thematic overlaps across them. Lastly, from the legal perspective, the ITS system is currently authorised and regulated by governmental decree (d.P.C.m. 25 January 2008) and a host of subsequent provisions.¹² Several stakeholders suggested that a more encompassing legislative framework ("legge quadro") is overdue, which could foster the coordination between central and regional administrations.

However, greater and more stable funding may not be sufficient to bring the ITS system to scale. While in many territories the demand for this brand of education exceeds the available offer of classes, there is no evidence that a much larger number of active courses will find sufficient students to enrol. The ITS suffer from the well-known societal stigma in Italy that associates technical education to a second-tier, less dignified schooling choice. Enhancing the visibility of the ITS as a suitable career opportunity for many young adults may therefore require a more encompassing, systemic approach, that involves at least the Ministries of Education, University and Research, regional administrations, and employers' associations – all key stakeholders in the ITS Foundations. These institutions can join forces to invest in student orientation, including at the lower-secondary education level, as students have the option to choose a VET upper-secondary education as of age 14. Campaigns to raise the appeal of STEM fields of study could also produce positive spillovers for the ITS system. More focused actions should directly target the visibility of the ITS in the population, and for instance advertise their important achievements in terms of labour market placing. This would translate into well-designed communication campaigns that take into account

¹⁰ These figures refer to graduates, and therefore do not account for the relatively high number of dropouts (approx. 20% of those who enrol), nor for the fact that the remaining students are likely to be a selected sample. By comparison, in 2019 the overall employment rate of 25-34 year-old tertiary graduates (ISCED 5 to 8) was 68% (OECD Education at a Glance 2020).

¹¹ In 2018 in Italy, 50 149 students graduated from a bachelor degree or equivalent (ISCED 6) cumulatively over these three ISCED 2011 fields of studies: Natural sciences, mathematics and statistics; Information and Communication Technologies; Engineering, manufacturing and construction. Data from OECD Education at a Glance Database.

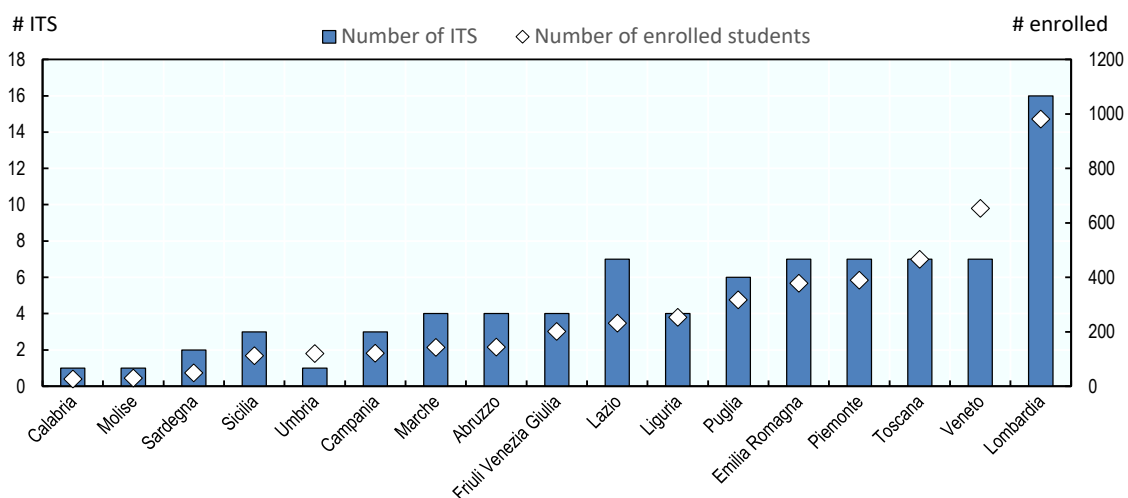
¹² <https://www.indire.it/progetto/its-istituti-tecnici-superiori/normativa/>

the (e.g. sectoral) specificities of the territory, and may include both a physical presence (roadshows, school orientation fairs) and a strong presence on social media. “ITS Open Days” can also be organised, in order to introduce individuals and families to the ITS, its infrastructure and accomplishments.

As the same societal stigma attributes greater value to university-based tertiary degrees, the appeal of the ITS can be further strengthened by facilitating the transition from an ITS degree to a tertiary degree. The knowledge acquired at an ITS can be partially recognised when enrolling at a university (see next section for more on this point).

A last aspect of interest for the current project is the territorial distribution of the ITS, which is skewed across Regions (Figure 3.3). The top three Regions by number of enrolled students (Lombardy, Veneto, Toscana) account for 45% of all enrolled students. The Southern Region with the largest number of enrolled students (Puglia) ranks sixth and hosts approx. one third of the students of the top region, and one half of the second top region. These patterns reflect a number of factors, but certainly also the density of firms that are active in the technological fields and sectors of operation for the ITS. This should not surprise, as firms are a key component of the ITS overall functioning, and their demand for graduates motivates the existence and sustains the success of the ITS. Territories that are characterised by a sparse production sectors do not seem able to set up or sustain the appropriate functioning of an ITS, thus reducing the territory’s potential for further industrial development. In other territories, conversely, ITS may be too numerous to thrive, which can result in classes that are intermittent and of lower quality. The ranking of ITS proposed by INDIRE, which factors in a number of key operational parameters and outcomes, reflects this reality and points at the poor functioning of certain “red-zone” ITS (INDIRE, 2020^[75]).

Figure 3.3. ITS figures per Region, 2018



Note: The left-hand axis reports the number of institutes, the right-hand one the number of enrolled students in 2018, where 1 unit = 1 student. Data refer to the 84 monitored ITS in 2020. Source: INDIRE, Banca dati nazionale ITS.

To a certain extent, however, this reality need not prevent further experimentation with the creation of ITS in industrially underdeveloped realities, as an ITS could be generative of future entrepreneurial developments. Strategies should be put in place, however, to guarantee that resources are appropriately invested. Resources should be invested in the supply of courses that are most suitable to the needs of the territory. Moreover, current efforts exist to create synergies or even mergers across ITS, or to establish subsidiaries of well-functioning ITS into other territories, for instance by granting extra resources to ITS that perform some of these “systemic” tasks. Cross-regional initiatives in this direction are currently

hindered by the regionalised structure of funding, and by the inherent difficulty to provide laboratory- and firm-based experience for students that are physically located far away. The successful experience of ITS online course offers during the COVID-19 pandemics could be re-proposed in the future to meet such needs. To this objective, hybrid courses must be considered as effective as in-presence courses.

Lauree Professionalizzanti

The relatively small size of the ITS student population taken alone is therefore currently unable to meet the labour market's demand for technical professional figures. Italian universities are showing increasing interest in providing tertiary-level technical education (OECD/European Union, 2019^[41]; OECD, 2018^[2]; OECD, 2017^[72]). An experiment launched in 2016 (D.M 987/2016 and D.M. n. 935/2017) has ended and resulted in the establishment of a new study programme called Lauree Professionalizzanti ("Professional" or "Technical" Bachelors) (D.M. 446/2020). This three-year programme delivers a bachelor degree in specific fields of technical/professional expertise: construction and territorial management professions; agricultural, food and forestry professions; manufacturing and ICT professions.

Relative to pre-existing Bachelor degrees ("Lauree Triennali"), these new ISCED Level 6 programmes combine an academic education with laboratory-based and firm-based experience, much like the ITS, but the balance of coursework is still tilted towards academic teaching. Also, an ISCED Level 6 degree is now required to access certain professional registers ("albi"). These new degrees can contribute to milden the shortage of technical expertise in the Italian labour market, and to make the technical educational pathway more attractive to the broader public. By offering shorter education cycles to students that want to obtain a university degree but cannot achieve a longer or less technical-oriented pathway, these programmes may also contribute to reduce universities' dropout rates. Lastly, the diffusion of these new programmes can leverage the existing network of universities and the fact that these are already well-established education institutions in the territory, thus generating potential savings, both in set-up costs and investment in branding.

On the downside, the programmes are still new and limited in number and student population, which makes them an unknown for candidate students. Their relatively recent creation also implies that some important aspects of didactics and organisation still need to be specified, let alone evaluated. Foremost among them is the way strong links between universities and companies can be created for the purpose of offering internships and sharing the teaching load, but also designing curricula and integrating technical and professional knowledge in what are usually more theory-oriented programmes. As for the ITS, university-based technical degree programmes in territories that cannot rely on a strong industrial structure will face the challenge of engaging with firms and promote the benefits of a more skilled workforce for firms.

In this respect, universities could leverage the existing experience of the ITS. Attempts to integrate ITS and the Lauree Professionalizzanti pathways are ongoing. The University of Bologna, for instance, has convened a roundtable with representatives of the Region, the Employers' Associations, and the ITS, among others. The aim is to enhance coordination of curricula and thus facilitate transitions from one educational pathway to the other, but also to leverage ITS instructors and technical facilities avoiding wasteful overlaps, and run joint orientation and awareness-raising campaigns.

Box 3.3. Corporate academies

Corporate academies are special “facilities”, established by firms, tasked to provide continuous training to the firm’s workers, according to a long-term vision.

The first academy in Italy was set up by Eni in 2001, almost eighty years after the establishment of first academy in the United States, by General Motors. The last two decades, however, saw an exponential increase in the number of academies, which nearly doubled between 2015 and 2020 to reach 100. They are not a sector-specific phenomenon.

Training activities in corporate academies aim to provide firm-specific training, often with a focus on technological innovation and business administration, and often with special attention paid to the training of managers. Recent years have seen an increasing use of online and at distance training courses, initially with the objective of expanding the number of participants adapting training to managers’ time constraints, and quickly training a wide group of people. The COVID pandemic is likely to emphasise this feature.

Academies are created to respond to specific business needs and they do not have a standardised and unique structure. However a number of common characteristics can be identified:

- Their objectives go hand in hand with the strategic objectives of the firm;
- They often set up a close collaboration with universities and research centres, and have a strong innovation dimension. This is positive, as it creates an extra channel of industry-university collaboration that, once activated, can generate spillovers for collaborations in other aspects of production (e.g. innovative didactics, R&D projects);
- They differ from a “traditional” training department and can be defined as business units, characterised by their own governance, structure and mission;
- They have a virtual or physical structure and provide training courses to employees, clients, providers and individuals who are directly linked to the firm.

