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Enhancing SME productivity: Policy highlights on the role of managerial skills, workforce skills and business linkages

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Enhancing SME Productivity

Policy highlights on the role of managerial skills, workforce skills and business linkages

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Introduction

This paper provides the main policy highlights of the OECD report on "Enhancing Productivity in SMEs" The paper is structured as follows. First, it briefly presents estimates on productivity gaps by firm size to show that, while SMEs are on average less productive than large companies, productivity gaps change significantly depending on the specific size and sector of the firm. Second, it provides an overview on the main firm-level drivers of SME productivity, i.e. factors internal to the firm that directly affect SME performance such as managerial and workforce skills, the use of ICT, R&D investments, etc. Third, it focuses on those drivers that have been more closely analysed in the frame of the project through three thematic workshops organised in collaboration with the Government of Mexico: *i.e.* managerial skills, workforce skills and business linkages. In particular, the paper focuses on how they affect SME productivity and what policies work best in helping SMEs leverage these drivers.

Productivity gaps by firm size

Productivity gaps by firm size are wider in manufacturing than in services, which is a consequence of the larger role that capital investment and economies of scale play in the former. Figure 1 and Figure 2 present synthetic information for 14 OECD countries on productivity gaps between SMEs and large companies in manufacturing and services over the period 2005-2014. In manufacturing, the productivity of micro-enterprises is only about 40% of the one of large companies, with the ratio declining between 2008 and 2014 from 45% to 37%. On the other hand, the productivity of manufacturing-based small and medium enterprises relative to large companies was respectively 62% and 75% in 2014, above the pre-crisis levels (Figure 1).

In the services industry, SME productivity relative to large companies is on average higher than in manufacturing, i.e. productivity gaps are smaller. In 2014, labour productivity in micro-enterprises was 68% of the one in large companies, while the ratios for small and medium-sized companies were respectively 91% and 111%. Similar to manufacturing, in services too, SME productivity relative to large companies declined in the aftermath of the recession, but it has recovered to the pre-crisis levels since then (Figure 2).

Figure 1. Labour productivity by firm size in manufacturing, 2005-2014

Value added at factor cost per person employed, current USD, current PPPs

Large firms (250+ persons employed) = 100

Note: Only countries for which both value added at factor cost and employment data are available for all size classes and all years: Austria, Czech Republic, Germany, Spain, Estonia, United Kingdom, Hungary, Italy, Lithuania, Latvia, Poland, Portugal, Slovakia and Slovenia. Manufacturing includes ISIC rev 4 classes, 10-33.
Source: OECD Structural Business Statistics Database, November 2017.

Figure 2. Labour productivity by firm size in business services, 2005-2014

Value added at factor cost per person employed, current USD, current PPPs

Large firms (250+ persons employed) = 100

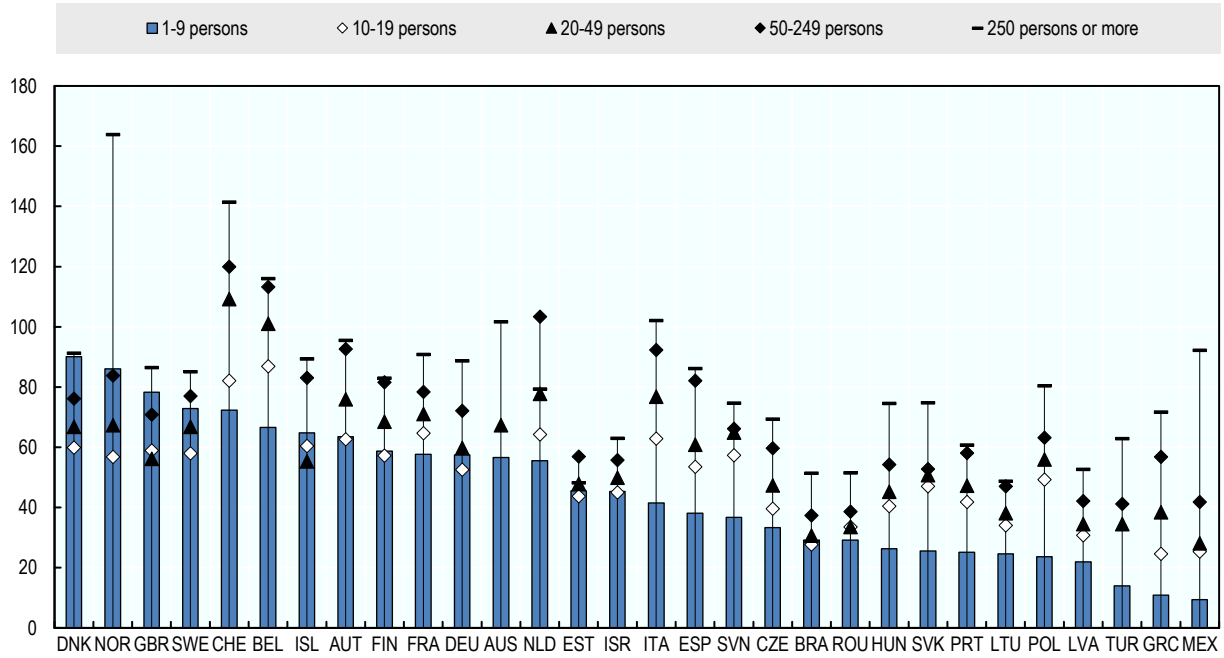
Note: Only countries for which both value added at factor cost and employment data are available for all size classes and all years: Austria, Czech Republic, Germany, Spain, Estonia, United Kingdom, Hungary, Italy, Lithuania, Latvia, Poland, Portugal, Slovakia and Slovenia. Manufacturing includes ISIC rev 4 classes, 10-33.
Source: OECD Structural Business Statistics Database, November 2017.

There are also strong cross-country variations in productivity gaps by firm size (Figure 3), although there is not a clear discernible pattern in this case. Productivity gaps are wide both

in upper-middle income countries such as Turkey and Mexico and in high-income countries such as Italy and Japan.

