# 2 Introduction

Designing policies for innovation through a rural lens can create better opportunities for rural regions. Yet there are challenges in ensuring measurement tools are not territorially blind and can capture innovation in rural places beyond the standard science and technology indicators. Re-evaluating how we measure and evaluate innovation helps in designing place-based policies to unlock rural innovation. This report calls for better measurement tools for rural innovation and reveals the importance of young start-up entrepreneurs to unlock rural innovation and its effects on driving outcomes in rural places.

Today's rural economies are going through fundamental changes to the way people, places and firms work and interact with each other. In part, this is due to how megatrends in digitalisation, innovation, demographics[1] and the environment are changing societies. More recently, the health pandemic revealed underlying weaknesses in public service delivery and place-based policies specifically in rural regions (OECD, 2020[1]; 2021[2]). Some rural regions, with low density and large distances to urban areas, often suffer disproportionately from economic shocks and structural change. Not only do they miss out on agglomeration benefits that dense areas enjoy, they suffer from lower levels of financial resources for public goods and government programmes targeted at improving skills, and infrastructure and providing adequate public services. However, rural areas can also be important places of opportunity and a source of ingenuity (OECD, 2016[3]).

Individuals and firms innovate in fundamentally similar ways but are exposed to different challenges and contexts. Rural regions often face different economic activities and business models than those in denser areas. They also suffer disproportionately from lower access to capital, labour, infrastructure and government services.

Further distances to markets is one of the major characteristics of non-metropolitan and rural regions. This can both be an advantage and a disadvantage. In the case of export and tradable goods and services, non-metropolitan and rural economies lack dense markets. Innovation, digitalisation and new technologies have the potential to overcome barriers to transport costs and access to markets. For this reason, and many others, innovation in rural places is of crucial importance.

In rural regions, the relative lack of access to basic resources has, in some cases, been managed through local ingenuity and, notably, innovation. Innovations can, for example, overcome market distances (online services, automated delivery services, etc.), labour force training challenges (distance learning) and access to services critical to the well-functioning of framework conditions (social innovation and public sector innovation). Nonetheless, structural inequalities, preparedness for megatrends such as demographic change and globalisation, and the missed opportunities associated with innovation for growth, continue to plague rural well-being. For example, changes in the demographic composition of areas mean demands for public and private services need to transition. Changes in supply chains due to increased globalisation means new opportunities for rural entrepreneurs to innovate using new products. Instead of observing improvements in well-being, studies demonstrate growing gaps in productivity and wages and depopulation of rural regions over the past decades (OECD, 2020[1]), suggesting that rural places have not fully reaped the benefits of globalisation and digitalisation.

Many rural regions are going through population decline. When populations, especially the skilled and youth, move to more densely populated areas, rural regions often lose potential gains in productivity that are crucial to survival. The extent of productivity and brain drain varies by the various types of rural regions. Population decline in rural places also calls for productivity gains to maintain well-being standards. Instead of fighting depopulation, governments can increase opportunities by encouraging the innovative endeavours of start-ups, supporting firms adopting pre-existing innovations and encouraging upskilling of rural populations to build the conditions to support the potential of rural areas and rural innovators. Ensuring that rural areas equally benefit from innovation breakthroughs can unlock the productivity gains that help balance the flow of individuals in and out of rural areas.

Entrepreneurs and innovators all share certain entrepreneurial, risk-taking or problem-solving characteristics (Pekkala Kerr and Kerr, 2020[4]). Differences in sectoral, occupational and territorial resources impact how innovations are produced and registered and, importantly, the societal or business purpose they serve. As such, the way we think about innovation in the context of rural regions merits reflection. Baumol (1990[5]) argued that entrepreneurial innovation has two main forms, driven by formal experiments or through the combination of tacit and formal knowledge and creativity to address barriers and become commercialised. In rural regions, formal innovations driven by large firms are less common and, when they do happen, may not always be attributed to the region because of reporting biases. Instead,

innovation in rural areas is driven by the action of entrepreneurs looking to overcome barriers that often serve a local or niche market. In some cases, this has also led to major technological disruptions. Innovation benefits from "systems" thinking and the formal and informal links that ensure the alignment of actors (OECD, forthcoming[6]). As will be further elaborated in this report, focusing on increasing the conditions that encourage the ecosystem around innovation and entrepreneurial activities is more relevant for rural well-being than the focus on innovation in high-technology sectors alone.