The Operational Plan of the National Strategy for Digital Skills aims to increase the number of academies to at least one per region or one every 1.5 million people. The Plan also stresses the importance of linking academies to territorial or sectoral production needs, by creating temporary associations of firms (*Associazioni Temporanee di Imprese – ATI*) that can define a common project to be developed by an academy. The allocation of public resources to Academies, however, should consider whether these facilities are not simply formalising an activity that the firm would perform even without public support, and whether the training offer is sufficient generic in nature (e.g. transversal skills, soft skills) to avoid that all returns from the training activity are appropriated solely by the firm. Academies that see the participation of a university are more likely to meet these criteria.

Source: OECD and Adapt (2017^[78]).

Lessons learnt (3): Addressing imbalances in technical skills with ISCED Level 5 and 6 programmes.

- Labour market shortages and mismatches for technical skills can be addressed by creating stronger linkages between firms and education institutions.
- ITS are tertiary institutions delivering ISCED-5 technical education and with a strong connection to (local) firms. Firms co-design the curricula and provide instructors, laboratories and internship opportunities. 92% of activated internships in 2018 took place in SMEs.
- 83% of ITS graduates find a job within one year from graduation. They are, however, too few in number to address the country's shortage of technical profiles. ITS growth is constrained by limited and sometimes irregular funding, a weak regulatory framework, and the societal stigma that associates technical education to a second-tier education.
- While extra funding has been made available, no substantial achievement has been reached on the regulatory side. Moreover, further investments in students' orientation, awareness-raising and on-the-ground communication campaigns are necessary to raise the appeal of technical education, also at young age.
- ITS are unevenly distributed in the country, likely reflecting pre-existing territorial differences in the strength of the industrial base and of entrepreneurial capital. These disparities can be addressed by creating synergies across ITS, establishing subsidiaries of performing ITS across Regions, leveraging more centralised funds to this purpose, supporting the temporary mobility of students during internships or laboratory activities, or supporting the diffusion of hybrid (online and in-presence) learning.
- Lauree Professionalizzanti are university-based ISCED-6 programmes providing a mix of academic and technical education in certain well-defined professional areas. Curricula envisage both course work and internships in companies. It is possible that they suffer less of the same social stigma than ITS, as they can leverage the university's reputation and territorial presence to attract students towards tertiary technical education.
- Going forward, these programmes need monitoring and evaluation akin to what provided for the ITS system. To limit wasteful overlaps between ITS and Lauree Professionalizzanti, important progress could be achieved through greater integration of ISCED 5 and 6 pathways, both in the design of curricula and in the management of programmes and resources.
- As for the ITS, these programmes in territories that cannot rely on a strong industrial structure will face the challenge of engaging with firms and promote the benefits of a more skilled workforce for firms.

Innovative industry-oriented doctoral programmes

In a context of limited resources, like the one characterising the Italian innovation system, creating synergies between the actors involved in the innovation generating process is key. Closer links between research institutions and the private sector help maximise the return on investment, and ensure that research and training meet the needs and challenges faced by the production sector, both in terms of skills and of innovation. Firms are more likely to hire and train skilled workers, if they produce innovation or if they have tight links to universities and their research. A more qualified workforce, in turn, is also bound to expand the firm's innovation potential and enhance firms' performance.

Many actions in the European Structural and Investment Funds foster the collaboration between companies and research entities by posting researchers within companies, in order to raise the companies' R&D output or innovation output. One particular program under the National Operational Programme "Research and Innovation", leverages ESF funds to pay for PhD scholarships in certain technological domains. These are the Innovative industry-oriented doctoral programmes ("Dottorati Innovativi a Caratterizzazione Industriale"). Under the programme, the university department receives funding for a given number of PhD stipends (for their full 3.5-year duration) to be added to those funded through other channels. These PhD positions: (i) must be activated in one of the areas identified by the Region where the university is based, which defines them according to its smart specialisation strategy; (ii) requires the PhD student to spend 6 to 18 months doing research in a company; and (iii) requires the PhD student to spend 6 to 18 months studying or doing research abroad, at a company, university or research institute. The projects are submitted by the university to the Ministry of Research and evaluated by the National Agency for the Monitoring of the University System (ANVUR).

At the 5th cycle of re-financing, this programme is considered successful by the authorities involved. The setup of these PhD programmes is likely to generate or strengthen positive cross-fertilisation between the universities and the corporate world, and at the very least to subsidise temporarily companies' R&D or innovation activities. The requirement of a period of permanence abroad for the PhD student can further represent an opportunity for cross-fertilisation of both universities and firms. The fact that the PhD scholarship is entirely financed with ESF resources means that all firms, including those with limited spare financial resources, can participate to the programme.

An evaluation of the programme across Southern Italian Regions is ongoing (Cavicchi, 2020^[79]). One aspect of fundamental importance would be the analysis of the characteristics of the firms involved. A programme that would only involve firms with previous experience with structured research projects and previous interactions with higher education institutions would be less generative of spillovers in the production sector, and may allocate resources to firms that would engage in innovation nevertheless.

A distinctive feature of these PhD programmes is that firms are not formally involved in the definition of the PhD research project, but are rather "takers" of a project that is defined by the university.¹³ Consequently, the doctoral project may not align well with the company's needs, especially if the university department has a different specialisation to the local production system. This possible obstacle can be overcome by focusing the research projects on "transversal" or "key enabling" technologies and the corresponding fields of study.

The misalignment between firms' and higher education institutions' research interests can be compounded by differences in culture between these two entities, and the lack of clear governance mechanisms that can compensate for them (Marinelli et al., 2018^[80]). In this perspective, the PhD students could act as intermediaries, bridges between these often-distant worlds. Such role could be strengthened, for instance by training students in their communication skills, and their ability to translate frontier research into knowledge that is accessible to managers and entrepreneurs. A successful experience in this exact direction is the training for PhD students Assolombarda organised in collaboration with a pool of universities (Polytechnic of Milan, Statale, Bicocca, Cattolica, Humanitas and University of Pavia) in 2020 ("Corsi trasversali interateneo").

¹³ Note that "Innovative industry-oriented PhDs" are not "Industrial PhDs" as defined by the Ministerial Decree 45/2013, which conversely regulates three other types of doctoral programs: "dottorato in convenzione con le imprese"; "dottorato industriale Executive"; "dottorato in apprendistato di alta formazione". Under these doctoral programmes, PhD students are required to spend a certain period of time in a company, too, but no period abroad. Moreover, they see greater involvement of firms in the actual design of the research project.

Lastly, participating firms sometimes lament the lack of extra funding for materials or infrastructure needed for the research activity (Cavicchi, 2020^[79]). Moreover, the period of student's employment at the firm could be extended, in order to increase the benefits of the programme for both firm and student.

Lessons learnt (4): Innovative industry-oriented PhDs to boost the innovation profile of structured SMEs

- One way to raise the R&D and innovation propensity of SMEs is to subsidise the employment of PhDs in them.
- “Innovative industry-oriented PhDs” are doctoral programs that require students to spend part of their research time in a firm, and part of it abroad. The field of research must be coherent with the smart specialisation strategy of the Region where the university is located.
- The setup of these PhD programmes is likely to generate or strengthen positive cross-fertilisation between universities and the corporate world, which are also exposed to the knowledge the students acquire in the permanence abroad. The administrations involved broadly consider the programme successful.
- The fact that the PhD scholarship is entirely financed with ESF resources means that all firms, including those with limited spare financial resources, can participate to the programme. It will be important to evaluate, however, whether participating firms are a selected group, that were already used to dealing with complex innovation or R&D activities before joining the programme.
- By design, firms are not formally involved in the definition of the research project, and the latter may not align well with the needs of the production sector, thus limiting the take-up of the measure and the benefits of the measure for firms. One way to overcome this potential obstacle is for the financed projects to focus on “transversal” technologies or KETs, so as to support a broad range specialisations of production.
- A more effective coordination between firms and universities is hampered by differences in culture and the lack of a governance mechanism that fosters exchanges.
- PhD students can become the intermediary between the two institutions, but they may lack appropriate skills to do so. Training can be (and has been) provided to PhD students for this purpose.

4 Reducing costs

Costs are among the main reasons hindering training provision in SMEs, as shown in Table 4.1. Lack of financial resources can be an important barrier to participation in education and training, which can be tackled by policy instruments covering the direct and indirect costs of training participation, partly or in full. Employers face direct costs to organise training provision in house or paying (part of) training costs for their employees to attend training outside the workplace. They also face indirect costs, though, due to decreased productivity during the training and the risk that workers leave their job after the training.

This chapter explores the range of instruments available to Italian SMEs to decrease the cost of upskilling their production, with a special focus on initiatives in support of training.¹⁴ It considers the experience of Training Funds (*Fondi Interprofessionali*), European Structural and Investment Funds, the *Fondo Nuove Competenze* and other national resources in the framework of “Industry 4.0” reforms. It further tackles whether anything can be done to reduce the costs related to information training and compliance with administrative procedures.

Table 4.1. Costs for training per participant, by firm size, 2015

In Euros, firms with at least 10 employees

	Direct cost	Wage bill of participants	Social contributions earmarked for training	Funds received to organise training activities
10-19	391	378	301	53
20-49	429	521	293	63
50-249	381	594	221	83
250 and over	364	770	183	99

Note: Values for the category “250 and above” are simple averages over the categories 250-499, 450-999, and above 1000.
Source: Istat, CVTS-5 2015

Funding education and training in Italian SMEs

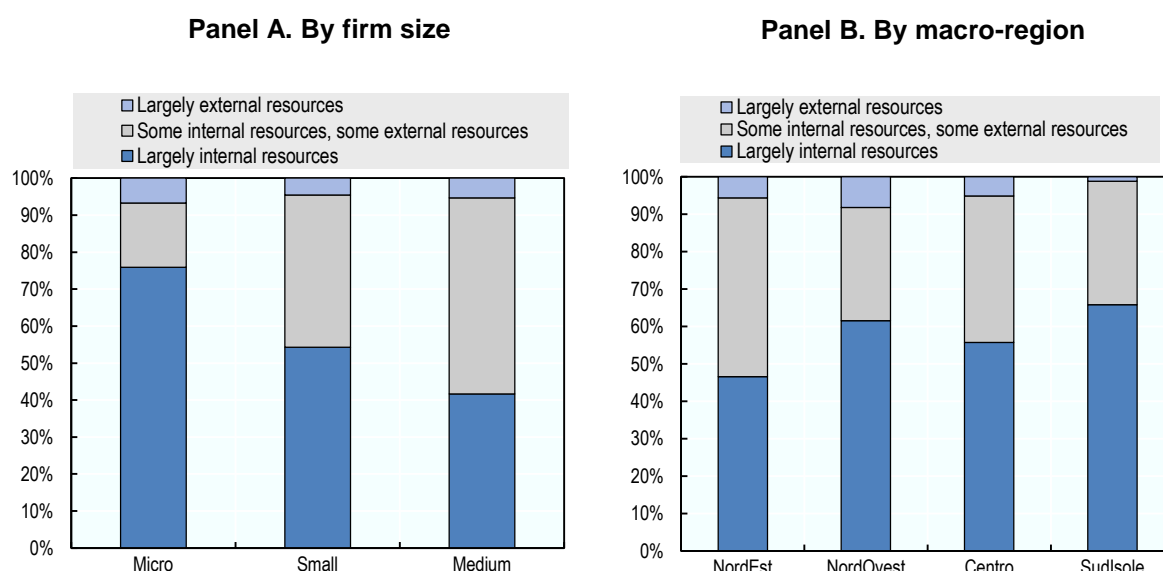
According to the CVTS, the nominal cost of structured training per participant is approximately the same for small and medium firms (Table 4.1). However, the per-participant direct cost of training (i.e. the cost of funding the activity itself) decreases with firm size, likely a function of economies of scale, while the labour cost of the trainee is higher for larger firms, likely a consequence of the wider distribution of salaries in them. Larger costs are especially demanding for SMEs, as they have less scope to release people from revenue-generating activities for training. Furthermore, SMEs tend to experience higher job turnover, which

¹⁴ As mentioned already, many firms rely on hiring of skilled workers to upgrade the human capital intensity of their production. To keep the description tractable, this chapter focuses on training initiatives only, contrary to what is done in previous chapters.

constrains their capacity and willingness to invest in skills development when there is a risk that the employee leaves shortly after training.