Figure 3. Labour productivity by enterprise size, business economy, 2016

Value added per person employed, thousands of USD, current PPPs, 2016, or latest available year

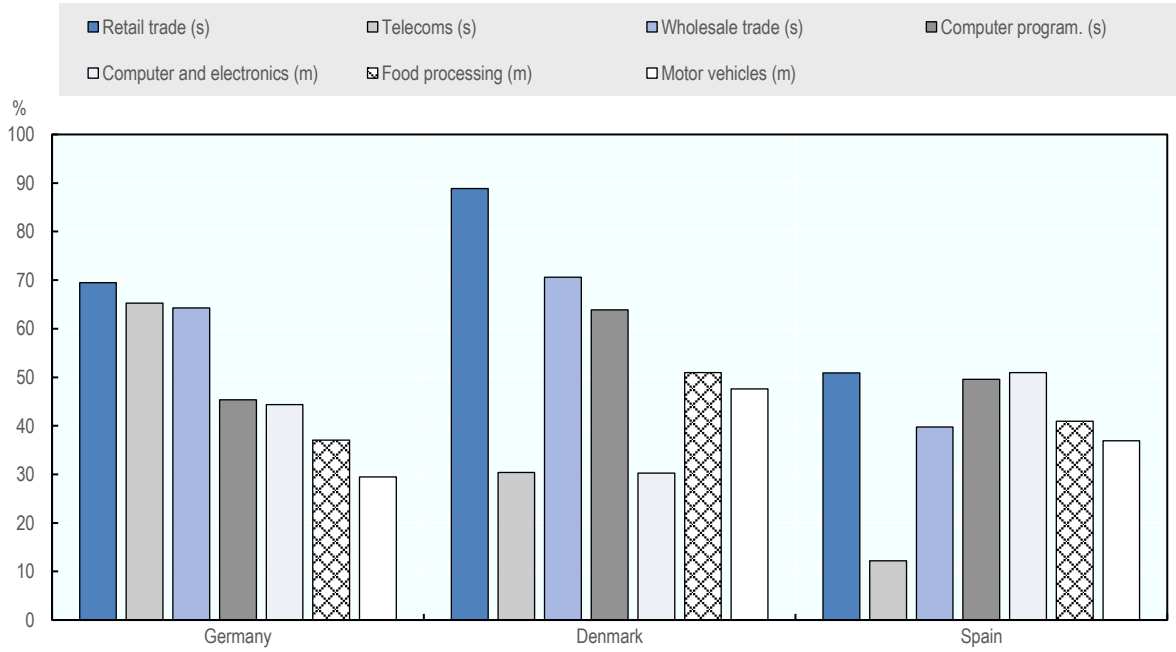


Source: OECD (2018), *Entrepreneurship at a Glance: Highlights 2018*, OECD Publishing, Paris. https://www.oecd.org/sdd/business-stats/EAG-2018-Highlights.pdf

While the distinction between manufacturing and services is helpful to start discerning different patterns across sectors, they are still broad categories with strong differences within them. Thus, Figure 4 goes a little bit further by showing labour productivity in micro-enterprises relative to large companies in seven sectors for three OECD countries (Germany, Denmark and Spain). The key takeaway is that micro-large enterprise productivity ratios at the national level differ considerably across industries. In Germany, the ratio ranges from 30% (motor vehicles) to 70% (retail trade); in Denmark between 30% (computer and electronics) and nearly 90% (retail trade); and in Spain between 12% (telecommunications) and 51% (retail trade and computer and electronics). Retail trade emerges as one of the sectors in which productivity gaps between SMEs and large companies are the narrowest, which is the result of low capital intensity and low average labour productivity in this sector.

Figure 4. Labour productivity of micro-enterprise relative to large firms by industry in selected OECD countries, 2014

Value added at factor cost per person employed; Large firms = 100



Source: Based on OECD Structural and Demographic Business Statistics (SDBS) database.

This section has provided a brief overview on productivity gaps by firm size, showing that such gaps are wider in manufacturing than in services due to the larger role that capital investment and economies of scale play in the former. Productivity gaps are the narrowest in retail trade, which however also has average low labour productivity levels. The next section presents the main internal determinants of SME productivity, based on the results of a review of the empirical literature on this topic.

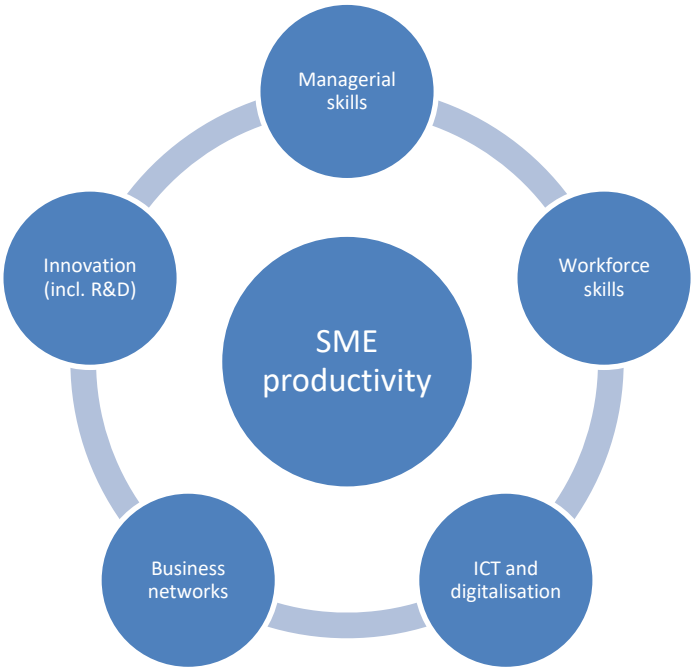
Main internal determinants of SME productivity

SME productivity is affected by factors both internal and external to the firm. Internal factors are typically levers (such as workforce and managerial skills) on which business owners and business managers can act to improve enterprise performance. External factors refer to market, industry and local conditions (*e.g.* degree of competition, technology development, education level, economies of agglomeration and specialisation), which influence productivity growth and productivity diffusion by shaping the incentives and investment choices of business owners. With a view to narrowing down the theme of the paper, the focus is only on the main internal determinants of SME productivity.

Figure 5 offers a synoptic view of the main internal determinants of SME productivity, although the visual is only for clarification purposes since many of the factors interact with each other in the way they affect SME productivity. For example, managerial and workforce skills influence the use of ICT and R&D investments in SMEs. Similarly,

business networks can result in an improvement of managerial skills or can facilitate access to R&D resources.

Figure 5. Main internal determinants of SME productivity



Based on the results of our literature review, the most oft-reported internal determinants of SME productivity were:

- Managerial skills and management practices, including those more closely related to the workforce such as training and human resource management;
- ICT and digitalisation, including the use of hardware, e-commerce, and software programmes that can help professionalise small business management (e.g. Enterprise Resource Planning and Custom Relations Management);
- Business networks, including participation in clusters and global supply chains that help SMEs to overcome size-related constraints with respect to access to resources and markets;
- Innovation, which has to do with the introduction of new products or processes at the firm level, including through R&D investments.

