The Future of Rural Manufacturing

Policy Highlights
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The full book will be accessible at:

The Future of Rural Manufacturing
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The Future of Rural Manufacturing provides insights on the transformations that have occurred in manufacturing across rural regions in recent decades. It describes opportunities and challenges in this context, highlighting those relating to climate and demographic change and digitalisation, as well as shifting patterns in globalisation. The project combines quantitative and qualitative analysis. The former examines broad trends in manufacturing performance across OECD rural (TL3) regions between 2000 and 2019, with deeper dives that draw on more granular microdata in 14 OECD countries. Case studies were conducted across 12 regions in Slovenia, Germany, Italy, and France. They comprised interviews with over 300 local, regional, and national actors across government, private sector, universities, research institutes, NGOs, and non-profit community organisations. The project also benefited from foresight and futures workshops conducted in January and July 2022 with experts and policymakers across OECD countries.
Why care about rural manufacturing?

Over the past two decades, manufacturing employment across OECD economies has declined across countries and regions, amounting to a loss of 8.6 million jobs between 2000 and 2018. Several factors explain this trend including outsourcing, globalisation, and productivity-enhancing automation. These have led to increasing tertiarisation in OECD economies, particularly in higher income economies. Indeed, across OECD countries, services now account for around 80% of gross value-added.

Metropolitan regions - through their higher densities and agglomeration effects - have been able to benefit in the form of productivity gains from these shifts. In contrast, rural\(^1\) regions - with thinner and more fragmented internal markets - have a more limited scope to boost productivity in services. This, in part, explains the significant gaps in GDP per capita between rural and metropolitan regions. On average, metropolitan regions across the OECD had around 32% higher GDP per capita than other regions in 2020\(^2\). Moreover, differences in GDP per capita between large metropolitan and other regions account for the largest share of regional inequality in most countries. Whilst there is scope for gaps to narrow with greater uptake of digital tools in rural areas (concomitant with investment in digital infrastructure, where large urban-rural gaps exist across the OECD), metropolitan regions have much stronger comparative advantages in services than rural areas. However, the flipside is that rural regions, often by virtue of the very factors that weigh down on their services productivity (such as low density), have comparative advantages in manufacturing. With shifting patterns emerging in international production networks and global value chains following the COVID-19 pandemic and Russia’s war of aggression against Ukraine, many countries are now embarking on historically high investment programmes and new industrial policies, with increasing emphasis to leverage on the potential of rural manufacturing.

Manufacturing trends across OECD rural regions

Manufacturing remains an important driver of jobs in OECD rural economies.

This report finds in 2018, around 1 in 5 jobs in rural areas were in manufacturing. At the same time, despite rural regions making up only 28% of the OECD population (OECD, 2020\(^1\)), rural regions accounted for nearly half (48%) of manufacturing jobs in the OECD. Across several rural places, the role of manufacturing can be even greater. In the region of Tuttlingen for example, a leading producer of medical equipment in Germany, manufacturing employment accounted for almost half (47.5%) of the regions’ workforce in 2019 (Table 1).

Table 1. Top 1% of OECD regions by share of manufacturing in local employment, 2019

<table>
<thead>
<tr>
<th>Country</th>
<th>Region (TL3)</th>
<th>Region type</th>
<th>Manufacturing employment (% total regional employment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>Tuttingen</td>
<td>NMR-M</td>
<td>47.5</td>
</tr>
<tr>
<td>Romania</td>
<td>Arad</td>
<td>NMR-S</td>
<td>45.3</td>
</tr>
<tr>
<td>Germany</td>
<td>Dingolfing-Landau</td>
<td>NMR-S</td>
<td>45.1</td>
</tr>
<tr>
<td>Portugal</td>
<td>Ave</td>
<td>NMR-M</td>
<td>43.0</td>
</tr>
<tr>
<td>Canada</td>
<td>Bellechasse, Quebec</td>
<td>NMR-M</td>
<td>42.0</td>
</tr>
</tbody>
</table>

Source: Authors’ elaboration based on the OECD Regional Database

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\(^1\) For the purposes of this report, rural is used interchangeably with non-metropolitan based on the OECD extended typology. See [https://dx.doi.org/10.1787/b902cc00-en](https://dx.doi.org/10.1787/b902cc00-en) or [https://www.oecd.org/regional/regional-statistics/functional-urban-areas.htm](https://www.oecd.org/regional/regional-statistics/functional-urban-areas.htm) for more details.

\(^2\) OECD Regional Outlook 2023, forthcoming
Moreover, even in many regions that have seen large falls in manufacturing employment over the last two decades, the sector remains a significant employer (Figure 1). For example, the traditional textile manufacturing region of Biella (in the northern region of Piemonte, Italy) still had 1 in 4 people employed in manufacturing in 2019 despite its share falling by 15 percentage points since 2000.