Differences in training costs per participant could be offset if SMEs were able to leverage public resources especially well. Unfortunately, small firms are on average less able to organise their training activities, or to apply for available public support, as they usually lack an HR department or a structured financial planning. As a consequence, large firms see a higher share of their costs reimbursed by available public resources (Table 4.1). As for the contributions firms pay through the mandatory training levy (Training Funds), firms with more than 1 000 employees recover approximately two-thirds of them as opposed to about a sixth of them for firms with 10-19 employees (ANPAL, INAPP, 2020^[81]). In the same vein, the STSME finds that the proportion of firms relying entirely or almost entirely on internal resources to fund the training of their employees decreases with firm size: this is the case for 76% of surveyed micro enterprises but only for 42% of medium-sized enterprises (Figure 4.1, Panel A). The regional breakdown suggests that relying exclusively on external resources is 6 times rarer in Southern Italy than in the North-western part of the country (Figure 4.1, Panel B).

Figure 4.1. Source of funding by firm size and region, 2020



Note: Values are based on SMEs providing non-formal training at least once in 2018-19.
Source: OECD Survey of Training in SMEs.

Training Funds

In Italy, employers are incentivised to engage in training activities by earmarking future training costs through training levies (*Fondi Paritetici Interprofessionali*, or Training Funds). The Funds are currently 20 (16 for employees, 3 for employers, 1 for temporary agency workers); some are dedicated specifically to SMEs, and some have a vertical focus on productive sectors.

Instituted in the early 2000s, Training Funds cover almost 900 thousand firms and over 10 million workers, and manage more than EUR 600 million a year (ANPAL, INAPP, 2020^[81]). They gather part of the resources firms pay through the levy, which is set to 0.3% of the firm’s payroll, and allocate them to “individual” or “collective accounts”. “Individual accounts” (also: *conto aziendale*, *conto formazione*) support a learning activity directed at the employees of the companies from which resources are levied. “Collective

accounts” can be accessed by any company after presenting a training plan, which abides to the features described by the Fund in a public call (“*Avvisi*”). The Fund then evaluates the plan and decides whether to finance the activity, i.e. the direct cost of training only. The calls are the main instrument through which the Funds can support training targeted to a specific set of competencies or a specific subset of workers, when applicable.

The use of Training Funds, however, is increasing with the firm’s size: in 2015, only 6.2% of small firms (10-19 employees) that provided training received financial support, compared to 64.1% of larger firms (1000+ employees). Similar disparities in participation in levy-supported training schemes can also be found in Ireland, Belgium or the Netherlands. While the causes of such under-representation of SMEs are varied, resources in individual accounts by SMEs are often too limited to fund any training for firms with few employees, while many SMEs lack information about the availability of Training Funds and face large administrative barriers to access those resources. The small amount of resources available per employee and per firm further constraints the *type* of training firms can access to: training providers cannot design ad-hoc training experiences, tailored to the company’s needs. Consequently, Training Funds’ individual accounts mostly pay for pre-packaged courses that are standardised across multiple firms. OECD (2019_[11]) suggests a number of actions to enhance the take up of Training Funds resources by SMEs in this framework.

Lessons learnt (1): lowering the SMEs cost of investment in training through Training Funds

- Few small firms touch the support offered by Training Funds, and this share is increasing with the firm’s size.
- Some options are available to reduce the *direct cost* of training for SMEs: (i) granting SMEs higher reimbursement rates for the direct cost of training; (ii) shortening/removing delays in reimbursements; (iii) exempting, or reducing, contributions paid by SMEs into the Funds.
- While the levy with which Training Funds are endowed is mandatory, not all firms claim back the resources they disbursed through the levy. The government could lead information campaigns to raise awareness of the Funds among SMEs, while social partners and trade associations could disseminate information among their networks.
- SMEs could benefit from a simplified funding application procedure, which would require them to describe training needs and expected outcomes, rather than to develop detailed training plans.
- Although the *opportunity cost* of training is typically not absorbed by Training Funds, actions can be taken to reduce it, e.g. (i) by reimbursing firms for workers’ wages during training, as proposed by the *Fondo Nuove Competenze* (see here below); or (ii) by introducing job rotation schemes, i.e. providing firms with support to find a temporary replacement worker during the training period.

Source: (OECD, 2019_[11])

Collective accounts, conversely, can potentially broaden SMEs’ take-up of resources from Training Funds. As the Fund mutualises resources across multiple participating firms, each firm receives more funding for training activities than it initially disbursed through the levy. As per latest available data referring to 2017-2018, Training Funds issued collective calls for approx. EUR 360 million, a 16% increase relative to the previous 12 months, and with demand by firms consistently exceeding available resources (ANPAL, INAPP, 2020_[81]). Conversely, processing times for collective calls tend to be longer, thus potentially introducing a (time) mismatch between demand and supply of training. A positive example is given by the Framework Plans (*Piani Quadro*), used for example by FonARCom, FAPI and Formazienda, which entrust

a local entity (usually, a training provider) with the task of grouping multiple firms in need of the same training program. These plans allow for flexible and adaptable responses to the training needs of a territory, and for longer timelines for the training itself.

At the same time, public calls can specify the type of training for which resources are provided, thus allowing for a better targeting of available resources. In 2017-2018, several calls dealt with the themes of innovation and Industry 4.0, paying special attention to digital skills and to skills obsolescence when firms invest in new technologies that are becoming mainstream. Other recurring calls dealt with training connected to the adaptation and reconversion of workers following company crises or transformations of entire production basins. Going forward, an important theme will likely become the developing of soft skills, including if not especially for managers (Fondirigenti, 2020^[51]) (Osservatorio 4.manager, 2019^[40]).

Public calls, however, do not usually cater to firm-specific, tailored training needs. A better targeting of calls could be achieved by narrowing the focus of each call to more precise fields of action, and increasing the number of calls in a year. This also allows for a better evaluation of the training plans submitted to the Fund for financing, and therefore for the more effective allocation of resources to the “worthiest” plans.

No matter how suitable the design of the call is and how many resources the Fund’s invest to steer firms towards the call, however, innovation-driven public calls can fail to allocate funds if companies do not have an innovation project or they do not understand how the advertised training can benefit their innovation effort. As mentioned before in this study, available funding may stay idle if companies do not have the ability to define their own training plan, or if there is no perception of the need for training (Assolombarda, 2018^[82]). Training Funds, however, can improve the participation of firms to the call, for instance by investing in dissemination of the information (both of the call and of the benefits of joining the Fund), or by offering greater reimbursement rates or higher value to projects submitted by first-time applicants. Furthermore, Training Funds could act as impartial operators between the firm and the training provider, and offer help in the definition of training plans to SMEs, as it happens with the French *Opérateurs de compétences*. This would likely require extra resources to develop these complementary services. One possible alternative mechanism is the collaboration among Training Funds for the provision of these complementary services. At present, such initiatives are prevented by the fact that Funds compete against each other for the enrolment of beneficiary firms.

Lastly, there exists still no nationally recognised formal coordination mechanism between Training Funds and other players in continuing education, in particular the Regions, which are the main conveying vehicle of resources for investment (including in training) from the European Structural and Investment Funds. This can lead to duplication of effort and a lack of synergy between the initiatives undertaken by the various players. This aspect will be further explored in the next section.

Lessons learnt (2): Targeted public calls to maximise SME participation through Training Funds

- Collective accounts are the main instrument through which Training Funds can expand their support to micro and small firms, as they mutualise resources for training. The scope of their action can be limited if they only leverage on the residual resources that had not been previously committed to individual accounts.
- Public calls can and do explicitly target training that is functional to firms’ efforts in innovation or technology upgrade, and going forward training of soft skills and skills related to the green transition. This may translate into more frequent but more narrowly defined calls.

- However, resources fail to reach firms that are not able to define their training plan and see how training relates to their investment plans. Training Funds could invest more resources in disseminating their calls, or in attracting first-time applicants.
- They can also assist SMEs in defining such plans, but current resources seem to be insufficient to that purpose, short of decreasing the funding made available to member firms. Extra resources could be found by: (i) raising the levy, which is quite low in international comparison; (ii) merging Funds among each other, or (iii) fostering mechanisms of collaboration across Funds for the delivery of such complementary services. However, solutions (ii) and (iii) may translate into reduced competition and diversity across Funds.
- While public calls usually have national scope, local territorial aggregators (usually, training providers) are instrumental to intercepting training needs of SMEs from the same area, and to designing a suitable training offer that can be funded through the call.
- Public calls tend to have longer processing times, which may be misaligned with the (often short-term) requirements of firms.

European Structural and Investment Funds

While the EU provides a significant part of the funding for up- and re-skilling of workers and exerts a strong influence through policy measures and strategic guidelines as the Recommendation on Upskilling Pathways and the European Qualifications Framework for lifelong learning, regional and national entities are in charge of turning such capital into concrete actions. The Italian regions are the main actors responsible for professional and vocational education and training, while the national government engages in monitoring and evaluation, sets strategic priorities, and develops the policy framework.