Access to finance and the scale of production have also been found to be reported as drivers of SME productivity. However, access to finance can rather be seen as an enabler of productivity-enhancing investments. In other words, companies may hoard cash without necessarily undertaking productive investments, in which case there would be little correlation between enterprise financial indicators and enterprise productivity. As to the scale of production, which essentially corresponds to the size of the firm, this clearly affects productivity levels, but firm size (i.e. business scale-up) is rather influenced by a wide range of macro-economic conditions and framework policies, from competition policy to

employment policy, as well as from policies affecting other firm-level drivers (e.g. skills, innovation and business linkages).

The rest of the paper looks more specifically at the role of three determinants that have been the subject of three thematic workshops organised by the OECD in collaboration with the Government of Mexico in November 2016, May 2017 and February 2018: managerial skills, workforce skills and business linkages.

Managerial skills and SME productivity: Issues and policies

A distinction is often made in the literature between managerial skills and management practices, where the former refer to the ability of doing something, while the latter concern the actual use of the skills to obtain something, like a qualification. Managerial skills and management practices (e.g. strategic planning, human resources management, accounting, marketing, logistics, certification and quality control) are commonly reported as important determinants of SME productivity (Bloom and Van Reenen, 2010; Peterson et al., 2004).

The literature finds that there is a positive correlation between the use of formal management practices (e.g. Total Quality Management, TQM, or lean production) and business productivity (Parker et al., 2010). However, returns from the use of formal management practices increase with the size of the firm (Baker and Hall, 2004), making informal management in SMEs a rational choice on occasion.

Furthermore, a business environment in which competition is fierce and business survival difficult tend to discourage investment in managerial skills and management practices (Nunes, et al., 2006), although competition as such favours productivity growth in the economy through the entrepreneurial process of "creative destruction".

Finally, managerial skills also influence other internal determinants of SME productivity, such as the use of ICT or the propensity to undertake R&D (Love and Irani, 2004). By the same token, other firm-level variables such as the quality of the workforce or participation in business networks increase the likelihood that business owners will adopt formal management practices (Bacon and Hoque, 2005; Gray and Mabey, 2005). This underlines the interplay between the main determinants of SME productivity, which should be taken into appropriate consideration in the design of programmes targeting SME productivity.

While the empirical literature points to the importance of managerial skills and management practices for productivity growth in SMEs, there are some important considerations to keep in mind in the design and implementation of programmes targeting managerial skills in SMEs. A key distinction is, for example, between programmes that target traditional sectors of the economy, such as retail trade, and those that work into more knowledge-intensive industries such as advanced manufacturing. The needed managerial skills in these two broad sector categories are clearly different, calling for different types of programmes to be implemented.

Upgrading managerial skills in traditional sectors

A different approach between advanced and emerging-market economies

A first important question that policy makers need to address is whether it makes economic sense to upgrade managerial skills in low-tech SMEs, such as those in retail trade, through targeted programmes. As seen earlier, the choice of not investing in managerial training and/or in the use of certain management practices can be a rational choice on the part of

the small business owner, for example because of his/her low level of competences and those of his/her workforce or because of the thin profit margins in a sector where competition is price-driven. In other words, in sectors such as wholesale and retail trade where average labour productivity is low, productivity gaps between SMEs and large companies are narrow and in which competition is fierce and price-based, there might be little incentive for small business owners to invest in upgrading their managerial skills.

From a policy-maker's perspective, these considerations are compounded by the fact that upgrading managerial skills in traditional low-tech SMEs is likely to be a costly endeavour, given the large pool of companies in this category, their average low survival rate, and possible displacement effects occurring when government-backed companies force out of the market similar companies that do not receive government support.

Finally, there is evidence that, at least in advanced economies, productivity growth in retail trade has mostly been a Darwinian process propelled by the entry of large discount stores and the exit of small inefficient mom-and-pop shops. For example, in Korea, Cho et al (2014) find that the massive restructuring and re-allocation driven by the entry of large discount stores substantially contributed to productivity growth in the retail trade sector, while in the United States Foster et al. (2002) find that new establishments owned by existing firms – i.e. part of large corporations – are much more productive than the average establishment in the retail industry. In other words, the entry of large and highly efficient corporate groups such as Walmart explains much of the productivity growth in retail in the last twenty years. The above arguments have been prevailing in OECD economies and, as a result, it is rare to find programmes that specifically target the upgrading of managerial skills in low-tech SMEs. Productivity growth in these sectors has rather been left to the outcomes of competition.

However, in some emerging-market economies, this narrative has been criticised because of the high social costs involved in letting the myriad of mom-and-pop shops out of the market. The rationale behind recent programmes in countries such as Mexico, Uruguay or Malaysia is that small retail trade shops play an important social function beyond the economic one, employing many family members and enabling access to health care for a whole family thanks to the formal employment of one of its members. Because these small shops are much more labour intensive than large discount stores, policy makers in these countries have argued that lack of support to small retail shops would result in a net employment loss. Furthermore, given that workers in these shops are low skilled, there is a risk that if they were to lose their job they would end up in an even lower-income and more informal job, worsening income inequalities.

To summarise, while the long-term productivity benefits from increased competition in retail trade also hold true in emerging-market economies, it has been relatively common in these countries to support the upgrading of managerial skills in retail shops because of the high social costs associated with their closure in the short to medium-term.

Operational details: how to go about supporting managerial skills in low-tech SMEs

The experience of programmes upgrading managerial skills in low-tech SMEs from emerging-market economies (e.g. Mexico, Uruguay and Malaysia) offers interesting insights for policy makers interested in implementing similar initiatives in their countries, keeping in mind that these programmes have an economic and social mission at the same time.

First, programme rules and activities should be simple to be able to attract generally low-skilled entrepreneurs into the programme. For example, in Mexico and Uruguay, a door-to-door approach has been used to raise interest among potential participants. Programme activities also need to be simple. In Mexico, business management training for low-tech small business owners only last six hours, to cover six thematic areas considered key to good small business management, while in Uruguay a programme that focuses on food retailers first identifies key development priority areas and then delivers four hours of training/advice to address the main shortcomings of the company. In Malaysia, on the other hand, small companies can use government vouchers to buy ICT services or to invest in skills upgrading.

Second, given the large pool of companies in traditional sectors of the economy, the cost per enterprise in such programmes should be kept as low as possible to allow for the largest possible number of participants. For example, in Mexico programme participants received the equivalent of USD 400 of training, while in a programme run by the SME Agency of Turkey the amount was USD 2 000. This enabled the Mexican government to work with 36 500 businesses per year and the Turkish government to serve 21 500 companies per year, which can be considered both large numbers in the context of targeted skills programmes.