**Figure 1. Manufacturing contribution to employment**

Contribution of manufacturing to total regional employment, % of total

![Manufacturing contribution to regional Employment](image)

Note: These cover 26 OECD countries as follows: Estonia, Hungary, Czech Republic, Slovakia, Italy, Bulgaria, Lithuania, Belgium, Denmark, France, Luxembourg, Poland, Latvia, Malta, Portugal, Ireland, Netherlands, Romania, Spain, Slovenia, Croatia, Germany, Austria, UK, Finland, Greece.

Source: Authors’ elaboration based on the OECD Regional Database, (last access: April 2023).

The manufacturing sector also supports a significant proportion of upstream services sector jobs, including in metropolitan regions. But the sector also sustains jobs in services through other indirect channels, including induced effects (i.e., spending of manufacturing workers on services) and through the use of produced capital in the production cycle. Estimates for the United States (National Association of Manufacturers), for example, reveal that for every job in manufacturing, 4.4 additional jobs were sustained in other sectors.\(^3\)

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\(^3\) Including in the non-durable manufacturing sector.
Manufacturing is also an important driver of gross value added (GVA) in OECD rural economies.

Table 2. Top 5 OECD regions by share of manufacturing in local total gross value added, 2018

<table>
<thead>
<tr>
<th>Country</th>
<th>Region (TL3)</th>
<th>Region type</th>
<th>Manufacturing GVA (% total GVA in the region)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>Dingolfing-Landau</td>
<td>NMR-S</td>
<td>63.19</td>
</tr>
<tr>
<td>Germany</td>
<td>Tuttlingen</td>
<td>NMR-M</td>
<td>57.96</td>
</tr>
<tr>
<td>Greece</td>
<td>Boeotia</td>
<td>NMR-R</td>
<td>55.58</td>
</tr>
<tr>
<td>Poland</td>
<td>Plocki</td>
<td>NMR-S</td>
<td>54.97</td>
</tr>
<tr>
<td>Germany</td>
<td>Altötting</td>
<td>NMR-R</td>
<td>53.05</td>
</tr>
</tbody>
</table>

Source: Authors’ elaboration based on the OECD Regional Database

The manufacturing sector’s direct contribution to rural GVA increased from 18.5% to 21.1% from 2000 to 2019 in OECD rural regions (Figure 2), despite falls in manufacturing employment in rural areas of around 2 percentage points (Table 1. Top 1% of OECD regions by share of manufacturing in local employment, 2019)

<table>
<thead>
<tr>
<th>Country</th>
<th>Region (TL3)</th>
<th>Region type</th>
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<tr>
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Source: Authors’ elaboration based on the OECD Regional Database

Moreover, even in many regions that have seen large falls in manufacturing employment over the last two decades, the sector remains a significant employer (Figure 1Error! Not a valid bookmark self-reference.). For example, the traditional textile manufacturing region of Biella (in the northern region of Piemonte, Italy) still had 1 in 4 people employed in manufacturing in 2019 despite its share falling by 15 percentage points since 2000.

Figure 1) over the same period. This share rose to around 25% in rural areas close to metropolitan cities, highlighting increased use of capital to drive productivity growth.

Between 2000 and 2019, 449 of the 769 OECD rural regions (58%) where data is available, saw manufacturing productivity and manufacturing output increase, with 289 of those experiencing employment falls (Figure 3). In addition, a higher share of rural regions saw productivity growth compared to metropolitan areas, lower shares of employment decreases, and, in turn, higher share of output increases.

Between 2000 and 2019, 449 of the 769 OECD rural regions (58%) where data is available, saw manufacturing productivity and manufacturing output increase, with 289 of those experiencing employment falls (Figure 3). Not only did a higher share of rural regions see productivity growth compared to metropolitan regions, but they also saw a higher share of regions increase output.
Figure 2. Manufacturing GVA by type of TL3 region across OECD countries
Contribution of manufacturing to total regional GVA, %

Note: These cover 26 OECD countries as follows: Estonia, Hungary, Czech Republic, Slovakia, Italy, Bulgaria, Lithuania, Belgium, Denmark, France, Luxembourg, Poland, Latvia, Malta, Portugal, Ireland, Netherlands, Romania, Spain, Slovenia, Croatia, Germany, Austria, UK, Finland, Greece.
Source: Authors’ elaboration based on the OECD Regional Database, (last access: April 2023).

