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# Assessments and recommendations

OECD countries today are facing a global slump in innovation, with fewer innovations that radically change the way our society works and a concurrent productivity slowdown. This slowdown is affecting countries across the globe, impacting wages, well-being and economic opportunities (OECD, 2019<sup>[1]</sup>).

Yet innovation is a precursor of long-term growth and productivity (Aghion and Howitt, 1990<sup>[2]</sup>; OECD, 2016<sup>[3]</sup>; Romer, 1990<sup>[4]</sup>). Across large OECD regions (TL2<sup>1</sup>), high-technology (high-tech) innovation<sup>2</sup> has five times more impact on jobs in regions with larger shares of people living in non-metropolitan regions.<sup>3</sup>

Innovation can bring well-being to people and places, yet it is important to understand that its impact varies across territories. A one-unit increase in patent intensity is associated with a 91% increase in productivity in regions with a relatively high share of non-metropolitan population, against a 54% increase in regions with a relatively lower share of non-metropolitan population in European OECD countries. This also translates into differences in average household income. Increased patent intensity is associated with an 86% increase in household income for those regions with a relatively high share of non-metropolitan population but only 30% in regions with a relatively smaller non-metropolitan population.

Welfare-inducing innovation is not automatic – especially in rural regions. Often regions with dependency on fewer sectors and fragile access to basic framework conditions have a harder time adapting to changes induced by innovation. Higher average household income associated with patent intensity will also raise wage inequality<sup>4</sup> and the increase is higher in rural places. A one-unit increase in patent intensity is associated with 11% higher inequality in regions with a higher share of non-metropolitan population, against a 3% increase in areas with a lower share of non-metropolitan population.

There are significant and growing gaps in innovation and productivity between metro<sup>5</sup> and non-metropolitan regions, meaning that many rural areas can potentially be less resilient to shocks and structural changes brought on by megatrends. Indeed, since the economic shock of the 2008 global financial crisis, non-metro areas have shown higher vulnerability to shock increasing their gaps in gross domestic product (GDP) per capita with respect to metro regions. Furthermore, rural regions must address demographic challenges associated with higher rates of population decline and ageing, which are having disproportionate impacts on rural communities.

Traditionally, subsidies have been one of the primary mechanisms through which many governments have addressed such challenges. However, there are substantial concerns related to the short-term impact of such subsidies and an increasing awareness that such efforts do not produce long-lasting effects. Unlocking rural innovation can mitigate the growing gaps and unlock new opportunities, especially related to digital and green transitions.

Importantly, governments should take advantage of the full benefits of innovation in a broader sense, as opposed to the narrower science, technology and innovation (STI) approach to rural innovation. There is significant potential to boost productivity growth by creating place-based policies to encourage broader entrepreneurial innovations in rural regions with less mature markets. For instance, in related studies in Scotland (United Kingdom), Switzerland and the United States, productivity growth is still strong in non-metropolitan areas and regions, against a slowdown present in urban areas over the last decade. Indeed,

the majority of productivity growth in non-metropolitan areas has reflected upgrading current processes and products (OECD, forthcoming<sup>[5]</sup>; forthcoming<sup>[6]</sup>).

## Understanding rural innovation

Unlocking rural innovation is crucial to addressing these challenges and indeed taking advantage of the potential benefits of digitalisation and technological change to maintain and boost well-being standards. But to unlock rural innovation, we need to understand how individuals innovate and adopt innovations in rural places. Once we have a clear vision of innovation in rural places, we can start creating the right framework conditions and innovation-enabling environments for individuals and entrepreneurs.

### ***The importance of defining innovation through a rural lens***

The Oslo Manual defines innovation as “a new or improved product or process (or combination thereof) [...] that has been made available to potential users (product) or brought into use by the unit (process)” (OECD/Eurostat, 2018<sup>[7]</sup>). However, many governments consider innovation *only or primarily* related to science and technology, focusing policies and programmes primarily on research and development (R&D) investments or patents. This is only one form of innovation that is often associated with specific sectors and occupations. In contrast, innovation in rural places tends to happen on a broader base, which includes significantly improved or new types of production and processes, business models or innovations that are not uniquely profit-driven (such as social as well as public innovation). These are often overlooked by standard policies and programmes for innovation.