Third, it is common for skills upgrading programmes, including those in high-tech sectors analysed below, to use intermediary organisations for the implementation of some or all of the programme activities. The main reason is that governments often do not have internally the skills needed to deliver the programme contents. A side effect of such an approach has been to encourage the development of a national market for business support services. However, the use of intermediary organisations comes with transaction costs, which means policy makers should also be cautious about setting too many layers of intermediation between the government and the final beneficiaries if they are to maximise the proportion of the programme budget spent on programme activities. In Uruguay, for example, the national chamber of commerce of small food retailers administered directly the activities of its programme, whereas the programme from Mexico experienced two levels of intermediation in which the government assigned the implementation of the programme to the national chambers of commerce which, in turn, contracted local training organisations to deliver the programme activities.

The following box gives further information on Mexico's "Tablet" programme and Uruguay's IT solutions for food retailers, which have already been introduced in this section and which both support the upgrading of managerial skills in very small low-tech businesses.

Box 1. Upgrading managerial skills in low-tech SMEs: The experience of Mexico and Uruguay

Mexico's Tablet Programme

The so-called Mexico's Tablet Programme was implemented by the SME Agency of Mexico (INADEM) over the period 2015-2016. It mainly targeted micro-enterprises employing less than 10 employees in traditional sectors of the economy such as retail trade (e.g. convenience stores and restaurants) and low value-added manufacturing (e.g. blacksmith's forges). Most participant companies (around 60%) operated in retail trade.

The programme was innovative in the way it combined basic training in key management principles with the provision of ICT solutions.

More specifically, the programme offered six hours of basic management training on six topics: *i.e.* inventory management, accounting, customer relationships, micro-market analysis, repayment capability, and use of a management software programme. Furthermore, participants received a tablet that comprised a management software programme, a software programme enabling customers to pay for utility bills and pre-paid phone charges, and a swipe-card extension allowing customers to pay by credit card. The two main objectives of the programme were to help small traditional enterprises increase their market shares via an improvement in their management skills, and to bring companies on the edge of informality within the purview of the government.

Over the duration of the programme (2015-2016), more than 70 000 companies participated in the programme, which had a budget of MXN 660 billion (i.e. about USD 34 million).

Uruguay's IT solutions for food retailers

This programme from Uruguay has aimed to improve business management practices in small food retailers through IT training, IT solutions (i.e. management software programmes) and bespoke management advice. Similar to the Mexican programme, the Uruguayan scheme has supported micro-enterprises in a low-tech sector including restaurants, small supermarkets and grocery stores through a combination of training, advisory services and IT solutions. However, the Uruguayan programme also helped participants to benchmark themselves against the local industry average to identify those management areas in greatest need of support. In doing so, the programme in Uruguay was more custom-tailored than the one in Mexico. The programme also offered further optional activities to participants, such as the possibility to join input purchasing groups to obtain better prices through bargaining larger amounts of products.

The programme has been able to apply a cost-recovery model and become self-sustainable in the long run, with participants paying part of the cost to the national chamber of commerce of small food retailers that is in charge with the administration of the programme. On the downside, the programme has been a niche intervention, working during the three-year period of technical assistance with only about 500 companies nationwide, which has clearly limited its impact on industry-wide productivity.

Upgrading managerial skills in knowledge-intensive sectors

While productivity growth in low-tech sectors such as retail trade is mostly the result of competition effects, there is a stronger rationale for targeted interventions aimed at upgrading managerial skills in knowledge-intensive sectors. By way of example, the introduction of automation or Industry 4.0 technologies in manufacturing generally requires the development of new skills both by entrepreneurs and workers. Similarly, the process of business high-growth – *i.e.* when companies grow fast over a short period of time – may prove difficult to manage for entrepreneurs, who will need to learn quickly how to make business growth sustainable. In fact, it is not uncommon for high-growth firms to experience an employment and/or turnover contraction in the aftermath of the rapid growth spurt, which can be considered a call to help growth-oriented entrepreneurs to acquire those skills needed to retain new market shares and manage larger and more complex business organisations.

Many OECD countries have also recently placed strong emphasis on the development of advanced manufacturing, which is the use of innovative technologies and methodologies to improve competitiveness in manufacturing. In the United States, for example, the government-sponsored and MIT-led project "Production in the Innovation Economy" has argued that "although the global distribution of manufacturing is not an automatic loss for the United States, gains from the colocation of manufacturing and innovation have not disappeared". The publication from this project, therefore, makes a call for public policies that encourage colocation through training programs, supplements to private capital, and inter-firm cooperation in industry consortia to maintain manufacturing capacity but also, crucially, to maximise its innovative potential (Locke and Wellhausen, 2014). In addition, manufacturing employment is thinning out in many rich economies, whereas jobs in advanced manufacturing are often considered key to bridging income inequalities through the employment of mid-skilled workers.

Training and coaching programmes in advanced manufacturing

Several types of programmes exist in OECD countries targeted at honing managerial skills in knowledge-intensive SMEs and start-ups, including business incubators and business accelerators. One new type of programmes concerns intensive training and coaching programmes for entrepreneurs aimed at the introduction of new technologies in manufacturing, such as the case of Canada's Operational Efficiency Programme (OEP) and Brazil's *Mais Produtivo* (see box below). The main lessons from this typology of programmes are as follows.

First, the success of such programmes often depends on the close interaction between the programme and its participants. This means that while some programme activities can be delivered online, the majority should involve face-to-face interactions to be able to offer custom-tailored solutions to the participant companies. Second, the workforce should also be closely involved in the programme activities, since it will be in charge with the implementation on the shop floor of some of the innovations introduced through the programme. Third, similarly to programmes in low-tech sectors, it is common for programmes in advanced manufacturing too to rely on intermediary organisations, such as consulting companies and training institutes. Finally, these programmes have usually worked with larger SMEs, avoiding *tout court* the micro-enterprise segment (up to 10 employees), to the extent that participant companies need to have an initial minimum level of technology.

Box 2. Upgrading managerial skills in advanced manufacturing: The experiences of Canada and Brazil

Canada's Operational Efficiency Programme (OEP)

This programme is managed by the Business Development Bank of Canada (BDC) and is mostly meant for small manufacturing companies. Participants need to employ at least 20 workers to be eligible, but most of them do not exceed the 50-employee threshold. The objective of this programme is to fine-tune business operational efficiency by helping participating companies to benchmark their performance against the industry average, to identify and eliminate causes of waste in the production process, and monitor progress against a set of key performance indicators built as part of the BDC support. The methodology hinges on site visits and interviews with managers and staff. For example, stage I of this programme (i.e. the "potential for operational efficiency") comprise two-

and-a-half days of site visits and interviews with company managers and workers, followed by a two-day preparation of an Action Plan to improve operational efficiency.

The main strengths of this intervention are its focus on one key dimension of productivity (operational efficiency), its ability to offer custom-tailored solutions to participants, and the close involvement of the workforce in the whole innovation process. On the other hand, the main challenges lie in the time and cost commitment for business managers. For example, the simplest stage of the OEP (stage I out of the existing three) requires participants to spend CAD 8 500 (60% of the 278 projects in FY 2015-2016 involved stage I).