Figure 3. Manufacturing productivity and output growth and employment declines by region type
Share of regions increasing productivity and output, share of regions seeing declines in employment, 2000 to 2019

Note: The data includes 27 OECD countries, productivity values are based on Millions USD, constant prices, constant PPP, base year 2015
Source: Authors’ elaboration based on the OECD Regional Database, (last access: April 2023)
Rural manufacturing trends differ significantly across countries

The trends in rural manufacturing vary significantly amongst OECD countries, in large part reflecting differences in local comparative advantages. These include factors such as labour costs, the regulatory environment, skills, transport and communications infrastructure, and geographic location (e.g., proximity to GVC hubs), many of which have been instrumental in shaping manufacturing pathways in Central Europe. On average the manufacturing sector in Central Europe was significantly higher than across many OECD and EU economies.

Where is rural manufacturing located in OECD countries?

• In the Czech Republic the average regional share of manufacturing employment was 30% across regions in 2019. In Slovenia and Hungary, this was around 24%. In Slovakia, this was 23.1% and for Poland, Estonia, Bulgaria, and Romania, this ranged between 20% and 23%.

• Average shares of manufacturing regional employment by contrast were 6.7% in Australia, 7.5% in Greece, 7.7% in the United States, and 8.9% in the United Kingdom.

Rural remote regions in many of these Central European economies also outperformed other regions in their country. For example, a taxonomy created to measure relative change\(^4\) of regions within countries, reveals that over one third (37.2%) of regions that moved up quintile groups were remote. For example, Wroclawski (Poland) and Smoylan (Bulgaria) leapfrogged from the second bottom and bottom quintiles respectively to the top quintile – with their shares of manufacturing employment increasing by 15.5 and 14.2 percentage points respectively between 2000 and 2018. Many other rural regions were also able to leverage on their comparative assets (e.g. land, lower unit labour costs, and proximity to production networks).

At the same time rural remote regions exhibited the highest probability of falling more than one quintile group. Beiras e Serra da Estrela in Portugal, experienced the most dramatic drop in manufacturing employment across OECD regions analysed, a fall of 55.5 percentage points from 2000 to 2018. This also led to a decline in total regional employment of 20% over the period. Other regions have successfully managed to reallocate manufacturing workers to other activities, offsetting employment losses. In the Isle of Anglesey in Wales, UK, for example, despite falls of 42% in manufacturing jobs, total regional employment increased by 4000 jobs between 2000 and 2019, as the region capitalised on comparative advantages such as tourism and other services activities.

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\(^4\) This path dependency across OECD rural regions is better understood through the taxonomy this analysis elaborates, grouping regions into quintiles within a country by their relative position of share of manufacturing employment and then measuring the number of regions that change quintile group. Different dynamics can alter the importance that the manufacturing sector in a region has relative to the rest of the country and, so, the changes are grouped into moving up, moving down, traditional (was in the top quintile in 2000 and remains so in 2018) and stable regions.
Recognising regional and manufacturing diversity

So, what drives manufacturing to one region and not another? Locational choice of manufacturing has traditionally been driven by cheaper labour and land in OECD rural regions. But other factors also play a critical role including:

- Accessibility and infrastructure (number of main roads, access to ports, share of households with high broadband connectivity)
- Input suppliers, markets, and competitors (manufacturing concentration, distance from existing manufacturing hubs)
- Skills, knowledge, and innovation (number of universities)
- Quality of government
- Policy interventions

Our analysis reveals that no dominant single determining factor drives manufacturing performance. This highlights that tailored, place-specific, approaches are needed for regional manufacturing development.

Hardhats to handmade

Understanding the mechanisms through which rural manufacturers differentiate their products is part of the challenge in supporting their adaptation to megatrends. Part of the explanation for the diversity of factors that can enable rural manufacturing reflects the diversity in the sector itself, and the diversity in value propositions, especially against a backdrop of growing consumer awareness of responsible business conduct and sustainability. Notwithstanding, the current cost of living crises studies in many countries consistently point to revealed preferences for goods made in local markets, and, in particular, higher quality products (Ruf, Emberger-Klein and Menrad, 2022).

In this sense it is important to note that not all manufacturing in rural areas is large-scale inherently tied to Global Value Chains (GVCs). Traditional manufacturing skillsets endure in many rural areas and can be important economic drivers at a local level. In a world of largely homogenous mass-production, handmade goods produced by skilled artisans continue to be highly prized by consumers – who are often willing to pay more and increasingly take an interest in where things are made.

The differentiation that heritage manufacturers develop helps insulate them from global price competition while at the same time anchoring production locally. The Italian region of Arezzo for example, specialises in gold jewellery and textile craft using local hand manipulation techniques that have been developed and established in the region for centuries and combining these with computer driven designs and printings. The region then leverages these skills on its geographic proximity to Milan.