Defining innovation narrowly as STI limits market forces. Governments, enacting policies that are ill-defined for rural places are missing out on their growth potential. In turn, this can hinder factors of productivity growth that may interact with macro-factors and structural reforms. Building the conditions for innovation and productivity that consider opportunities and barriers across the different territories will ensure that the mechanisms underlying productivity growth are well targeted. For this purpose, the report identifies several alternative indicators associated with innovation to be considered jointly and caveats to be made when they are being used.

For instance, cities benefit from economies of agglomeration as well as a diversified industrial base, including high value-added activities. Policies focused on encouraging innovation in cities are tied to indicators related to the flow of goods, services and skills and increasing competition that drive forces for innovation, in particular among large, incumbent firms. In contrast, rural areas have less industrial diversification and fewer incumbents across all sectors, including agriculture and manufacturing. Among other goods, rural places depend on tradeable goods that can be exported to cities and other markets. As rural economies transition to service industries and, increasingly, digital trade and services, the relative comparative advantage of these areas will transition to the intersection of diversified services tied to nature-based comparative resources, among other sectors. In this context, innovation based on new entrepreneurial activity, process-based innovations and indicators to capture these will be crucial to ensure rural places can add more value to these activities.

Although the primary focus of this report is on non-agricultural output, it is important to note that the findings are also relevant to agricultural activities, which can often benefit from the same framework where there is significant scope for innovation. For example, in a study on block-chain, new nature-based branding and marketing in organic, fair trade, organic or net-zero production can also be considered as process and product innovations that provide means to break into new markets and bring new services to existing ones (Bianchini and Kwon, 2020<sup>[8]</sup>).

To date, there are many studies at the subnational level that focus on science and technology or regional innovation systems in metro areas and cities, but relatively few that systematically try to understand innovation in rural regions.

### ***Entrepreneurs as drivers of innovation***

Starting a firm is a good proxy for new activities in rural places. While high value-added activities are still strongly associated with agglomeration in cities, local demands and solutions for challenges in rural places create the impetus for entrepreneurs to address larger societal challenges. For rural entrepreneurs, these are not as frequently hinged on products and production processes.

Rural regions have the opportunity of developing a model of growth and innovation that benefit from local resources, assets, bottom-up solutions and new opportunities available in those areas. Rural markets allow for experimentation and incubation of ideas, due to higher market dominance of incumbents, lower risks of intellectual property leakages and low operation costs based on the resources and opportunities of the region, which is, by definition, substantially different from those in cities.

Young entrepreneurs are important drivers of innovation for rural regions. Diversity, in age, gender and cultural backgrounds tends to breed new ideas to answer old questions. Young entrepreneurs tend to adopt more recent methods for providing services and products. Such services tend to better cater to the future of the workforce across all types of territories. Encouraging opportunities for youth in rural regions has spill-over effects on the rest of the community, where depopulation and youth flight is often a primary concern.

This report, *Unlocking Rural Innovation*, is the first in a series that will systematically address the following areas:

- Better understanding how innovation unfolds in rural places and reframing how we think about rural innovation.
- Identifying framework conditions and policy levers to encourage innovative entrepreneurship.
- Measuring the impacts of innovation on rural performance and well-being standards.

## **Assessment**

### ***We need to overcome biases and expand beyond traditional measures of innovation in rural regions***

Innovation as defined by the Oslo Manual (OECD/Eurostat, 2018<sup>[71]</sup>) encompasses non-tech-based innovations, such as innovations in business models and social innovations. For rural regions, it is important to apply this broader definition of innovation that encompasses new activities, new products and new processes, regardless of whether they involve high-tech activities.

It is increasingly important to rural-proof how we measure innovation in rural regions in order to better design place-based policies for rural regions. For example, patents, as a common proxy for innovation, lack the capacity to account for the occupational and sectoral structure of rural regions. Quite often, this can bias how we understand innovation, primarily in high-tech industry. It easily overlooks innovations in process and non-technical innovations that are more relevant for rural regions. Rural-proofing or viewing statistics and analysis through a rural lens can help by:

1. Adjusting pre-existing indicators to address the underlying occupational, sectoral and territorial structure of rural places.

2. Expanding beyond the traditional science and technology as indicators of innovation in rural regions.

This report proposes measuring innovation in rural regions using a variety of tools, each carrying advantages and disadvantages. These potential measures include, for example:

- Self-reported innovation measures on introducing new products or processes to the firm or market (with a large enough sample size).
- Product-level data that demonstrate upgrading (especially for the manufacturing and tradeable sectors).
- R&D jobs and investment (focused on relevant sectors).
- Adjusted patent intensity (accounting for industry and occupational structure of territories).
- Proxies for absorptive capacity such as shares of high-growth firms and productivity, start-up rates, especially among young entrepreneurs.