As mentioned before, this study covers initiatives funded by the ERDF and ESF that support firms in their investment in human capital, and in particular in education and training of employees and employers. Some initiatives funded by ERDF or ESF have already been presented in previous chapters. This section presents the broad Thematic Objectives for the **2014-2020 Programme** (DIPCOE, 2017^[83]) under which most initiatives for human capital investments of SMEs are concentrated, and which features of the supported plans are most likely to yield a positive outcome for SMEs.¹⁵

ERDF *Thematic Objective 1* (“Strengthening research, technological development and innovation”), especially in Investment Priority (b), focuses on the most relevant dimension of formalized innovation and research and development, i.e. the collaboration between enterprises and R&D, technology transfer and higher education institutions, but is not directly tied to up-skills and re-skilling of companies. One example of initiative under this Objective is the “Industrial PhD” presented in Chapter 3. An effective collaboration of firms with knowledge intensive entities, however, requires a relevant set of skills already in place within the enterprise, or the active role of intermediaries aimed at shaping and training the potential demand and offer in order to facilitate their collaboration.

ERDF *Thematic Objective 2* (“Enhancing access to, and use and quality of, information and communication technologies”) focuses on the development of competitive ICT infrastructures, while sustaining the use of

¹⁵ This study does not propose a quantification of the overall resources these two Funds accounted for in the 2014-20 Programme. Importantly, the ERDF sustains initiatives of technological and smart transition, which only indirectly affect the propensity of firms to invest in human capital. Many complementary investments by firms therefore escape even a thorough analysis of each initiative funded through national and regional Operational Programmes. Moreover, resources earmarked in Programmes can differ substantially from actual disbursements, making an a-priori analysis of planned resource allocation under the different investment priorities less than meaningful (ANPAL, INAPP, 2020^[81]).

ICT based services and technologies among citizens, enterprises and public administrations. Under this Thematic Objective, few initiatives mention support to digital skills, with the exception of actions pursued by Marche¹⁶ and Campania¹⁷.

ERDF *Thematic Objective 3* (“Enhancing the competitiveness of SMEs”) supports the creation of new companies, their growth, and their innovation efforts. Possibly the most relevant Thematic Objective for the purpose of this study, the topic of up-skilling and re-skilling in SMEs is not frequently mentioned in the supported initiatives. A notable exception is the Spinn – Scaleup Programme Invitalia Network, funded through the National Operational Programme (OP) “Firms and Competitiveness”, which targets innovative SMEs (including start-ups and university spin-offs) mostly in Southern Italian regions. Under the programme, firms receive funds for a range of tools aimed at developing entrepreneurial skills and the firm’s innovation and development projects. These tools include, among others, a tutor, a self-assessment tool, a report on the firm’s positioning in the market, and, for a subset of recipients, specialised entrepreneurship services and training. As for regional OPs, in the Toscana OP¹⁸, funding to start-ups is justified by their role in raising the human capital and innovation intensity of the economy.

Box 4.1. The Voucher Digitalizzazione

In 2018, the Ministry of Economic Development launched a financial measure to support the digital transformation of Italian SMEs, the Voucher Digitalizzazione, which relied partially on ERDF resources through the National OP “Firms and Competitiveness”. The scheme operated until March 2019.

The incentive granted Italian SMES a voucher of up to EUR 10 000 to cover up to 50% of the total costs necessary for the implementation of a digitalisation project. The beneficiaries had to demonstrate yearly sales for at least EUR 100 000. The instrument aimed to encourage the digitalisation of business processes among SMEs, and to support the ensuing training on digital technologies. The voucher was not intended to cover simple purchases of hardware and software but rather more organic and far-reaching digitalisation projects, that had to be stated in an advanced report, highlighting the areas of improvement for the company business. At the same time, technologies needed not be cutting-edge, but rather technological solutions that improved companies’ performance according to the technological horizon of their sector. One of the reimbursable expenditures was training, as long as it was related to the technological investment and it was provided by a training provider. The voucher also covered the costs of consultancy expenses that were complementary to the technological investment.

The measure distributed EUR 342 million over 91 000 companies, and exerted a positive leverage effect on a total value of submitted projects of EUR 1.49 billion. The Digitalisation Voucher proved to be a successful initiative, with a large number of project proposals submitted. Successful elements of the measure were: the flexibility of access by a diverse spectrum of companies and for a diverse spectrum of technologies; the potential for informal learning associated to the adoption of a new technological tool; the short and relatively simple application process (using digital channels on a dedicated platform); the large proportion of support allocated to beneficiaries in Southern regions (INVITALIA, 2018^[84]).

Other aspects, instead, ask for further reflection, and in particular the fact that the average grant was relatively small (EUR 3 700), reflecting the use by a large number of micro and small firms, but also possibly

¹⁶ Regione Marche POR FESR TO2 IP 2c action 2.2.1.

¹⁷ Regione Campania POR FESR TO2 IP 2b action 2.3.1.

¹⁸ Regione Toscana POR FESR TO 3 IP 3a action 3.5.1.

making the investment less transformative for the firm; and the scarce use of resources for formal or non-formal training and consultancies (2% and 12% of planned expenses, respectively).

Under the same Objective, the ERDF supports companies' investments in ICT technologies, with particular reference to e-commerce, cloud computing and cybersecurity, open data and big data for industrial use. These incentives do not directly support up- and re-skilling, though competences are explicitly mentioned in Emilia Romagna¹⁹ and Molise²⁰ OPs as a necessary baseline for the implementation of new ICT solutions within small and medium companies. A greater focus on the up-skilling and re-skilling of companies as a complementary investment in technology is likely to increase the return on the technological investment in terms of firms' development and growth. Positive exceptions are simple and timely financial incentives for the purchase of innovation solutions firms find most suitable, that also allow to cover the cost of consultants (to improve business efficiency and management of change) and on-the-job training. One such example is the Digitalisation Voucher described in Box 4.1.

ESF *Thematic Objective 8* ("Promoting sustainable and quality employment and supporting labour mobility"), and in particular Investment Priority (i), (ii) and (iii), aims to raise the employability of those who are either outside the labour market by providing them with training that might help their employability, or supporting the creation of new companies. Most importantly, though, IP (v) targets "adaptation of workers, enterprises and entrepreneurs to change". As argued in previous chapters, targeting entrepreneurs is especially important to foster the up- and re-skilling in SMEs, and in small and micro firms especially, where the business owner is often the general manager, too, and she oversees both strategy and operations. This Thematic Objective is not concerned with growth and innovation but rather the resolution of industrial crises and employability of workers, but training, VET education and availability of temporary managers are leveraged to foster both.

ESF *Thematic Objective 10* ("Investing in education, training and lifelong learning") provides resources for key initiatives in the realm of up- and re-skilling, from assessing the educational and training needs of companies, to improving the quality of educational facilities and services, including for ITS (e.g. in Emilia Romagna²¹); to providing training opportunities for workers in fragile companies (e.g. in Friuli Venezia Giulia²²); to improving the supply of courses by training providers (e.g. in Piemonte²³). In Friuli Venezia Giulia, in particular, training initiatives must be consistent with the industrial policy objectives defined by the Region's smart specialisation strategy (ANPAL, INAPP, 2020^[81]).

It should also be pointed out that Italian Regions mobilised important resources, often from ERDF and ESF, to support firms in training activities during the COVID-19 crisis. As of April 18, 2020, for instance, the Bolzano Province, Liguria, Lombardy and Sardinia had already provided funding for online training of employees in SMEs, as well as for the definition of SMEs' "smart working plans" and the purchase of digital technologies that would enable remote work (OECD, 2020^[57]).

Lastly, the 2014-2020 Programme allows for *synergies across the two Structural Funds* for the funding of workers' training. Firms interested in developing a training project funded by the ESF could thus ask for extra resources through the ERDF, if the project was also coherent with one of the objectives of said Fund. ERDF resources were thus usually mobilised for ESF initiatives that also involved the acquisition or restructuring of buildings or equipment, or the purchase of hardware, software, patents, licenses and other intangible assets. The integration allowed for multiple simultaneous targets (e.g. employed and unemployed individuals) and multiple instruments (not only training, but also e.g. R&D or investment in technology). Exploring the existing corpus of initiatives, few such examples could be found, making it

¹⁹ Emilia-Romagna POR FESR TO3 IP 3a action 3.5.2.

²⁰ Molise POR FESR/FSE TO3 IP 3a action 3.5.2.

²¹ Regione Emilia-Romagna POR FSE TO10 IP 10ii.

²² Regione Friuli Venezia-Giulia POR FSE TO10 IP 10ii.

²³ Regione Piemonte POR FSE TO10 IP 10iv.

impossible to draw general conclusions on the design or effectiveness of such mechanisms. That said, the importance of skills and change management for the successful adoption of ICT and digital technologies suggests that joint initiatives by the two Funds or the extension of support to training by the ERDF may be appropriate.

Many of these Objectives can be found again, under a different conceptual framework and structure, in the current discussions for the **2021-2027 Programme** (DIPCOE, 2020^[5]). The next EU Cohesion policy will develop around five Policy Objectives (PO):

- A Smarter Europe, through innovation, digitisation, economic transformation and support to small and medium-sized business;
- A Greener, carbon free Europe, implementing the Paris Agreement and investing in energy transition, renewables and the fight against climate change
- A more Connected Europe, with strategic transport and digital networks
- A more Social Europe, delivering on the European Pillar of Social Rights and supporting quality employment, education, skills, social inclusion and equal access to healthcare
- A Europe closer to citizens, by supporting locally-led development strategies and sustainable urban development across the EU.

Depending on the country's GNI, it is expected that 65% to 85% of ERDF and Cohesion Fund resources will be allocated to Objectives 1 and 2. Measures in support of SMEs have been concentrated in PO1, which is itself articulated into four specific objectives ("Investment Priorities" for the ERDF): (i) Research and innovation; (ii) ICT; (iii) SMEs' competitiveness, and (iv) Skills for smart specialisation. Each of these objectives can be in principle leveraged to support investment in skills in SMEs in the green and digital transformations:

- *Strengthening research and innovation capacities and the introduction of advanced technologies* touches upon the relationship between firms and between firms and universities or other research centres with the goal of fostering innovation in firms. Some policies to address such issues were already presented in Chapter 3.
- *Reaping the benefits of digitisation for citizens, companies and governments* can fund initiatives such as digitalisation vouchers, purchases of cloud computing facilities and other advanced ICT services.
- *Enhancing growth and competitiveness of SMEs* is envisaged to cover initiatives in support to innovative start-ups, firm creation, firm internationalisation, but also link these to sustainable growth.
- *Developing skills for smart specialization, industrial transition and entrepreneurship*: This specific policy objective is key for the purposes of the present study, recognizing up- and re-skilling as necessary enabling conditions for industrial transitions. The objective can support post-secondary training initiatives (including the ITS), but also industry-oriented doctoral programmes, to mention some examples from previous chapters. Under this objective, countries can finance hiring and training of R&D and scientific personnel, but also of other professional figures that foster SMEs' ability to engage with the green and digital transformations.