At the same time, rural regions can also differentiate through their innovation and technological advances that may be anchored to local natural resources. For example, the latest national industrial and regional development strategies for Slovenia highlight the potential for developing high value-added and technically advanced wood products such as sustainable housing. Rural regions that are innovative through high technology production also face significant competition. In these cases, regional clusters can be beneficial as a mechanism to share ideas, resources, combine supply chains, and tackle similar challenges such as
regulatory barriers. An example in the report is the medical mountain cluster\(^5\) in Baden-Württemberg Germany.

Considering the degree of differentiation and ties with the territory, we develop a simple typology of manufacturing firms that is relevant for the rural context (Table 3). It aims to capture distinctions in how a firm competes and classifies firms based on whether their products are differentiated or commoditised and then considers the underlying drivers. Broadly speaking, firms may create products that are either differentiated, meaning they are able to command a price (brand) premium for their product, or else are commoditised and more open to global price competition.

Rural manufacturers may differentiate themselves in three, not mutually exclusive, ways, i.) through their artisanal skills and specialised local reputation, ii.) through their heritage, and/or iii.) through innovation.

Among firms selling commodities that are somewhat homogeneous and competing mainly on price, the ties of such production may be driven by their business being built around local natural resources, and, in cases where these resources are not scarce nor costly to leverage, distance to markets can create a barrier. Manufacturers with no ‘local anchor’ of comparative advantage therefore are generally at higher risk of international, and indeed, national competition, heightening the importance of policies that enable upgrading or product differentiation.

### Table 3. A typology of manufacturing diversity

<table>
<thead>
<tr>
<th>Manufacturer Type</th>
<th>Differentiated</th>
<th>Innovative</th>
<th>Commodified</th>
<th>Commodified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characterised by</td>
<td>Artisanal</td>
<td>Heritage</td>
<td>Innovative</td>
<td>Anchored by natural resources</td>
</tr>
<tr>
<td></td>
<td>Highly skilled, small-scale production leveraging a historic process with longstanding ties to the region</td>
<td>Products with a longstanding traditional link to a region</td>
<td>High-technology products at the cutting edge of both production technology and product features</td>
<td>Products created from locally sourced natural resources</td>
</tr>
<tr>
<td>Examples</td>
<td>Cottage industries, handmade, premium bespoke products</td>
<td>Swiss watches, Scottish Whisky, Italian fabrics</td>
<td>ICT, pharmaceuticals and medical devices</td>
<td>Agri-food, forestry and mining processors</td>
</tr>
<tr>
<td>Scalability</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

Source: Author’s elaboration

In the province of Amiata Grosseto, Italy, regional stakeholders were searching for a means to expand from traditional agricultural production. With the help of researchers, they identified their comparative advantage in the production of a new and differentiated dairy product, Amiata donkey milk, which is well-suited for infants and children with intolerance/allergies to bovine milk products as well as for adults with dyslipidemia.

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\(^5\)More information including the groups within this can be found at [https://medicalmountains.de/](https://medicalmountains.de/)
**Microenterprises to Mega Factories**

The manufacturing sector comprises a vast array of different types of businesses, requiring, in turn, policies that recognise this heterogeneity. These range from small-scale farmers beginning to expand into manufacturing, micro entrepreneurs bringing innovations to remote areas, medium sized family businesses looking to upgrade their traditional processes, all the way to large scale multinationals employing large portions of a small town.

For example, recent work on enhancing rural innovation (OECD, 2022[9]) reveals that SMEs and entrepreneurship are an essential pillar to enhance rural innovation, and that national innovation programmes need to be adapted to the specific rural characteristics. The business models underpinning rural businesses that specialise in niches linked to traditional know-how and local consolidated cultural heritage for example, engage in 'innovations' that would not typically be captured in more common notions of innovation. Spatial inequalities relating to access to finance, networks, broadband infrastructure, and skills are also critical factors that need to be addressed when considering innovation, and innovation-enhancing policies in a rural context.

At the same time, large multinationals are moving to just-in-case rather than just-in-time modes of production, which favour geographically shorter chains. These patterns of trade are shifting in response to rising geopolitical tensions and higher emphasis placed on mitigating risks of ruptures in GVCs. This presents challenges for firms integrated into more geographically fragmented GVCs but also potential opportunities for rural regions to attract investment in manufacturing, particularly in sectors considered as nationally strategic. However, attracting this investment will require boosting the attractiveness of the territory (OECD, 2023[4]). For many areas this will require improved investments in the same factors that can drive innovation, including infrastructure - transport and digital – especially in remote rural areas. It will also require efforts to improve skills in the local workforce, particularly with respect to the green transition (OECD, 2023[5]).

**Examining the main drivers transforming manufacturing**

The analysis examining the major factors transforming manufacturing point to three main drivers, which have led to substantial changes in the skills demands of the sector:

- Production processes have become increasingly fragmented and shifting patterns of trade are emerging.
- Manufacturing processes are increasing their use of digital and advanced, including automation, technologies.
- The green transition is accelerating, creating new manufacturing requirements and prospects.