Brazil's Mais Produtivo

Brazil's *Mais Produtivo* is a programme of the federal Brazilian government to encourage productivity growth in manufacturing SMEs through the introduction of low-cost and high-impact improvements. The programme includes three axes: lean manufacturing, energy efficiency, and digitalisation and connectivity. Each of the axes includes a training component of between 120-160 hours. The programme is implemented by four different government institutions, depending on nature of the policy intervention, and is based on a cost-sharing arrangement by which the government covers 80% of the cost of the programme and participating firms the remaining 20%. According to government estimates, the intervention led to an average increase in productivity by 52% on the 3 000 companies part of the pilot programme.

Workforce skills and SME productivity: Issues and policies

This paper mainly looks at workforce skills development in SMEs through the means of formal workplace-based training, which is defined as any kind of training that is delivered at the firm level. As such, this definition does not include apprenticeship and traineeship policies, which are generally called initial training.

SMEs are faced with important financial and human resource constraints with respect to training, which are linked to the small size of the business, the starting level of education and skills of the labour force, lack of information about appropriate training and the benefits of training more generally, and fears of not realising a return on the training investment. More specifically, SMEs generally lack dedicated internal training or Human Resources departments and are also less likely to employ training managers or to have formal training policies. Direct financial costs of training are also much higher for SMEs because trainers need to tailor their courses to the needs of smaller firms. SMEs also have smaller workforces, leaving less scope to release people from production, and tend to experience higher job turnover than larger firms, constraining the capacity and willingness of SMEs to invest in skills development.

The literature generally finds a positive relationship between workplace-based training and SME productivity. Training is also positively related to other enterprise performance indicators, such as enterprise survival, ICT adoption and business internationalisation. For example, Collier et al (2011) conducted a study of UK businesses over a 7 year period (1998-2004) that focused on SMEs. They found that establishments that train at least some of their employees for up to 2 days in the largest occupational group (e.g. training some managers and administrators) are 13% more likely to survive (Collier et al., 2011) than non-training workplaces, with equivalent increases for workplaces providing training for more than 2 days. Thus, training was positively associated with enterprise survival, though

with decreasing returns to the duration of training. A more recent study of UK SMEs during the recession period (2011-14) find similar results (Bryson and Forth, 2016). In particular, the authors find that: i) firms where at least 40% of core non-managerial employees had undertaken training grew at a significantly faster rate than those that were less training intensive; ii) training reduced the probability that the company would exit the market; iii) firms that engaged larger proportions of their core employees in off-the-job training had higher levels of employment growth and higher levels of turnover growth than other, similar firms.

In Germany, Kuckulenz and Zwick (2003) found that participation in workplace-based training had a significantly positive effect on wages, suggesting positive effects on labour productivity as well. Holzer et al (1993) found that a change in annual hours of training per employee has a significant and substantial impact on product quality via a reduction in the scrap rate, i.e. the percentage of output that is discarded in the production process due to avoidable errors.

With respect to emerging-market economies, a World Bank study (Lopez-Acevedo et al., 2005) of Mexican firms found that, in micro and small firms, employees who had gone through on-the-job training were 27% more productive and earned 19% more than those without any form of training, while workers with external (off-the-job) formal training were 55% more productive and earned 29% higher wages (Lopez-Acevedo et al 2005). Similar results were found for medium and large firms.

Beyond training, the use of formal management practices, such as HRM, is also positively linked to SME growth, although SMEs are more likely to adopt such practices if they employ highly skilled employees and engage in networks with other organisations (Bacon and Hoque, 2005), stressing again the interplay between different firm-level drivers of SME productivity.

Common workforce training policies in OECD countries

Common mechanisms to support workforce skills in SMEs across OECD countries have included: awareness-raising campaigns on the importance of training; information and guidance mechanisms; tax incentives; training subsidies; training levies; statutory mechanisms such as rights to training leave; job rotation schemes; employer networks; accounting standards; pay-back contracts; and occupational licensing. The most important of these mechanisms are presented as follows.

Training tax incentives

The use of this particular instrument has recently been explored in detail by Müller & Behringer (2012). They point out that most OECD countries routinely permit firms to offset 100% of training costs against annual profits in their tax returns, but that some systems also allow deductions greater than the costs incurred, especially for smaller firms. The main attraction of tax incentives is that they allow employers to decide who will be trained (and how), and tend to address under-investment in training by shifting the incentive balance towards training rather than recruiting skills externally. However, in some countries, tax incentives – as well as another fiscal measure such as training levies (see below) – have mostly been used by larger SMEs, if not large companies *tout court*.

The Netherlands, for example, experimented with an extra deduction from taxable profits on training expenditures (totalling 120%), plus an additional deduction (20%) for firms spending less than a specified amount. In targeting firms with low absolute levels of

training expenditure, the incentive both automatically targeted small firms and minimised deadweight losses (Leuven and Oosterbeck, 2004; EIM/SOER 2005). France, too, has long operated a training tax credit for those SMEs that, year after year, invest in vocational training beyond the statutory obligation, with a higher credit for firms with fewer than 50 employees. Through being related to the previous year's training, the device is an incentive for both increasing training expenditure and restricting deadweight costs (Stone and Braidford, 2008).

While targeting (e.g. via differential rates based on firm size) and allowing for previous training performance can lower deadweight costs, it usually also implies higher administration costs for tax authorities and employers. The burden of "form-filling", together with various other barriers, may explain why substantial fiscal incentives might be needed to activate small companies. This is, indeed, suggested by Korea's experience in the mid-1990s, where larger firms were more responsive than small ones to tax incentives, and accordingly benefited more from the scheme, causing a change in policy orientation towards network-based solutions examined below (Ra, 2005).

Other observations regarding the impact of training tax incentives on SMEs are that concessions typically apply to externally-provided formal training rather than internal informal training, which is also often important to small firms, and that complex systems with different rates for different companies can be administratively expensive and confusing for smaller enterprises. Thus, transparency and clarity is needed over how the tax authorities are likely to treat the case of small enterprises (Müller & Behringer, 2012).

Training subsidies

Overall, evidence tends to support the view that small firms are more inclined to invest in training if a subsidy is available. Müller & Behringer (2012) conclude that direct subsidies are more effective than tax incentives at targeting particular enterprises such as SMEs, which also reduces the extent of deadweight costs. In fact, the experience from different countries suggests that, without a clear SME focus, large firms benefit disproportionately from training subsidies. However, targeting efforts implying complicated application procedures can also favour larger firms, which typically have more administrative capacity than small firms (Müller & Behringer, 2012). Other studies (e.g. EIM/SEOR, 2005) have also argued that subsidies need to be *substantial* in order to engage SMEs. This is necessary to compensate them adequately for both the direct and indirect costs (e.g. lost working time) of training.