Several novelties are envisaged in the 2021-27 programming cycle relative to the previous one, some of which are likely to bear important consequences for skills investment in SMEs. First, a greater operational integration between Funds should enhance coordination between ESF-funded initiatives for the training of workers with innovation-focused initiatives under the ERDF. Second, the simplification of regulation for businesses that are funding recipients should benefit SMEs disproportionately, as it reduces the fixed cost of applying for support. Lastly, enhanced visibility provisions should aim to raise awareness of the available funding opportunities, which is usually more limited among SMEs than larger firms (ref. Chapter 2 and 3).

Design features for the support of investment in skills in innovative SMEs

An analysis of initiatives funded by ESF and ERDF allows drawing a few general lessons on features that can be mobilised to maximise the uptake of support to up- and re-skilling by SMEs.

(i) *Focus of the calls.* Through Regional OPs, Regions express their ranking of priorities for investment. These priorities can stem from an analysis of local needs, negotiations with social partners, and/or strategic choices for industrial policies, including smart specialisation policies. Most Regions already stressed the importance of technological innovation, including in relation to workforce training. These calls, however, often refer to concepts of innovation and educational providers that are formal in nature and mainly work for larger and more structured companies. Micro and small firms benefit especially from calls that assist them with informal learning activities and changes in products and process that are new to the firm but not necessarily to the market. Other initiatives, however, simply earmark resources for training in micro and small firms as a size category, no matter the industry of operations or the propensity to innovate.

(ii) *Training content and methodology.* Freedom to design the training activity according to the firms' constraints and needs is likely to maximise uptake of support by SMEs. SMEs operate in hundreds of highly differentiated sectors, in very different territories, highly dependent on necessarily different individuals (the entrepreneurs). As technological and organisational settings differ even substantially across firms, firm-specific, tailored training plans are in most instances the first-best solution. While such approaches may not be sustainable by the market (as the fixed cost of designing and delivering tailored training may very well be too high for most training providers), ESF and ERDF calls should be written to encompass the variety of needs, and expand take-up by networks of firms with similar skill needs (ref. next bullet point). Resources for routine, mandatory health and safety training should be progressively phased-out, as they support training that companies would in any case provide, and they distort competition between applicants and non-applicants.²⁴ One important margin of freedom is the methodology with which the training activity is delivered in ESF calls, where approaches that minimise the time spent away from work seem especially suited for SMEs. In Piemonte, for instance, calls typically restrict funding for training by "affiancamento" ("shadowing") to 25% of the total hours, while firm vouchers do not allow for online training. Similarly, in Basilicata, informal training on the job can make for 40% of total training at most.

(iii) *Beneficiaries.* While ERDF and ESF can fund training initiatives that are submitted by firms and are the direct expression of their up- and re-skilling needs, micro and small firms may find it especially difficult to design a training plan and submit it for financial support. Funds should therefore allow for the submission of multi-firm plans. Increasing the financing or refund rate for multi-company plans (including rates that exceed 100%) could provide a further incentive for firms to collaborate for joint training activities. This option could be applied to organisational modes that are especially worthy for the legislator, e.g. those organised within a production chain ("filiera"). In these instances, training providers play a fundamental role, as they analyse the skill needs of firms in a territory, design an appropriate, coherent training plan, and deal with the paperwork related to the application for funding. Such key role stresses the importance of a well-functioning market for training providers, where the quality of their operations can be assessed, certified, and recognised across Regions.

(iv) *Targeted individuals.* Despite the fact that Training Funds can only target firms' employees, most of the initiatives of the ESF have been directed at both employees and entrepreneurs, and only a few have focused on one of the two targets (ANPAL, INAPP, 2020_[81]). Notably, training plans in Emilia Romagna, aimed exclusively at "key figures in innovation processes", usually encompassing both managers and entrepreneurs. The possibility to target employers is a welcome feature, as previously mentioned. It is however essential that training plans can be differentiated for the two targets within the same firm, as the two figures have different training needs and respond to different incentives.

²⁴ This type of training cannot be financed through collective accounts already.

(v) *Integrated actions*. European regulation on the ESIFs factors in, and indeed encourages, the possibility of integrating ERDF resources into ESF actions, given that certain policy actions are transversal to the objectives of both Funds. This usually gives origin to a new governance level, where both managing authorities of the regional OPs participate and discuss. Integrated action is constrained by the cumbersome nature of managing administrative procedures that can differ greatly between the different programmes and funding sources. Steps can be taken to harmonise types of calls for proposals, cost recording options, management and reporting guidelines etc., but these experiences seem to be limited in number and scope so far (Regione Abruzzo, 2020^[85]; Regione Lombardia, 2020^[86]).

Synergies between Training Funds and European Structural and Investment Funds

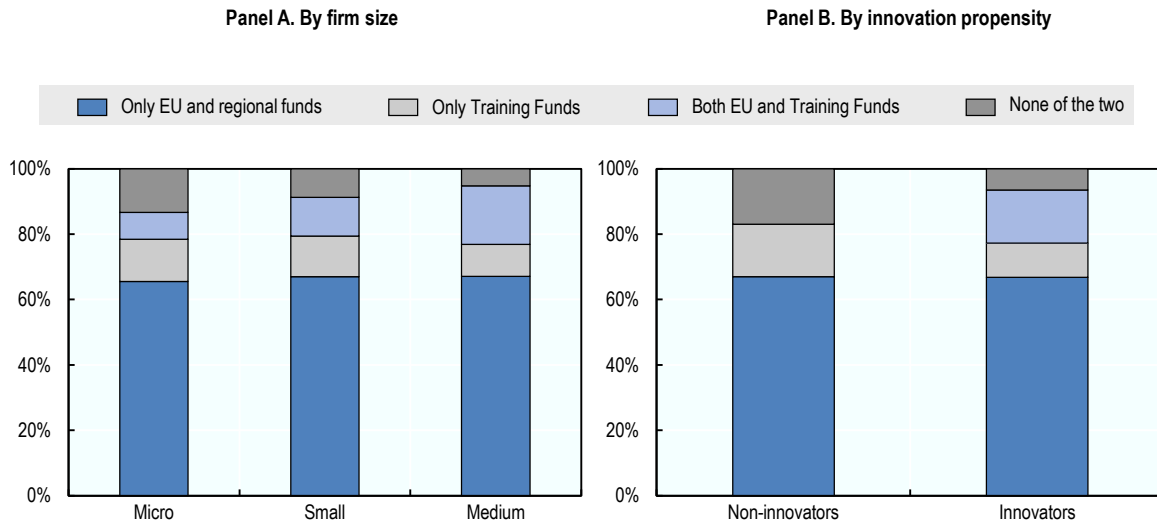
While Training Funds focus their activity on “affiliated” firms only, and employees in them only, European Structural and Investment Funds can support training activities for all firms and all individuals in a given Region, including entrepreneurs, the self-employed, and the unemployed. These differences in focus could be exploited to design complementary strategies between the two broad instruments, thus rationalising disbursements and maximising impact. This coordinated action would enable Training Funds to meet firm-specific skill needs, while ESIF resources would leverage training activities to meet industrial and technology policy objectives, or to support training to entities that cannot be funded by Training Funds by law.

This does not seem to be the case in reality. A simple comparison of the regional demand for support for training through ESF Regional OPs (2014-2018) and Training Funds (2016) reveals that regions with larger volume of resources provided by the Training Funds also see larger demand for ESIF resources, as a percentage of total potential beneficiaries (ANPAL, INAPP, 2020^[81]). In contexts in which the Funds finance more training plans, the regional administrations allocate more ESF resources, and where the Funds intervene to a lesser degree, the Social Fund does not act as a compensation at all.

At the micro level, this may have non-neutral consequences for the take-up of support by different types of firms: according to the STSME, medium firms are twice more likely to apply to both ESIF and Training Fund resources than micro firms, while micro firms are twice more likely to apply to none of the two (Figure 4.2, panel A). By a similar intuition, firms that do not report to have introduced any new product or processes are also three times more likely to fail to apply for either source of funding (Figure 4.2, panel B).

Figure 4.2. Share of firms by source of external funding for continuous education and training

100= number of firms relying on external sources of funding to some or a large extent, 2020



Note: “Innovators” are firms that report to have introduced a product or process that is new for the firm or for the market in 2018-19.
 Source: OECD Survey of Training in SMEs (STSME).

Difficulties in coordinating the design of Structural and Training Funds already emerged during the 2007-2013 programming cycle, when a first experimental attempt was made by Regione Emilia-Romagna, Regione Lombardia, Regione Toscana and Provincia di Genova.

According to the research evaluating the results of such experiment with a particular focus on Emilia Romagna (ISFOL, 2014^[87]), the four integrated Plans mobilized limited resources (slightly above EUR 20 million) and a small share of the eligible companies and workers. Nevertheless, they were considered a success in terms of stakeholders’ engagement and value for money. The main shortcomings experienced were a defective synchronicity between the retraining needs of companies and the timing of the administrative calls; an excess of bureaucracy, that also required a strong intermediation by training providers, which were ill equipped for the task; and the excessive resources dedicated to compulsory training. Most importantly, coordination required a conscious effort from all parties, who had to gather around the same table and negotiate the respective areas of action. While several similar initiatives took place in Regione Emilia Romagna, Puglia or Veneto under the 2014-2020 programming cycle, these negotiating tables are yet to become a permanent institutional feature in the design of up- and re-skilling policies in the country.