1. Production processes have become increasingly fragmented

Driven by declining costs of trade and eroded comparative advantages of higher-wage OECD rural manufacturers, firms have outsourced and relocated more labour-intensive activities to countries with lower labour costs — and in some cases lower regulatory and fiscal costs too.

Competition often led to closures, as physical fragmentation of production put an end to the large-factory era and many manufacturing towns that traditionally specialised in low-cost production lost their competitiveness. This in turn accelerated transitions towards more complex and innovative services parts of value chains that favoured metropolitan regions able to benefit from agglomeration advantages (OECD, 2015[6]).
Many OECD rural regions however were able to benefit from these shifts too, in particular, former transition economies in Eastern Europe. Rural manufacturers in these rural areas were able to leverage on their relatively lower unit labour costs, proximity to European GVC hubs, and their benefit from entry to the EU single market. Many others were also able to identify niches and specialisations in global value chains by upgrading existing manufacturing processes to higher value parts of those chains, boosting productivity in the process. As seen through the case studies. These transitions can build on a region’s existing path dependency that either a.) leverage on diversification to economic activities where the region has, or indeed had, a relative comparative advantage in the past or, b.) move to new activities where the skill-set, and often, capital, can be transferred.

2. Manufacturing processes are increasing their use of digital and advanced technologies

From cutting-edge advancements such as nanotechnologies and artificial intelligence to the fundamental automation and digitalisation of processes, technology is an increasingly indispensable tool for enhancing efficiency, productivity, and competitiveness. However, there are significant gaps in digital infrastructure between urban and rural areas. In terms of broadband connections, in 2019, 59% of rural households in the European Union were located in regions where access to fixed broadband with a minimum speed of 30 Mbps was available, in comparison to 86% of households in all areas overall (OECD, 2021[7]).

Analysing the employment share across types of TL3 regions in 14 OECD countries shows that rural regions tend to have a higher share of employment in sectors that are considered less technically complex6 (Figure 4) Despite the relatively high share of less technologically complex manufacturers, the share of more technologically complex manufacturers in rural areas is growing. From 2008 to 2019, the average share of rural region manufacturing employment in high and medium high industries increased from 5.7 to 6.4%.

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6 The body of the report categorises what is considered a technologically intense industry, manufacturing sub-industries based on 2-digit level of NACE Rev. 2 are related to four technological intensity categories: high-technology, medium-high-technology, medium-low-technology, and low-technology following the Eurostat methodology.
Figure 4. Average share of manufacturing employment by technological complexity and region type

Average share of manufacturing employment by technological complexity and region type, 2022 or latest available year

Note: the employment shares for each sub-industry in every country were calculated for each region as $EmpShare_{rcit} = \frac{Emp_{rcit}}{Emp_{rcit}}$, with $c$ referring to countries, $r$ to TL3 region, $t$ to year, and $i$ to technology intensity group. In the next step, these were then averaged by region type for every country: $(EmpShare)^{\bar{}} = \frac{\sum g(EmpShare)_{grc} \times 1/n_g}{g}$, with $g$ denoting region type. Consequently, the shares for each region type for each technology don’t necessarily add up to 100%.

Source: National Statistics Offices from the following countries: Finland, Portugal, Sweden, Japan, Denmark, Norway, Slovenia, Switzerland, Australia, Canada, Germany and Ireland

Nevertheless, even after adjusting for differences in occupation and activities that typically lend themselves to technological innovations, innovation in firms in rural areas continue to lag those in urban areas. For example, in the US, there are on average 13.2 patents per 1000 innovative occupations in metropolitan counties against only 5.6 on average in rural counties, despite the evidence that points to particularly strong productivity-enhancing effects of innovation absorption in non-metropolitan areas. For example, in the US, nearly two thirds of overall productivity growth from 2010 to 2020 can be attributed to productivity gains in non-metropolitan areas, in large part reflecting better use of resources within non-metropolitan regions, considered a proxy for innovation absorption (OECD, Forthcoming[a]).

3. The green transition is accelerating new manufacturing requirements and prospects

The manufacturing sector is amongst the most polluting industries. In 2021, the industrial sector accounted for 38% of total global final energy consumption (IEA, 2022[a]). Building on analysis of regional industrial transitions to climate change (OECD, 2023[b]), this report finds that rural regions tend to have higher shares of higher emitting manufacturing industries. For example, employment in the manufacture of other non-metallic mineral products is, on average twice as high in non-metropolitan than metropolitan regions. And so, in turn, these regions are more exposed to potential transitions towards net zero (Figure 5).
In addition, rural manufacturers have greater challenges to overcome in engaging or driving the green transition, including access to financing, skills, knowledge, and networks. Furthermore, rural places are highly dependent on transport to move and export their output, which adds to GHG emissions.