France offered targeted training subsidies through the measure *Engagement de développement de la formation*, which provided a subsidy of up to 70% of training costs (with a further 10% for special groups of employees). Some 90% of recipients had fewer than 50 employees, and evidence suggests that the incidence in training rose significantly in those small enterprises assisted - with respect to both qualified and unqualified workers (Jallade et al., 2004). Reviewing evidence from the United Kingdom regarding subsidies for various forms of training, Hogarth *et al*. (2009) concluded that there was mixed evidence on the degree of additionality arising from training subsidies, but it was clear that they encouraged a proportion of employers to do more training, and that there was particular value for small companies in having both a subsidy and specialist advice/guidance. The subsidy was particularly valuable if it also included the indirect costs (i.e. the time of the employee taken off for training).

Training vouchers

Vouchers are a specific form of training subsidy. The main advantage of vouchers is linked to the relatively low cost per beneficiary of the policy and to the flexibility deriving from choosing the training provider and type of training from a pool of accredited options. On the downside, the ability of training vouchers to change the long-term attitude of SMEs towards training – i.e. whether SMEs will continue to provide training after the use of the vouchers – has often been questioned.

In Belgium, Flanders and Wallonia regional governments operated similar training vouchers schemes, targeted upon small (and especially micro) firms. Employers could buy online vouchers, which could be used to purchase training from accredited providers. Half of the price of the voucher was paid by the government. While in Flanders, the scheme focused on SMEs as a whole, in Wallonia eligibility was targeted upon the self-employed and firms with fewer than 50 employees. Both company-specific and general training were eligible, encouraging a wide range of training. Firms with under 10 employees were the main users, which bears witness to its non-bureaucratic and simple to use features. On the whole, the type of training tended to be job/company-specific rather than general in nature, and focused on white-collar staff rather than the less skilled (Müller & Behringer, 2012; Stone & Braidford, 2008).

Training levies

Levy systems can result in higher levels of workplace-based training, while addressing the issue of 'poaching' by requiring all firms to contribute to training expenditures. A common typology distinguishes between: i) "Train-or-pay" systems, requiring employers to invest a particular amount (typically by share of payroll) on training, or pay a tax based on the shortfall; ii) Systems where the employer contributes to a common fund (administered nationally or through a sector body), from which training costs are met. Fund authorities are able to mutualise some of the funds acquired through the levy and establish priorities for their use with respect to the type of training, target groups or type/size of enterprise, and even allow firms that exceed their target level to reclaim the surplus.

Train-or-pay schemes tend to give employers more discretion in how money is spent upon training, but this individualistic system works against more collective solutions which can favour SMEs better. France and Canada (Québec) operate such statutory schemes. The French scheme offers rate concessions to small firms, and Quebec's exempts many such firms. But both systems relate only weakly to SMEs, if anything because they involve detailed paperwork. Thus, in practice, SMEs are often primarily addressed through separate training instruments, notably training subsidies and training networks. Indeed, Train-or-pay schemes are perceived as having so few benefits for small companies that they are often regarded simply as a tax by SMEs (EIM/SEOR, 2005; Stone and Braidford, 2008). It has also been argued that they encourage inefficient and inappropriate training by favouring 'superficial compliance' and may even cause firms to reduce their investment towards the minimal level (Johanson, 2009).

With respect to common funds, The Netherlands operates over 100 levy schemes, set at an average of 0.67% of gross wages, but usually also requiring co-funding from employers (of 50% or more). Based firmly on consultation, which promotes employer commitment, these systems incorporate infrastructure support (such as qualifications design), administration of public funds for training, and facilitate longer-term perspectives on sectoral training. The Dutch system finances collective training for employers, on-the-job training, advisors to help formulate training needs, etc. The system reportedly has had a positive influence upon

training culture, improved the quality of training supply and achieved employer 'buy-in' (helped by pre-existing local and sectoral bi- and tri-partite relationships) (Müller & Behringer, 2012). However, the schemes do not to target small firms in particular, and research shows that small firms have benefited less than larger ones (Gasskov, 2001). By the same token, Cox *et al*. (2009) conclude that impacts are often uneven across firm size bands, with larger firms making greater use of training grants funded by levies than small firms in many countries. By way of example, the experimental 1990s Training Guarantee Levy in Australia increased substantially overall private sector spending on training, but noticeably less so among small companies, which were not specially catered for in the design of the scheme.

Nonetheless, there is also evidence that training levies can also reach to small companies, if they are properly designed. In Spain, they were deployed to encourage firms with fewer than 100 employees to co-operate over training (Ok and Tergeist, 2003). Joint funds for training plans in Italy have offered another demonstration of how levies can be used to target support to SMEs. Administered by the social partners, funds were used for the preparation of training plans, and then the training itself (via the issue of vouchers), in firms with fewer than 15 employees (Stone and Braidford, 2008).

To summarise, experience shows that levies, especially the pay-or-train model, find it difficult to reach small enterprises, unless they are specifically designed for SMEs, for example by converging to common funds used to support SME training networks. However, similar to other training financing measures, it should also be stressed that realising the full effect of levies is also dependent upon broader structures of advice and support. In particular, policy makers should always bear in mind that onerous approval processes tend to favour larger firms with HR administrative resources.

Training networks

Pooling of resources is commonly used to address various obstacles to training confronting individual SMEs. This may involve local or sectoral cooperation among SMEs themselves, or between larger firms and their supply chain partners, including small firms, in forms such as group training associations, sector skills councils and business clubs. The use of collective funds (e.g. from levies) is also one example of pooling resources, as seen in the case of Spain above. Conceptually, developing networks can not only strengthen the engagement of small companies in training – e.g. through educating managers about the value of training, diffusing management practices and behaviour and discouraging poaching – but can also give rise to further dynamic benefits based on opportunities for knowledge exchange, collaborative R&D, etc. (Bosworth, 2009).

Group training associations, for example, offer to members various benefits related to economies of scale, specialist training expertise, and reduced transactions costs in handling administration (including in applying for public subsidies). There is generally strong evidence that embedding firms in wider networks can positively affect the number of training days undertaken by SMEs; with even higher training inputs for those firms involved in multiple networks (Cox et al., 2009).