Lessons learnt (3): Mobilising ESIF resources for up- and re-skilling in SMEs

- To maximise the uptake of resources by micro and small firms, ESIF calls should :
 - Consider that SMEs often operate under innovation and training models that are mostly informal in nature;
 - Fix ambitious industrial policy goals, but be sufficiently broad to allow for flexibility in training content and methodology;
 - Minimise the incidence of *ex-lege* and catalogue-based, one-size-fits-all training; possibly, give priority to soft skills and skills for the green and digital transitions.
 - Provide incentives (including: reimbursement rates above 100%) for multi-firm training initiatives, although this stresses the importance of a well-functioning market for training providers;
 - Pay special attention to entrepreneurs, whose training cannot be easily subsidised through Training Funds;
 - Consider calls that can be accessed by micro and small firms only. Micro and small firms may further benefit of ad-hoc application procedures (for instance, avoiding click-days that are likely to be missed by less well-organised firms) or reimbursement practices (e.g. setting a first tranche of reimbursement as soon as possible, to foster uptake from cash-constrained firms).
 - Strengthen the integration of ESF and ERDF actions at the regional level, when objectives are coherent and actions can be mutually reinforcing.
- Greater coordination between ESIF and Training Funds is welcome, as it can reduce the overlap of resources and focus Regional resources on populations that can hardly be served with Training Funds. These initiatives should be enshrined in the Region's strategic choices for smart specialisation and industrial policy more broadly.
- A permanent negotiating table between regions, employers' associations, unions and training providers would be a key instrument to foster synergies between ESIF and Training Funds.

Other key national instruments

Industry 4.0

The Italian Government has recently introduced a set of ambitious industrial policy reforms with the objective of igniting a radical shift of the Italian productive system towards the use of new and high value-added technologies. The set of reforms goes under the name of Industria 4.0, then amended by Enterprise 4.0 and Transition 4.0 follow-up plans. The reforms tackle a major challenge of the Italian production and skills system, i.e. the average low productivity and limited product diversification of Italian firms, which in turn translates into weak demand for skills in most sectors, and skill shortages in others. Industria 4.0 can affect positively the demand for skills in the country by helping smaller firms to become more innovative, connected to the world technology frontier and open to international markets (OECD, 2018^[2]).

To achieve these results, Industria 4.0 policy initiatives have put in place a series of tools and instruments that include: incentives for technological acquisitions, tangible and intangible capital (including R&D, design and innovation) tax credits, tax incentives for training activities in the digital technologies, credit schemes for SMEs, the creation of digital innovation hubs and competency centres.

A review of all Industry 4.0 measures would go well beyond the scope of the present study, but it is important to highlight that the Plans are built around the rationale that firms cannot adopt or benefit fully from advanced “Industry 4.0” technologies if they do not also have a sufficiently skilled workforce and a suitable organisational structure. In this light, two of the proposed Industry 4.0 financial instruments have special interest for the purpose of this study: the Training Tax Credit 4.0 (“Credito Formazione 4.0”) and the R&D, Innovation and Design Tax Credit (“Credito d’imposta ricerca, sviluppo, innovazione e design”).

With the **Training Tax Credit 4.0**, the Government seeks to foster investment by companies in training on digital and enabling technologies (a broad list of areas technological areas is provided) (Gazzetta Ufficiale, 2019^[88]). The tax credit amounts to a certain percentage of the incurred training expenses, with percentages varying according to the company’s dimension:

- 50% of expenses for small businesses (up to an annual maximum of € 300,000)
- 40% of expenses for medium-sized enterprises (up to an annual maximum of € 250,000)
- 30% of expenses for large companies (up to an annual maximum of € 250,000)

The rate increases to 60% of the eligible expenses, across firm sizes, if the training involves disadvantaged employees. All companies can apply (with few exceptions). The earned credit can only be appropriated in the form of discounts on the firm’s tax liability or social contributions for the following year(s).

The scope of eligible expenses is broad: the labour cost of workers in training, both as learners and as teachers, for the hours concerned by the training activity; (almost) all operating costs related to the training activity, including travel expenses, supplies directly related to the project, depreciation of tools and equipment used, or overheads (administrative costs, rents); the costs of consultancy services related to the training project, including those aimed at assessing the training needs and developing the training plan. The activities can target both the development of new skills, and the consolidation of existing ones.

These features translate into very flexible and versatile training pathways, which can well adapt to the company’s actual training needs. The possibility to pitch the costs of workers that are either teaching or learning provides a double advantage to those firms that organise and deliver the training activity internally. Importantly, as of 2020 costs related to the entrepreneurs’ training are eligible as well. These features milden the concerns that training tax credits distort firms’ decisions away from informal learning (which is likely preferred by SMEs) towards externally provided, formal training (Stone, 2012^[89]).

On the downside, the measure requires firms to submit some documentation that SMEs may fail to assemble appropriately: a certification to workers, attesting their attendance to the activity; a document describing the way the activity was organised; proofs of the expenses incurred in the training activity, as certified by a professional accountant; a collective agreement governing the training activity, which may be more complicated to set up in firms where there are no unions’ representatives. Lastly, little is currently known about the firms that are benefiting from the tax credit, nor about its effectiveness in terms of firms’ outcomes, which calls for a renewed effort to monitor and evaluate the measure.

The Ministry of Economic Development (MISE) further provides a **tax credit for activities of R&D, innovation, or design** by the firm, as long as these happen within technological domains that are connected to the fourth industrial revolution and the green transition. Recently amended in design, tax credit rates currently range from 6% to 12% of the volume invested, and are different for different activities (fundamental research, industrial research and experimental development; technological innovation; design) and different expenditure threshold. The measure covers investments in both tangible and intangible assets.

The measure is of relevance for this study because it provides an incentive to hire qualified R&D personnel, as the labour costs of these employees, as well as those of external collaborators, consultants and R&D groups, qualify for R&D tax relief.

No special provision is made for SMEs. While SMEs are found to react more strongly (i.e. to produce more R&D for each Euro of tax credit) than large firms (Appelt et al., 2020^[90]), they may be more sensitive, once again, to the cost of compliance with the policy requirements. These include a certificate showing that the assets possess certain technical characteristics, and this certificate must be issued by a sworn expert in case costs exceed EUR 300 000.

Enhancing informal learning

As pointed out in the introduction, a large part of the learning taking place in SMEs is informal in nature. This is especially common when the firm adopts a new technology in the production process, which requires efforts in bringing the workforce to speed with its use, and possibly change the organisational structure of production. In this perspective, other instruments of the Industry 4.0 Plan can contribute to up- and re-skilling of the workforce, insofar as they provide support for the purchase of tangible and intangible investment goods. They include for example the Tax Credit for tangible and intangible instruments, the “New Sabatini” subsidy, the Digital Transformation subsidy (“Agevolazioni Digital Transformation”, as per art. 29 Decreto Crescita), or the Patent Box.

In some cases, the cost of training related to the adoption of a new piece of technology is already subsidised if it is included as an extra service in the purchase. If not included in the price of the purchased technology, employers have nevertheless the incentive to allow for some learning on the job, so that the workforce can operate with the new technology. For the policy maker to be able to provide financial incentives to these forms of reskilling, however, informal learning needs to be “formalised”. Informal learning does not happen accidentally, it is an intentional act of learning, which however has less structured nature. Given this intentionality of learning, the activity can be acknowledged and given structure, for instance by organising a conversation between (manager), instructor and learner ahead of starting the activity and at its end. In these conversations, it would be possible to discuss and record the trainee’s skill needs and achievements, as well as the activity’s objectives and structure. Some of this information could be also posted in a public register. This “formalisation” would then allow firms to post their expenses linked to informal learning for partial refund. Training Funds, for instance, could cover the cost of assisting firms in their skills audit or in the effort of validation and certification of the skills acquired.

Lastly, a different incentive to informal learning stems from the possibility of recognising the skills the worker acquires in the learning activity. While these skills may be very valuable for the firm, workers may be less than willing to make the effort, if this cannot be leveraged in future career steps outside the firm. Moreover, a sound allocation of public resources should not substitute private resources when the benefit of the investment is fully appropriated by the firm itself (Bassanini et al., 2005^[91]). Lastly, subsidising informal learning should not make it a substitute of other forms of training that would be more easily recognised by the market and would enhance workers’ mobility.

Linking this informal activity to the delivery of a certificate is one way to ensure that the training provided does not only benefit the firm but also the employee, and that public support is justified. Certification could improve the visibility of workers’ human capital gains on the labour market, and raise workers’ incentives to learn. Effective systems rely on the recognition of prior learning, but this must be transparent and ensure the buy-in of all relevant stakeholders, including employers. The recent implementation in Italy of a National Qualification Framework is a very positive evolution in this respect, as it provides a systematic and coherent description and classification of qualifications that are recognised by the National System of Certification of Competences (MIUR and MLPS, 2018^[92]; MLPS, 2021^[93]).

Fondo Nuove Competenze

The New Skills Fund (“Fondo Nuove Competenze”, henceforth FNC) was set up in 2020²⁵ to contrast the possible detrimental consequences of the COVID-19 crisis for employment. The measure primarily aims to offer workers the opportunity to acquire new skills and adapt to new labour market conditions, in a context where firms may need to convert their production or change the way they produce the same products. The recipients of the measure are private employers who enter into a collective agreement that reorganises working hours due to the adverse market conditions in which the firm operates.²⁶ This agreement, signed between the employer and trade union representatives, establishes that part of the working time is dedicated to the training of workers.

The application for funding is evaluated by the regional administrations (as far as the appropriateness of the training plan – see below), then by ANPAL for its procedural conformity. Each worker can train for a maximum of 250 hours, and complete the training activity within 90 days (or, in some instances, 120 days) from the approval of the application by ANPAL. While the measure targets re-skilling needs emerging from an organisational or technological transition within the firm, the training plan must account for workers’ prior learning and lead to the attainment of a certificate of level EQF 3 or 4 or higher. In the case of training courses organised by the company itself, the training plan must contain proof that the firm has the capacity to carry out the project. Training providers, therefore, need not be accredited entities.

The FNC is endowed with EUR 730 million (2020-2021) that are used to reimburse employers for the salary and social contributions of workers in training, i.e. to cover the indirect cost of training. As for the direct cost of training, companies receiving support from the FNC can also apply to Training Funds and see the direct cost of training reimbursed as well. In fact, Training Funds can submit the application to the FNC on behalf of firms participating to a collective call. Importantly, however, these resources can be accessed only if the firm has not yet reached the quota of funding available at the Training Fund for the period of reference.

The Fund is an important and welcome initiative that addresses the challenges of firms’ foreclosure or downsizing with active labour market instruments, as opposed to the current passive labour market instruments (primarily: unemployment benefit and short time working schemes). The Fund can support training for employees in managerial positions, as well as informal learning (albeit with some conditionality), and training submitted by a network of firms (as organised according to a *contratto di rete*).²⁷

The pivotal role of continuous training in the initiative is also likely to strengthen the culture of up- and re-skilling among workers and companies alike. In particular, the initiative gives the training project a central role. The project must detail how the prior learning of concerned workers is identified, and how the personalised training project can at the same time expand the worker’s skills and address the company’s training and reorganisational needs. Regional administrations must evaluate the reskilling project against the EQF system and the suitability for certification, “taking into account the Regional plan for continuing education”, and validate and certify the acquired learning. By requiring a sound training plan, therefore, the Fund introduces an important element of conditionality to access resources, thus in principle decreasing the frequency of deadweight losses in the allocation of public resources.