At the same time, the transition to a net-zero emission economy can provide an opportunity for rural manufacturing businesses. Most outputs of manufacturing firms will continue to be demanded in a climate-neutral economy (including in growing activities e.g., production of electric batteries). Rather than phasing out activities, manufacturing subsectors need to transform the way they produce products. There is great potential to drive progress through renewable energy sources. Rural regions cover approximately 80% of the OECD land mass, containing most of the water and other natural resources that can also provide sources of renewable and cleaner energy for manufacturing activities. Currently rural regions already produce 63% of the renewable energy in OECD countries, with the 36% coming from the most remote places (OECD, 2022[10]).

4. All of which is leading to changing demands for skills

Across OECD countries nearly half of all jobs face substantial implications due to automation. A considerable 14% of these jobs are at high risk (indicating a likelihood of over 70% to be automated). Moreover, an additional 32% of jobs face some risk (a probability of being automated ranging between 50% and 70%), highlighting the potential for significant transformations in the execution of these roles due to automation’s impact (Nedelkoska and Quintini, 2018[11]).

The risk of job automation exhibits considerable variation across regions. For instance, in certain regions like West Slovakia (a rural region), the share of jobs at high risk reached nearly 40% in 2016, whereas in others like the region around Oslo, it can be as low as around 4%. These disparities highlight the importance of region-specific policy approaches to address the challenges posed by automation. In
addition, the share of jobs at high risk of automation varies within countries. In Canada, for example, the
difference between the best and worst performing regions is only 1 percentage point, while in Spain, this
gap expands to 12 percentage points (OECD, 2018[12]).

However, automation also presents significant opportunities for rural regions that are facing declining
working-age populations and ageing workforces. Over half of all OECD regions witnessed a decrease in
their working-age population between 2010 and 2016. Furthermore, between 2001 and 2019, in most
OECD countries, metropolitan regions had a population growth rate that was twice as high (0.70%) as that
of remote regions (0.33%).

Training and reskilling will be important pillars to mitigate the effects of a declining and ageing workforce,
but rural regions face significant challenges in training, retaining, and attracting high skilled workers,
particularly for skills required for the green transition (OECD, 2023[5]). The share of green jobs in remote
rural regions can be as low as 5% compared to capital cities where these can be as high as 30% (OECD,
2023[5]). At the same time, as most green job growth, especially those in mid-skill level occupations, is
expected to occur in currently male-dominated sectors (ILO, 2019[13]), there is also an opportunity to
reduce gender gaps in the sector. Currently women make up only 28% of green-task jobs (OECD, 2023[14])
and around 30% of manufacturing jobs (World Manufacturing Foundation, 2022[15]).

**Policy takeaways emerging in the case studies**

The analysis along with the case studies in four countries reveals several policy takeaways. The regional
case studies included the Italian provinces of Arezzo and Grosseto in Tuscany, the Slovenian regions of
Slovenia Goriška, Podravje and Koroška, the German regions of Ostprignitz-Ruppin, Hochsauerland,
Ostprignitz-Ruppin and Tuttlingen and the French regions (départements) of Gers and Tarn-et-Garonne.

The case studies identified several common challenges to unlock the potential of rural manufacturing
summarised in Table 4 below, across four broad frequently reported areas of policy relevance including:

1. Overcoming skill shortages,
2. Improving land use and spatial planning,
3. Fostering a business environment conducive to growth, and

**Table 4. Case study regions most prominent rural manufacturing firm challenges**

<table>
<thead>
<tr>
<th>Firm challenges</th>
<th>Italy</th>
<th>Slovenia</th>
<th>Germany</th>
<th>France</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour shortage</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Education/skills mismatch</td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Limited access to capital</td>
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<td>Infrastructure deficits e.g., broadband</td>
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<td>Limited access to land for expansion</td>
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<tr>
<td>Low attention to climate change mitigation practices</td>
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<tr>
<td>Limited innovation</td>
<td>x</td>
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<td>Lack attractive work environments</td>
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<tr>
<td>Inflexible regulatory environment</td>
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<tr>
<td>Need access to Futures/foresight training</td>
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Source: Author’s elaboration

**1. Overcoming skills shortages**

Manufacturing regions in transition need to continue upgrading the skills and production capabilities of
existing industries while simultaneously promoting the diversification of the local economy towards more
future-oriented economic propositions.
Skills shortages appeared in almost all case studies identified. Specific recommendations on skills development include:

- Better anticipate future skills demands, for example through industry and skills mapping or through regional skills foresight exercises, that can help move industrial transitions forward (OECD, 2019\[16\]). More generally, the development of future-oriented activities, such as smart manufacturing, life sciences, e-mobility, or higher value-added services, have higher chances of success in those fields where the region already has some related assets to build on.
  - In the German case studies, the analysis points to the importance of platforms of exchange between education institutions and companies that were structured rather than ad hoc.
  - In the French case studies, Territoires d'Industrie can draw on the positive examples of the Lot département (Occitanie region) that successfully worked with the *Campus des métiers et des qualifications* and its network of high schools offering initial training tailored to the needs of industry.
  - In the Slovenian case studies, business engagement whilst positive with university researchers was negligible with earlier years of educators. As such means to establish these relations e.g., through high school internships, could encourage students to stay in professional or vocational education for the manufacturing sector.

- Develop digital skills. Improving digital skills, through the simplification of access to pre-existing programmes, such as one-stop-shops, can help develop digital skills and access to digital resources, as is the case in Scotland/UK (e.g. Find Business Support), Canada (Business Pathfinder Tool) and Switzerland (Business Promotion Guide) (OECD, 2023\[17\]).
  - In Germany, this translated into ensuring that measures to strengthen digital skills also reached rural manufacturing firms, that were not covered by existing federal programmes, including through voucher schemes.

- Communicate the changed nature of the industry. The image and branding of the sector were found in most case study regions to still be a male-orientated manual labour industry. Highlighting the importance of diversity for innovation and renewed interest in better environmental, social and governance (ESG) goals can be helpful for attracting diversity and talent, including with high-skilled young and female workers.

- Facilitate the changing nature of the workplace. Talent attraction to the manufacturing sector can be improved through, where possible, flexible models of work (e.g., home office) (Marshalian, Chan and Bournisien de Valmont, 2023\[18\]) or adjusting child-care services to manufacturing schedules. In addition, there is potential to leverage skilled migration workers including through reforms for accreditation systems.
Women in Manufacturing

A new strategy was developed by The Department of Regional Development, Manufacturing and Water in Queensland Australia in 2023, recognising that increased diversity boosts productivity, fosters a more creative environment, and can improve morale and employee retention. This recognises that encouraging more women to pursue a career in manufacturing is critical to the industry’s continued growth. As such the strategy focuses on four main priorities:

- Supporting diversity, equity, and inclusion in the manufacturing industry.
- Building on existing capabilities and skills to further women’s leadership and development.
- Boosting women’s participation in VET, building the STEM pipeline, and promoting advanced manufacturing capabilities throughout secondary and tertiary studies.
- Celebrating and showcasing the women in Queensland’s manufacturing industry.

2. Improving land use and spatial planning

Land-use permits, and related regulatory barriers represented a bottleneck for entrepreneurial activity for many case study regions. Putting in place flexible mechanisms across levels of government to tackle firm growth with local cultural preservation can reduce substantial planning permission delays. Specific recommendations on land-use include:

- The German case studies pointed to the importance of more flexible approaches to land-use planning at state and regional levels. This can be done through the establishment of specific zones in a community (which are more open to experimentation and temporary uses) as well as through fostering inter-communal co-operation for land-development.

- The Slovenian case studies revealed utilise more regularly and informally the channels between local and national policymakers. Most clearly where this can be applied is the involvement of all parties throughout the process of formulating the long-term strategy of spatial planning. Through better management of spatial districts and with collaboration with neighbouring regions, this can provide solutions on migrant housing which is crucial for rural area growth and attraction.

3. Fostering a business environment conducive to growth

Building a stable and transparent business environment is critical for the health of manufacturing regions. However, often the basic framework conditions and key mechanisms for a vibrant business eco-system are missing. Specific recommendations on fostering a business environment conducive to growth include:

- Increasing the focus on digital and green energy infrastructure:
  - Reduce administrative approval times for communication network deployment, including obtaining rights of way, and improve co-ordination between different public authorities.
Closing the digital gap with policies that invest in skills and ICT infrastructure to facilitate the uptake of new ideas and technologies (OECD, 2021[7]). Some of the tailored initiatives to bridge connectivity divides in rural and/or remote areas, include demand aggregation models, public private partnership (PPP) initiatives, public funding to expand connectivity in rural/remote areas and open access municipal and community-led networks.

Assist more localised production and uptake of greener energy sources such as biogas or wind power whilst speeding up national plans to provide grid access to alternative sources of energy. Enhance local capacity to recycle manufacturing waste to develop a circular economy ecosystem.

Building vibrant business ecosystems and an innovative and entrepreneurial culture by:

- Strengthening links between established firms, start-ups and research institutes for funding opportunities, knowledge exchange and skills development at state and regional levels (OECD, 2023[19]). Formulating a supply chain directory can also foster investment and better monitor the benefits from FDI-SME linkages (OECD, 2023[20]).