The enterprise-led Skill-nets Training Networks Programme (STNP) in Ireland was a renowned model of training network, which involved 55 sector- or area-based networks all focused upon small firms. Designed to mobilise and support groups of enterprises to address their joint training requirements, the scheme mobilised enterprises through networking techniques; provided funding to networks (50-75% of the costs); and promoted an enterprise-led outlook with respect to how to develop, recognise and certify learning and

qualifications. Skill-nets did not specify the type or scope of training; its role was to support the networks with resources and expertise (Stone and Braidford, 2008).

The Skill-nets approach has been found particularly appropriate for smaller firms, which frequently lack the time, expertise and money to develop training customised to their specific needs. The Irish government has been offering two-thirds of funding in grants to networks, with the rest mainly from participant firms. Nearly four-fifths of the courses developed through the Skill-nets initiative were customised to meet Network member requirements. The experience from Ireland suggests that training networks require strong facilitated support (both internal and external), but once they are fully engaged, small enterprises are able to determine and satisfy their own training needs.

Training consortia are a particular form of training network. In Korea, for example, the prevailing model is that about 50/60 SMEs get together to appoint training managers to liaise with local training providers to identify the type of training suited to the members. Evaluation shows that the approach results in training that is more relevant, of improved quality, and available at lower cost (and for which levy support is available) to SMEs. Training consortia have helped SMEs in Korea to shift from supply-oriented public institution training to more cost-effective demand-oriented workplace-based training (Lee, 2006).

Supply chain relationships, often built around a major employer, are also a means of driving skill formation. Nissan's supply chain training organisation in the United Kingdom, as described by Gospel and Foreman (2006), consisted of over 50 member companies, each paying a basic membership fee plus an amount trainee. The Training Organisation coordinated and delivered training and positively attracted SMEs. In Austria, Graz-based automobile manufacturer Magna Steyr organised training for its supplier network, partly motivated to do so because of quality and other production gains (OECD, 2005). Small firm engagement is encouraged by prospects of access to the supply chain as a reward for achieving the requisite accreditations.

Business linkages and SME productivity: issues and policies

Business linkages enable SMEs to overcome some of the constraints related to their size, through achieving economies of scale (e.g. through the joint purchase of inputs) or through being exposed to innovation as part of collaborative networks. The main focus in this paper is on three forms of business linkages: FDI-SME linkages, the participation of SMEs in global value chains (GVCs) and participation of SMEs in business clusters.

Foreign direct investments (FDI) are often expected to generate knowledge spillovers that end up increasing the productivity of domestic firms. Prior research has identified a set of channels through which FDI increases local SME productivity, including: i) demonstration effects, which involve the imitation by host-country firms of the products or practices of multinational enterprises (MNEs) investing in their territories; ii) worker mobility that allows employees trained by MNEs to apply their knowledge in local firms; iii) knowledge spillovers from MNEs to suppliers and customers, or rival firms; iv) increased competition by MNEs inducing a more efficient use of existing resources and technology.

With an allusion to the production chain, linkages are usually classified into horizontal (i.e. from FDI to local competitors) and vertical (i.e. from FDI to local firms in other sectors). Vertical linkages are further split in backward (i.e. from FDI to local suppliers) and forward (i.e. from FDI to local buyers). Overall, the empirical evidence suggests that there can be FDI spillovers, but they do not occur everywhere to the same degree (Keller, 2004). For

example, horizontal spillovers are less likely to take place than vertical spillovers, to the extent that MNEs try to prevent the leakage of knowledge to competitors in the same industry where they operate, while they are more willing to share their knowledge with buyers or suppliers (Smeets, 2008; Rojec and Knell, 2017).

Related to FDI-SME linkages is the participation of SMEs into global value chains (GVCs). An active involvement in supply chains is likely to enhance efficiency, by allowing firms to specialize in functions which are aligned with their skills and capabilities. Participation in GVCs has been associated with learning, technology transfers, and knowledge spillovers (Giuliani et al., 2005; Blyde, 2014). In some cases, knowledge and skills that first-tier suppliers absorb from the global companies orchestrating the GVCs, often MNEs, also diffuse to other firms (Poon, 2004).

A cluster can, finally, be defined as a geographic agglomeration of interconnected firms and supporting institutions. Clusters are often considered conduits to a number of positive externalities that allow firms to achieve better competitive advantages thanks to thicker input markets, localized knowledge spillovers and complementarities (i.e. better access to the market and suppliers, labor pooling, and easy flow of technology know-how). Overall, the majority of the existing studies tend to argue in favor of a positive impact of industrial clusters and spatial agglomeration externalities on the productivity of SMEs, although there are some exceptions (Ciccone, 2002; Frenken et al. 2015). Some contributions also examine the evolution of the productivity premium stemming from industrial clustering. Although they show that clustered firms tend to be more productive than non-clustered firms, they provide evidence that this advantage tends to decline over time (Giuliani and Rabellotti, 2017; Iuzzolino and Menon, 2011).

The remainder of this section highlights the most important policy trends to support SME participation in GVCs, and business clusters.

Supporting SME participation in GVCs

Policies supporting SME participation in GVCs are meant to fix certain market failures, such as information asymmetries and coordination problems between SMEs and MNEs. Among those policy interventions, matchmaking policies stand out (Blyde, 2014). One example is from Costa Rica with the programme "Linkages for Exports" (*Encadenamientos para la Exportación*). This programme was established in 2001 to support local SMEs in becoming suppliers of these MNEs and, subsequently, direct exporters by bolstering their technological capabilities. Once the specific needs of the MNEs were identified, these were matched with local suppliers able to meet the required production, technical, and quality specifications. In doing so, the programme primarily addressed a market failure related to information problems. However, "Linkages for Exports" mainly focused on SMEs with more advanced capabilities, more limited technical assistance needs, and thus displaying a higher likelihood of becoming successful providers of MNEs (Blyde, 2014; Monge-González and Rodríguez-Álvarez, 2013).

A recent econometric assessment of "Linkages for Exports" (Monge-González and Rodríguez-Álvarez, 2013) finds that the program had a positive impact on wages, employment, and export status of participating SMEs. Furthermore, these firms were found to benefit from the knowledge acquired through the linkages established with MNEs, even in the following year they joined the programme. The evidence also shows that firms receiving more services from the programme received greater benefits, which supports the idea that the level of support is important. Despite these positive effects, "Linkages for Exports" appears to have had a limited scope (Blyde, 2014). There is a perception that even

though the programme was a valuable first step, it was far from making a substantial contribution to the extent that, at the aggregate level, knowledge spill-overs associated with backward linkages were still limited (Monge-González et al., 2010; Blyde, 2014).