In addition to defining innovation, defining rural areas has an impact on how rural innovation is perceived. Rural and non-metropolitan regions are very diverse: some are close to metropolitan regions; others are close to the intermediate cities and others are remote. Each type of region requires a differentiated focus.

As such, the framework for enhancing innovation in rural regions is built on the understanding that it is important to: i) take a broad view of innovation, one more closely adapted to leveraging the full potential of rural regions; ii) ensure that rural regions have the appropriate framework conditions to unlock rural innovation which includes labour, physical and digital markets, access to finance and government services; iii) specifically encourage networks and linkages through the free flow of individuals, goods and firm activities across regions.

***Innovation, and its adoption, is a function of skills and capital, yet little is known about how to support individuals as drivers of entrepreneurship in rural regions***

A few framework conditions particularly matter in terms of innovation. Innovation, and its adoption, is a function of skills, capital and investment (Autor, 2014<sup>[9]</sup>; Solow, 1957<sup>[10]</sup>). Framework policies regulating markets, competition, finance and human capital endowments are important factors for encouraging innovation (Aghion et al., 2001<sup>[11]</sup>; Andersson et al., 2009<sup>[12]</sup>; Bloom, Draca and Van Reenen, 2016<sup>[13]</sup>; Goos, Manning and Salomons, 2014<sup>[14]</sup>; Grossman and Helpman, 1990<sup>[15]</sup>). However, most of the analysis and research on framework conditions for innovation overlooks regional differences, especially for rural regions. For example, competition may well be a driver of growth in regions with large firms and high levels of investment, but an advantage of rural innovation is a less stifling environment that allows “slow innovation” to take place.

Part of the challenge in understanding rural innovation is access to data and appropriate monitoring and evaluation mechanisms. In addition, there is also a challenge related to building capacity in understanding, monitoring and evaluating rural innovation and developing initiatives. Governments have a myriad of policy tools to help offset the growing divide in education and access to capital and investments that hinder rural innovation; however, such policies are often inadvertently misguided if they are territorially blind and overly sector-focused.

***Better indicators can give us a more accurate picture of innovation in rural areas***

Analysing innovation through a rural lens provides a more promising and nuanced picture of innovation in rural regions. For example, in Canada, the share of occupations with a high patent potential is no longer only located in the coastal regions. In studies associated with this report, evidence from Switzerland suggests that R&D investments are associated with more jobs and inward expenditure in rural regions than

in metropolitan areas. For example, in 2019, close to 35 cents per Swiss franc spent on R&D were outsourced; in rural regions, only 4 cents per Swiss franc left the firm for R&D expenses (OECD, 2021<sup>[16]</sup>).

Innovators innovate no matter where they are located. When looking at the narrower view of innovation, differences seem to reflect firm and territorial characteristics such as occupational or sectoral specialisations. For example, in the United States, adjusting for the share of occupations that are involved in patenting (of high-tech innovation) reduces disparities in patenting activity between metropolitan and non-metropolitan regions by a factor of 75. Evidence from an innovation-based survey in Scotland (United Kingdom) finds that controlling for sector and firm-level attributes, rural and urban entrepreneurs innovate at the same rate. Geography, in itself, is not the only determinant of who innovates: differences are driven by firm characteristics across places, for example, the size and age of businesses that increase the likelihood of innovation. In Scotland, large firms (101 or more employees) are 28% more likely to innovate than smaller ones, while young firms (0-5 years old) are 22% more likely to innovate than older ones. However, in rural areas and towns in Scotland, there is a much lower share of large and a relatively higher share of older firms.

While innovators are the same across regions, the return to innovation is larger in rural regions. In Scotland and the United States, both the reallocation of resources and the upskilling and upgrading of pre-existing resources in accessible rural and remote rural regions still contribute positively to productivity growth despite the fact that there is allocative inefficiency (OECD, forthcoming<sup>[5]</sup>; forthcoming<sup>[6]</sup>).