- Utilising digital platforms for exchanges of ideas and resources among all stakeholders including ideas relating to technical concerns, process-related (e.g., artificial intelligence, 3D printing), finance, etc. In France, this could be combined with the TI one-stop shop.

- Improving SME access to capital and uptake of support programmes. For SMEs, challenges in access to external finance and an overreliance on internal funds are often major constraints for growth (OECD, 2020[21]). In addition rural firms face greater difficulties accessing traditional forms of finance than their metropolitan counterparts (Kärnä and Stephan, 2022[22]) Policies therefore in this space include improving access to alternative sources of finance and reducing bureaucratic barriers to access grants and subsidies. OECD work on financing SMEs (OECD, 2022[23]) , particularly sustainable financing (OECD, 2022[24]) provides more insights.

- Sharing learnings and coordinating management of state or regionally-run structural programmes that follow bottom-up processes. These approaches have proven successful because they develop goal-oriented collaborations across districts which benefit businesses. Such collaborations can be enhanced by sharing learnings through peer-to-peer exchanges. Lessons learnt from these programmes should be systematically gathered and exchanged between territories, including to regional governments looking to develop similar programmes. Successful examples can be seen in Brandenburg, Germany and Grosseto Italy.

Municipality of Grosseto bringing together policymakers and manufacturing business representatives from across the region to exchange ideas.
4. Governance and policy for rural manufacturing regions

Effective co-ordination across levels of government to design visions and strategies and implement them in unison is crucial. As such, specific recommendations on governance and policy include:

- **Pursuing a higher degree of integration between rural development and industrial policy** can lead to more effective actions for rural manufacturing at all levels. The Italian case studies as well as the French industrial territorial development programme (TI) reveal that rural manufacturing is not a policy domain per-se. Rural manufacturing is on the crossroads between industrial, cohesion and rural development policies. Indeed, one of the challenges is that every “rural” area is different and specific adaptation capacity to the place is needed for effective action.

- **Encourage new sectors, sub-sectors, and value chain propositions.** The consolidated clusters, part of the competitive regional fashion sectors (particularly jewellery), are the backbone of the vibrant local manufacturing and an asset of Arezzo local industry. Yet, there are companies in other sectors such as ICT firms, agrifood, and the recovery of waste materials, which are currently singular cases but have the potential to further develop. Providing these industries with financial support, helping them to build networks with other such companies in the wider region and with universities and research institutes can allow these firms to explore opportunities for growth. This would allow for diversification of the local industrial texture, creating a more resilient structure.

- **Strengthen the evaluation, monitoring and supervision of programmes.** In the example of Slovenia many industrial parks were created to boost entrepreneurial activity. However limited supervision has meant an estimated 20% are being fully utilised. France provides an example of how this can be tackled by pointing to methods in their Territoire D’industrie that allow room for the development of formalised plans in all territories that encourage mixed (public-private) project ownership and dialogue.

- **Establish one-stop shops for each region** in response to the difficulties faced by industries and local agents when faced with the multitude of information on existing aid and support schemes. One solution could be to set up a virtual one-stop shop, run within an appropriate regional agency, who could also provide in-person support to beneficiaries. This can also unnecessary bureaucratic barriers through increasing and improving coordination (state and regional levels).

- **Integrate foresight and futures** into policy making to understand how megatrends are shaping new opportunities and how rural regions, firms and entrepreneurs can leverage these. Overall, in the rapidly changing environment, governments cannot be reactive and must, instead, be forward looking in their policy design, including through engagement with all stakeholders, including firms and communities.
<table>
<thead>
<tr>
<th>Skills</th>
<th>Land use and spatial planning</th>
<th>Innovative business ecosystems</th>
<th>Governance and strategy</th>
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<tr>
<td>Better anticipating future skills demands</td>
<td>Flexible approaches to land-use planning</td>
<td>Strengthening links between established firms, start-ups, and research institutes</td>
<td>Pursuing a higher degree of integration between rural development and industrial policy</td>
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<tr>
<td>Developing digital skills</td>
<td>Clearer long-term strategy of spatial planning</td>
<td>Utilising digital platforms for exchange</td>
<td>Encouraging new sectors, subsectors, and value chain propositions</td>
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<tr>
<td>Communicating and facilitating the changed nature of the industry</td>
<td>Expanding digital and green energy infrastructure facilities</td>
<td>Improving SME access to capital and uptake of support programmes</td>
<td>Strengthening the evaluation, monitoring and supervision</td>
</tr>
</tbody>
</table>

Source: Author’s elaborations
References


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OECD (Forthcoming), Enhancing Rural Innovation in the United States, OECD Publishing. [8]