Many countries have also rolled out supplier development programmes. This is the case of Chile with its *Programa de Desarrollo de Proveedores* (PDP). This programme, established by the Chilean SME Agency (*Corporación de Fomento*, CORFO) had the main aim of promoting long-term commercial relationships between large buyers (i.e. potential exporters) and SME suppliers. The PDP provided partial funding to strengthen the management of local businesses through specialised services, professional advice, training, and technology transfers. A recent econometric analysis evaluating the impact of PDP on sales finds that the programme generated benefits for both suppliers and buyers. More in detail, although the direct impact on SME productivity was not estimated, the results show that suppliers were more likely to survive in business and reported a stronger increase in sales, employment and wages than similar SMEs that did not participate in the programme.

To summarise, recent policy initiatives aimed at matchmaking between MNEs and SMEs and at the upgrading of SME suppliers have been generally effective in establishing and fostering local linkages and improving productivity in participating firms. On the downside, effects have usually been measured shortly after the intervention, which opens a question on the long-term effects of these policies.

Cluster policies

Many national and local governments have implemented cluster policies with a view to improving the performance of local SMEs. There is, however, a lack of quantitative impact evaluation studies of cluster policies due to the inherent methodological complexity involved in this kind of impact assessments (Martin et al., 2011, Maffioli et al., 2016).

One of the few econometric studies on clusters has concerned France and its poles *pôles de compétitivité* policy. This policy was established in 2005 with a budget of EUR 1.5 billion over the period 2005-2011. It aimed to: i) foster innovation through networking, synergies and collaboration among firms, research institutes and training organisations in specific territories; ii) retain and develop innovative activities, create jobs and add value in focal areas; iii) improve France's industrial competitiveness. One of the benefits for participating SMEs was to use financial incentives to engage in joint R&D projects with other firms and research organisations. Using a difference-in-differences approach, Braune at al. (2016) examine 174 participating SMEs against a control group of 574 SMEs. Overall, the results suggest a positive impact of the policy: sales, R&D and employment grow at higher rates among the SMEs funded by the competitiveness poles than in the control group. However, when it comes to profitability, the estimations do not yield significant results. Thus, France's cluster policy has had a positive effect on employment, but not on other performance metrics such as profitability.

In Chile, PROFO (*Proyectos Asociativos de Fomento*) has offered incentives for SMEs to come to come together to address a common set of production and/or management problems. Benavente and Crespi (2003) compared a treatment group of 102 SMEs to a control group of 148 firms of similar size, industry and region drawn randomly from the annual industry survey. The study yielded two main findings. First, participation in PROFO was associated with improvements in administration, planning and marketing, increased managerial and worker training, and greater access to other public institutions for extension services, consultants, and public funds for technology and technical assistance. However, only small gains were achieved in the introduction of new products or productive processes.

Second, firms participating in the programme experienced higher TFP growth as compared with the control group, ranging between 11-14% depending upon model specifications (Benavente and Crespi, 2003).

Conclusions

After a brief overview of the magnitude of productivity gaps between SMEs and large firms across sectors and countries, this paper has focused on policies that can strengthen managerial skills, workforce skills and business linkages as three main conduits of SME productivity growth.

Productivity growth in low-tech sectors, such as retail trade, has mostly been the consequence of increased market competition, notably the entry of large discount stores at the disadvantage of small retail shops (*i.e.* mom-and-pop shops). However, especially in the context of some emerging-market economies, these dynamics have caused a reaction by policy makers concerned with the short-term social costs of the market exit of the myriad of mom-and-pop shops. In some countries (e.g. Mexico), policy makers have therefore put in place programmes aimed at upgrading managerial skills in low-tech SMEs, notably in retail trade. The ambition has been to help small retail shops to better compete with large stores through the upgrading of managerial skills and, often, the introduction of IT solutions and software programmes. For such programmes to achieve meaningful impacts, four main conditions should be respected: i) programme rules and activities should be kept simple to cater to low-skilled entrepreneurs; ii) the cost of the intervention per each single recipient should be low to attract as many companies as possible in the programme and, thereby, magnify its impact; iii) intermediary organisations, such as training institutes and consulting companies, should be used for the delivery of the programme activities in light of their technical expertise; iv) at the same time, layers of intermediation should be kept to the minimum to maximise the amount of budget spent on programme activities.

The upgrading of managerial skills in knowledge-intensive sectors through targeted programmes holds a stronger economic rationale than in low-tech sectors. For example, many OECD countries have undertaken advanced manufacturing initiatives to encourage the use of Industry 4.0 technologies in SMEs. Evidence from these programmes suggests that they are often time-intensive because programme activities and services need to be tailored to the specific needs of the participant, which often requires on-site visits and on-site training/coaching. Furthermore, not only the managers but also the workforces should be involved in such programmes, since the latter will often be responsible for the implementation of the innovations on the shop floor. Finally, especially in OECD countries, these programmes have mostly worked with larger SMEs, which are more likely to have the initial technology know-how to engage with this type of policy.

Turning to workforce skills, there is strong consensus in the literature that workplace-based training – i.e. training organised by a company for its employees – positively affects SME productivity. However, not all training policies reach SMEs in the same way. Tax-based measures, such as tax incentives and training levies, are more likely to be used by large firms due to their relatively high administrative complexity, unless they are specifically tailored to SMEs through the convergence of fiscal resource to a specific fund used to give resources directly to SMEs.

On the other hand, direct subsidies and training networks are more likely to reach and involve SMEs. However, subsidies need to be substantial to engage small enterprises, if possible by covering not only the direct costs but also, at least partly, the indirect cost of

training (i.e. the loss of working time of the staff involved in the training). Vouchers are a specific form of subsidy that has been quite commonly used to first expose small firms to the benefits of training. The main advantage of training vouchers is its administrative simplicity both for the government and the users. On the downside, the ability of vouchers to change the long-term attitude of SMEs towards training – *i.e.* whether SMEs will continue to provide training after the use of the vouchers – has often been questioned.

Training networks are the most SME-specific form of training policy and have been used to target specifically SMEs, especially in countries such as Australia and Korea where SMEs turned out to be largely excluded from fiscal measures (e.g. tax incentives and training levies). By gathering small companies with similar training needs, training networks enable SMEs to achieve economies of scale, benefit from more sophisticated training expertise that otherwise they could not afford, and save through reduced transactions costs in the handling of paperwork.

Finally, with respect to business linkages, policies aimed at building stronger linkages between MNEs and SMEs or at upgrading the product quality of small suppliers have generally proven effective in achieving their objectives, including increasing the productivity of the participants, although these policies have often targeted more advanced SMEs with less technical assistance needs. However, the evidence on the extent to which knowledge spill-overs trickle down to the rest of the local economy, beyond first-tier suppliers, is rather limited. On the other hand, evidence on whether participation in clusters enhances SME productivity is more controversial, if anything because it is methodologically difficult to single out the cluster effect on firm performance. However, some studies have found that the cluster advantage, while present, tends to diminish over time.

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