### ***Entrepreneurs are drivers of innovation***

High business dynamics are an important determinant of innovation and the resilience of regions. Overall, however, there is less dynamism in firms rural areas, with lower birth and death rates. There are 13% more firms created per 1 000 workers in urban regions as compared to rural regions, and a 9% lower rate of firm closure. Building a dynamic environment with low entry barriers and fast business exits brings opportunities for change in the business environment for rural regions.

Second, the sectoral composition of rural regions is different. Growing sectors in rural and intermediate areas tend to be in industry, hospitality and construction. Close to 60% of industry is located in rural and intermediate areas, while 50% of hospitality is also located in intermediate and rural areas. Likewise, the importance of the agricultural sector is strong in rural regions, despite growing service sectors.

Young and new entrepreneurs are important to rural regions and are often associated with innovation; yet they are still lagging in rural areas. In European rural areas, for example, there are 2 missing young start-up entrepreneurs per 1 000 inhabitants – that is 25% fewer young start-up entrepreneurs in rural areas than in cities. In 2011-19, a relative and absolute fall in the number of young founders in rural areas has outpaced peers in cities, suburbs and towns.

Young entrepreneurs as an age group are particularly important for encouraging innovation. With demographic change and ageing rural regions, the importance of finding attractive opportunities for those areas is increasingly important. In European OECD countries, young rural entrepreneurs, however, are 8.6% less likely to start a company than those in cities. Most of this difference is explained by socio-economic characteristics such as education, sector of activity, household characteristics and living conditions.

There are specific differences in the conditions in which young prospective entrepreneurs operate. In particular, young women in rural areas as well as towns and suburbs are 7.5% less likely to start a firm than young male in rural areas. Young entrepreneurs in cities have a 57% likelihood of having received training the year prior to starting a firm, while those in rural areas, towns and suburbs were only 26% to have received training in the year prior to starting a firm.

Young rural entrepreneurs are not inherently different from entrepreneurs in other areas; however, they have limited access to educational and government resources that hinder their potential. Providing access to create a level playing field is a start. However, building curricula tied to local opportunities and focusing on vocational skills is critical for the future of young rural entrepreneurs. In addition, more is needed to level the playing field for young female entrepreneurs in rural areas and help unlock rural innovation.

Access to education and skills upgrading opportunities is an important driver of entrepreneurship among young start-up entrepreneurs. Reducing socio-economic disparities – such as access to training, education, and employment opportunities (sector and occupation), and proxies for household income, education and migration status – has the potential of reducing the potential start-up rates by half. There is also room to improve framework conditions in regions, for example, access to digital infrastructure and export markets.

### ***Building the case for social innovation***

Social innovation and entrepreneurship can bring important opportunities for rural regions and individual well-being. With a primary purpose that goes beyond profit maximisation, social entrepreneurs and innovators can provide services to rural communities that have often been left behind in rural regions. Community anchor organisations can support the public sector in creating a vision for the community, while social innovators and entrepreneurs often can only operate if their service is of need to the community.

## **Recommendations and takeaways**

This report identifies a number of recommendations and takeaways to help unlock the innovation potential of rural regions by rebuilding the scope of policies and programmes for innovation by:

- Going beyond science and technology as indicators of innovation in rural regions.
- Recognising the strong correlation between entrepreneurship and innovation, especially youth with entrepreneurship.
- Targeting barriers such as limited access to improving skills and government resources that hinder the potential for rural entrepreneurs.
- Building evidence and programmes to support the demographics in rural regions, such as older workers and women.
- Unlocking barriers, such as legal status and access to funding and resources, for social innovators and entrepreneurs, as an important stimulus for well-being-focused innovation in rural regions.
- Understanding that while innovation is positively associated with increasing incomes and employment in rural regions, without place-based policies, it will also increase inequalities, in part due to innovation-induced structural change.

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## Notes

<sup>1</sup> OECD large (TL2) regions represent the first administrative tier of subnational government, for example, the Ontario Province in Canada. This classification is elaborated in Box 3.1 of chapter 3 of the report.

<sup>2</sup> This refers to patenting intensity or the number of patents over the number of people in the active labour force.

<sup>3</sup> This refers to individuals living within the 75 percentile of regions with the highest levels of individuals living in non-metropolitan regions. The alternative group captures the individuals within the 25<sup>th</sup> percentile of regions that have the lowest shares of individuals living in non-metropolitan regions.

<sup>4</sup> As measured using the Gini index which is a measure of income inequality.

<sup>5</sup> For all chapters of this report, “metro” refers to “metropolitan.”





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