The FNC has only been recently established, so there is no available evaluation nor public information on actual take-up by firm size classes. A preliminary reading of the Fund’s design, however, suggests that

²⁵ DL n.34/2020 (“Decreto Rilancio”), converted into Law n. 77/2020; Decree n.104/2020 (“Decreto Agosto”), converted into Law n.126/2020.

²⁶ “Accordi collettivi di rimodulazione dell’orario di lavoro” (Art. 88, comma 1, Decreto Legge 34/2020).

²⁷ At the time of writing this report, no monitoring data were available. Some of the hypotheses developed in this section could be re-examined once such data will become available.

some of its features may limit access to micro- and small firms more than to medium or large firms. The FNC regulation stipulates no special provision for SMEs, for instance. In particular, as funds are allocated on a first-come, first-served basis, resources may run out if enough large firms exploit their superior ability to comply with administrative requirements and apply first. This adds uncertainty about the concrete possibility to touch the support, which can be a disincentive to investment in training in the first place. These drawbacks could have been prevented if a share of the Fund's resources had been earmarked for SMEs only, or by stripping the first-come, first-served approach in favour of a set of differentiated rates and ceilings (e.g. by firm size) that would limit the use of resources by selected categories of firms.

The cost of compliance with the application procedure (set up of an agreement with social partners, design of a suitable training plan, application, delivery of the training within 90-120 days from approval) further suggests that the measure, as currently designed, offers greater returns for firms that can allocate a relatively large number of employees to training, and keep operating nevertheless. The 90-120 day limit to deliver the training, for instance, can translate into frequent training days for the involved workers and an important disruption of production in SMEs as a consequence. The short timeline allowed for the signing of collective agreements, albeit now extended, also favoured large over small firms, in light of the same difference in organisational capabilities and the higher likelihood of previous experience with the design of a training plan. Lastly, union representatives may be absent from micro and small firms, subsidised training plans in these entities have to comply with collective agreements that are agreed upon at the territorial level, and can be therefore less well tailored to the actual reality of each participating firm.

Lessons learnt (4): Other national instruments to support training in innovative SMEs

- Industry 4.0 reform program has set up a series of policy instruments that can tackle the low level of penetration of digital technologies in the country. These reforms recognise that that firms cannot fully benefit from advanced technologies if they do not also have a sufficiently skilled workforce.
- The Training Tax Credit 4.0 and the tax credit for activities of R&D, innovation, or design recognise a tax discount to firms that invest in human capital, either by offering structured training to their workers, or by hiring a more skilled workforce.
- The range of eligible expenses is broad and therefore can adapt well to the company's actual needs. The Training Tax Credit 4.0 further contains special provisions for SMEs, including the possibility to post expenses sustained by the employer in training. Some SMEs, however, may be reluctant to apply because of the costly requirements in terms of documentation to be submitted for support.
- Other provisions of the Industry 4.0 reform package which more explicitly aim at supporting firms in their technological investment can also be a source of learning within the firm, and in particular of informal learning. Often this takes the form of learning from suppliers. Support to informal learning requires extra systemic efforts to recognise and certify prior learning, and some firm's resources to "formalise" the learning activity by drawing a learning plan and following up on its achievements.
- The Fondo Nuove Competenze provides resources for the training of workers in companies that need to reorganise working hours due to the adverse market conditions in which the firm operates.
- The available resources (730 million for 2020-21) finance the cost of labour for workers in training, but not the direct cost of training, which can be sustained by Training Funds. The FNC

is an important instrument of active labour market policies and can help spread a culture of learning among employers in Italy.

- It is not clear, however, whether the FNC can foster training in micro and small firms as well as in medium and large ones. The application procedure is less than straightforward, especially if firms have not had previous experience with the design of a training plan, and time to comply with some requirements short. Furthermore, resources are allocated on a first-come, first-served basis (conditional on acceptance), and no funds have been earmarked specifically for SMEs, which may put these at disadvantage, in light of their lower (average) organisational capabilities.

The cost of administrative procedures

SMEs often lack a dedicated HR department/staff that could identify financial incentives available as well as existing government-supported adult learning programmes. Many entrepreneurs and small business owners find it hard to navigate the policy support landscape and therefore often do not apply for (financial and non-financial) assistance for which they could otherwise qualify. For young firms, which also tend to be small, high compliance costs and complexity of tax regimes can exacerbate the resource constraints often experienced in the early stages of business development. This is especially binding for SMEs, which may not have the scale to absorb the fixed cost of managing an application procedure. Governments across the world therefore are increasingly searching for ways to simplify procedures for firms to touch existing incentives, while striking a balance between the application of norms and the effectiveness of the designed support measures. Attention to this aspect of the policy design may be particularly important in Italy, which ranks rather low among countries in the ease of doing business (58th out of 190 surveyed economies), despite significant improvements in the overall underlying “score” between 2010 and 2019 (World Bank Group, 2020^[94]). SMEs are among those most affected by the non-supportive business environment. According to the European Commission’s SME Performance review, Italy ranks among the lowest countries in the EU as far as responsive administration, state aid and public procurement procedures are concerned (European Commission, 2020^[3]).

Calls for proposals are the most common approach to procuring education and training services in ESI Funds and Training Funds for multi-firm actions. The process involves providers writing proposals according to specified criteria to apply for the delivery of education and training services. The degree of competitiveness of calls can vary across proposals, and may or may not require the application to be handled by accredited or certified providers.

From a public administration perspective, calls for proposals increase competition between providers, which can lead to higher quality provision and more efficient allocation of resources. On the downside, calls for proposals are often associated with high administrative costs for the public administration, which usually informs the calls’ priorities by a SAA exercise, and uses experts to screen applications. The same holds true for beneficiaries. Firms that do not want to sustain the cost of an intermediary to comply with application requirements, may face complex rules and procedures, delays in reimbursements, and the hurdle of applying to multiple Funds at the same time, if applicable. Calls may also introduce uncertainty in planning when funding is short-term and firms need to reapply at regular intervals to sustain training activities.

Mitigating measures are: the introduction of calls with multiple steps that do not require a second application; the standardisation of calls under the same objectives, including in the timing of the calls themselves; the use of “certificates of excellence” attributed to applicants (both firms and training providers), which then re-apply with simplified procedures; consistently enforcing the “only once” principle, whereby second-time applicants need not file the same supporting documents again; first-time applicants,

conversely, can be given higher reimbursement rates, which would not incentivise applications, but also compensate firms for the extra cost of first-time applications; if documentation on eligible expenses must be validated by an accredited party, one can make the cost of the intermediary eligible for reimbursement as well.

Calls, however, are not the only way in which policy makers can support SMEs in their up- and re-skilling efforts. While analysing every tool separately would not be feasible in this study, some general strategies can be implemented to reduce the cost of applying and complying with administrative requirements.

SMEs should not have to navigate a fragmented system involving different authorities in order to complete the necessary procedures. One-stop shops are a fundamental solution to save time and cost for both businesses and the administration. Good practices further typically impose the filing of the application and all supporting documents in electronic format only, and simplified procedures for very small firms.

Firms often iterate the need for targeted guidance on how to process the application for funding correctly. Governments therefore are increasingly putting in place online tools to inform SMEs and guide them to appropriate support measures for their business. Online websites provide information about each financial instrument (see also Chapter 2 on this point), but can also point companies towards the most appropriate accredited organisation or branch of the public administration. Visitors may be asked to fill in a short questionnaire, after which the tool generates a customised list of supports, tailored to the visitors' business requirements. Furthermore, the user experience can be improved by deploying "digital assistants" (e.g. chatbots) that help businesses navigate the website and sort through the amount of existing information. Similar services can be provided in person by the administration, for instance in thematic "road tours", or by employers' associations, which offer these services as part of their statutory activity with affiliated companies.

Lastly, attentive public administrations are able to intercept and valorise the feedback of the support beneficiaries. Firms' perceptions on the most burdensome regulations and procedures can be gathered in multiple ways, such as for instance through online open public consultations, or by organising Business Fora.

5 Conclusions and lessons learnt

In a world of ever-changing production technologies, providing firms with the right skills of workers and managers is key to generate new ideas, absorb knowledge and adopt technologies that are produced elsewhere. SMEs, however, are typically less well equipped to attract and nurture human capital, as they typically lack the culture, organisational capability, scale or financial resources to engage in the necessary training activities. This can translate into a lower propensity to produce or absorb innovation, and ultimately into lower competitiveness and survival.

According to the OECD Survey of Training in SMEs, a new survey of training and investment behaviour of Italian SMEs, informal learning is more frequent than formal and non-formal one, but both happen less frequently in micro than medium firms. The analysis further confirms, albeit only descriptively, that innovation and “green” investments are complementary to firms’ efforts to retrain workers. Once again, these two firm investments co-occur more frequently among medium-sized than micro firms.

This report reviews the wide range of existing initiatives in Italy that can expand the up- and re-skilling efforts of SMEs, as a means to accompany their transition towards a digital and greener way of producing. The measures reviewed tackle three broad barriers that prevent SMEs from investing further in their workforce’s skills: the lack of a learning culture in these firms, their relative inability to identify skill gaps and attract appropriately qualified workers, and the high sensitivity to the cost of training.

Chapter 1 addresses the lower capacity of managers and entrepreneurs in SME to recognise the value and benefits of human capital and training in particular. This chapter therefore focuses on the training of business leaders (managers and business owners), with the aim of improving their ability to design a learning or even investment project and to leverage training to foster changes in the structure of production. The main policy instruments to this end in Italy are subsidies (vouchers) to expend in consulting services, and coaching and mentoring activities. These measures allow for a tailored, flexible and even “personalised” approach to training of business leaders. Many SME managers or entrepreneurs further ignore the existence of support instruments, which requires the design of information-spreading tools such as awareness-raising campaigns, often in collaboration with employers’ associations and chambers of commerce.

Chapter 2 addresses the SMEs’ relative inability to understand the skills gaps and mismatches that exist between the human capital of the firm’s current workforce and the competences required by the fast-evolving world of production. Attention is therefore given to skills assessment and anticipation exercises and the complementary support that may be required to interpret and implement their results. Punti Impresa Digitale (PID), Digital Innovation Hubs (DIH) and Competence Centres, when actually known to business leaders, can be important to perform assessments of the firm’s (technological and skills) maturity, to distribute information and screen SMEs towards the most appropriate Industry 4.0 actors and resources.

Labour market shortages and skills mismatches can be addressed by strengthening the linkages between firms and education institutions, and expanding the supply of technical skills that can foster the adoption of Industry 4.0 technologies. Educational pathways that respond to this need are the Istituti Tecnici Superiori and the more recently-created Lauree Professionalizzanti, which deliver a tertiary education of technical nature. At a higher ISCED level, Innovative industry-oriented PhDs are doctoral programs that require students to spend part of their research time in a firm, and part of it abroad, thus strengthening firms’ human capital intensity and R&D and innovation propensity.

Chapter 3 deals with the cost of training provision in SMEs, which can be disproportionately higher for SMEs, as they typically suffer from more limited liquidity, fewer economies of scale and higher job turnover. Several actions can be undertaken to expand the access of SMEs to resources made available by Training Funds and European Structural and Investment Funds. In both cases, this goes through the appropriate design of collective calls for submission of training plans, as collective calls are the main instruments through which SMEs can apply (directly or indirectly) for financial support. The recently introduced Fondo Nuove Competenze has great potential to expand the proportion of workers who can have access to subsidised training, and to spread the culture of learning in the country. Future actions should evaluate, however, whether the lack of earmarked resources for SMEs, the short application times and a relatively complex application procedure may have favoured applications by larger, more organised firms over micro and small ones. The cost of compliance could also limit the access of SMEs to the Training Tax Credit 4.0 and the Tax credit for activities of R&D, innovation, or design, which are otherwise characterised by a broad range of eligible expenses and an otherwise overall SME-friendly design.

Box 5.1. Fostering skills investment in *micro and small firms*

Micro and small firms face additional challenges in investing in skills development and in introducing new technologies, compared to larger firms, calling for policy solutions that are targeted to their specific needs. This report highlighted a number of general principles that could contribute to strengthen micro and small firms' up- and re-skilling efforts linked to the digital and green transformations.

1. Identify flexible and simple solutions

Many micro and small firms are mid- or low-tech companies, and require technological solutions that are relatively affordable, easy to implement, and often already in use in other firms operating in the same sector. If they innovate, micro and small firms usually do so in incremental steps. To match this great heterogeneity and maximise its returns, training in micro and small firms should be flexible in content (e.g. tailored to the needs of the firm and covering both technical and soft skills), provision (e.g. modular training, at distance training, training outside working hours) and recipients (e.g. involving the owner as well). The policy maker should also acknowledge that training in these firms is more frequently informal in nature, sometimes even provided by the supplier of the purchased technology, and it therefore easily escapes measurement. Initiatives that cover the cost of labour for workers participating in training are potentially more interesting for micro and small firms, where the opportunity cost of the hours dedicated to training is high.

2. Provide guidance to managers

Entrepreneurs and business owners play a key role in understanding the needs of their company and its workers, and in designing and implementing change. However, managerial skills are often limited, in micro, small and family-led businesses more than in large or publicly-owned companies. Training to managers contributes to raise awareness of the benefits of up- and re-skilling, and to better address skills gaps within companies. Existing skills assessment tools are considered useful, but more support should be given to managers in the interpretation of the results of the assessment, and in the identification of actionable and targeted solutions.

3. Foster collaboration

Micro and small firms have limited resources to formalise collaboration with other firms or other institutions that contribute to bolster their innovation capacity. A greater involvement of micro and small firms in company networks or associations, as well as the development of joint strategies with the supply chain would reduce training costs and promote the exchange of services and knowledge. Policy interventions could further leverage existing intermediary structures between the administration and micro and small firms, to multiple goals: raise awareness of the existence of support instruments, and help firms to use them, thus

strengthening the policy transmission channel; accompany firms in their upskilling strategy; involve firms in a broader network of institutions, including universities and other post-secondary education institutions (e.g. ITS), which can decrease the cost of knowledge sharing and idea generation, but also be receptive of the firm's needs; etc.. The collaborations need not be territorial in nature, if some of the needed inputs are not locally available, as it is likely the case for the mastery of some new technologies or organisational practices.

4. Strengthen the relationship with trustworthy figures

Actions aimed at improving the learning culture and the use of public support instruments in micro and small firms should target the entrepreneurs or business owners, as they are usually the locus of control. This can be achieved via external figures that the entrepreneur can trust, such as representatives from employers' associations, professionals (e.g. tax accountants, employment consultants), or other business leaders. Policy actions could strengthen the training of professionals in Industry 4.0 themes, raise their awareness of public policy instruments, or facilitate the aggregation of professional practices within and across specialisations, with an eye to raise the quality of the consulting expertise provided to SMEs.

5. Reduce the cost of compliance

Many micro and small firms do not make use of government support for adult learning activities, because they lack the capacity (e.g. a dedicated HR department), financial resources, or time to apply for support and comply with the ensuing administrative requirements. Efforts should be therefore exerted to reduce administrative costs for the beneficiaries (e.g. delays in reimbursements, multiple simultaneous applications, complex procedures, etc.). This could be done by providing micro and small firms with ad hoc conditions in terms of generosity of the support, application procedures, or reimbursement practices (e.g. setting a first tranche of reimbursement as soon as possible, to foster uptake from cash-constrained firms).

Some features of the reviewed policy actions can be traced across chapters, and can tackle multiple obstacles to the investment in skills simultaneously. Making the business case for training, for instance, could change CEOs' mind-sets towards learning and can ultimately change the firm's workplace organisation and raise training levels. Firms should be provided with more and better evidence on the links between skills and firms' performance, for instance among peers in the same sector or region. A manager who is better aware of the benefits of training will also provide learning opportunities that are more targeted to the firm's needs, which requires an analysis of the firm's training needs on a regular basis. For this to happen, skills analyses should be performed at the sectoral, territorial, or firm level. Firm-level analysis could happen in the form of a self-assessment tools, similar to the Chambers of Commerce "Selfie 4.0" tool, but these need to be paired with assistance in the interpretation of the self-assessment results, and with support in drawing an adapted skill and/or technology upgrade project. Currently, several Training Funds require SMEs that respond to collective calls for training projects to produce the results of an SAA exercise, and this is considered a key parameter for the allocation of funds. SMEs that are not able to perform an SAA or cannot afford a consultancy service to identify their skill needs are therefore penalised in the application for resources.

The importance of firm networks, for instance, should be emphasized, as networks allow for the sharing not only of costs, but also of information, knowledge and strategic decisions across firms, including for training activities. Two or more firms can share training costs, services provided by external suppliers (consulting companies, training providers), or personnel within the company (HR figures, or apprentices on a rotating basis). Policy makers can support the up- and re-skilling of SMEs through firm networks by allowing these entities to apply for support alongside individual firms, by differentiating the rate of subsidisation for networks, or by earmarking specific resources for networks only. The creation of networks can be supported via intermediary bodies that foster the synergies across firms. These entities should be on the territory and therefore aware of certain local or sectoral specificities, but also have superior information about the benefits of certain investments (e.g. in skills and in innovation), or the availability of

public instruments in support of such investments. The entities could be market players such as business consultancies, large training firms, professionals, or the lead company of a supply chain, or institutional entities such as emanations of social partners, the Chambers of Commerce, the PID, DIH or Competence Centres, or other, newly created institutions. The Ministry could provide these chains of firms with initial funding in view of fostering self-sufficiency over time.

Informal learning, too, is especially important for SMEs, as it reduces or resets the indirect cost of training, and often follows automatically the investment in technology adoption. In this sense, several aspects of the Industria 4.0 plan stimulate the (informal) up- and re-skilling of employees by subsidising the uptake of new technologies. Expanding the support to informal learning, however, requires extra systemic efforts to recognise and certify prior learning, and a conscious effort by the firm to give a minimum “formalisation” to the learning activity.

A last area of policy actions with crosscutting consequences deals with coordination between institutions that have competence or provide funding for investment in human capital in SMEs. The report has highlighted, albeit certainly not for the first time, the fragmentation of sources of funding and information on this area of policy action. Limited coordination increases the risk of inconsistent, overlapping or ultimately incomplete approaches. Strengthening synergies and maximising impacts requires further reflection on the most suitable, formalised, mechanism(s) for inter-institutional coordination, and possibly on a common national strategy for up- and re-skilling in SMEs. One example of coordination between sources of funding is the joint use of ESF and ERDF resources for the support of up- and re-skilling in SMEs, as this policy action is transversal to the objectives of both Funds. Another such example is coordination between the administrations in charge of ESIF resources, and the Training Funds, which are currently the two main providers of financial resources for training in the country.

Annex A. Methodological note

The OECD Survey of Training in SMEs has surveyed a representative sample of 528 SMEs in Italy, inquiring about these companies' training, innovation and investment practices, about their uptake of public funding and support programmes available for these activities. The survey is organised in five sections: the **first** one includes information about the company such as the sector in which it operates, the size, the year of creation, the level of qualification of the CEO; the **second** section covers learning and its obstacles, focuses on training participation and barriers to training, as well as collaboration with other firms in relation to training provision or hiring new staff; the **third** section focuses on investment, including in innovation green technologies and intangible assets, and on barriers to innovation; the **fourth** one covers public measures to fund training and firms' knowledge thereof; and the **fifth** one covers the impact of COVID on production and the workforce.

The stratification for the sample considered the following dimensions:

- Four macro-regions: North East, North West, Centre, South and Islands;
- Four macro-sectors: Manufacturing (Manufacturing (ISIC Rev.4 section C), Constructions (ISIC Rev.4 section F), Advanced Services (ISIC Rev.4: J+K+L+M+N), All Other Services (ISIC Rev.4: G+H+I+R+S);
- Three firm size classes: 1-9; 10-49; 50-249.

The number of units sampled per dimension was chosen in order to respect predefined constraints based on firms' revenues from sales from 2018 (i.e. the share of each sub-category's revenues in the dimension's total revenues from sales) by macro-region, macro-sector and size class. Data on revenues from sales by region were sourced from the OECD System of National Accounts Database, those on by firm size and sector from ISTAT's "Aggregati Economici delle Imprese per Settore ATECO e Taglia d'Azienda".

The unit of observation for the Survey is an enterprise which was active at the time of the survey and which employed at most 250 staff on average in 2019. The enterprise had to be exercising its activity in the business sector excluding Agriculture (ISIC rev.4 Section A), Mining (B), Utilities (D, E), Public Administration and Defence (O), Education (P), and Human health and social work activities (Q).

The survey was administered in CAWI format between December 2020 and January 2021 to business owners, directors or managers aged 25-70. This group of people was considered more knowledgeable about the topics of the survey.

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