## Innovation as a predecessor of rural well-being

Innovation is a precursor of long-term growth, productivity and, in some cases, well-being (Aghion and Howitt, 1990[7]; OECD, 2016[3]; Romer, 1990[8]). Enhancing the creation, adoption and diffusion of innovative products and processes,[2] is often a target of policy makers and community leaders alike. Yet, innovation can be destructive in industries that are on the decline (Autor, 2014[9]; Aghion, Antonin and Bunel, 2021[10]). They can replace human labour and jobs with machines, removing a major source of income and welfare for areas where such declining industries are geographically located (McCann, 2019[11]).

Framework conditions matter for innovation. Innovation, and its adoption, is a function of production inputs, skills, capital and investment (Autor, 2014[9]; Solow, 1957[12]). As such, governments wishing to encourage innovation-led development also target programmes that improve the general framework conditions for firms and entrepreneurs. Framework policies regulating markets, competition, finance and human capital endowments are important factors for encouraging innovation (Aghion et al., 2001[13]; Andersson et al., 2009[14]; Bloom, Draca and Van Reenen, 2016[15]; Goos, Manning and Salomons, 2014[16]; Grossman and Helpman, 1990[17]), yet the academic literature on framework conditions for innovation often overlooks regional heterogeneities and, even more so, when trying to specifically understand innovation framework conditions in rural regions.

Governments have a myriad of policy tools to help offset the growing divide; however, such policies are often inadvertently misguided if they are *territorially blind* or *geographically misdirected* (OECD, 2014[18]). Understanding how to calibrate the policy levers that trigger benefits of innovation in rural regions can contribute to the reduction of current and expected future inequalities while reducing the growing "geography of discontent" (McCann, 2019[11]; OECD, 2019[19]) that is built from territorial inequalities between metropolitan and non-metropolitan regions. These inequalities have exacerbated the vulnerability of non-metropolitan regions to shocks such as the global financial crisis, the COVID-19 health pandemic and the large-scale Russian aggression on Ukraine. For instance, with inequalities in access to health services, individuals impacted by COVID-19 were more vulnerable. Likewise, firms with limited access to government services may have not been able to benefit from relief funds as substantially as those in metropolitan regions with a strong presence of government service providers. The recent war being waged by Russia on Ukraine is also now impacting energy prices in European countries. Those regions with low-quality housing stock and lower incomes are more vulnerable to increases in energy pricing and may be more exposed to extreme weather conditions. There is substantial and growing policy literature focusing on the territorial aspects of rural and regional policymaking (EC, 2020[20]; 2020[21]; OECD, 2013[22]; 2014[18]).

Innovation diffusion and adoption often occur in networks (Akcigit, Grigsby and Nicholas, 2017[23]; Lengyel et al., 2020[24]; Sorenson, 2018[25]) and are subject to agglomeration forces and positive spill-overs that vary by territory (Ahrend et al., 2017[26]; Maloney and Valencia Caicedo, 2022[27]). As such, the diffusion and adoption of innovation are equally – if not more – important in rural regions. For individuals and entrepreneurs in less dense areas – where access to labour, capital, markets and public services can be hampered by gaps in physical and digital infrastructure policies – networks of innovation diffusion and partnerships take an increasingly central role.

Following the literature review, our current knowledge of drivers of innovation and rural development tells us that:

- Entrepreneurs and innovators are fundamentally looking to overcome challenges and search for opportunities, whether they are in rural or urban regions.
- Innovation is a predecessor of growth but not necessarily well-being for all territories.
- Framework conditions encouraging innovation and innovation adoption and diffusion can be better targeted to satisfy the economic structure of rural regions.
- Innovation diffusion and adoption occur in networks and can be a source of growth for rural areas if barriers to physical and digital distances can be addressed.

While there is a multitude of research on innovation and geography, there is no systematic study on drivers of innovation in rural regions that focuses specifically on unlocking rural innovation. Seeing innovation through a rural lens means understanding what innovation and entrepreneurship look like in rural regions, before studying how they can be improved. The current report attempts to contribute to closing this gap.

The analysis makes use of several novel sources of data and reveals a number of findings:

- Entrepreneurs innovate across all regions. Analysing innovation indicators through a rural lens can give a more accurate picture of innovation that is more relevant for rural regions. While standard indicators of innovation and patent intensity find that rural places are lagging in innovation intensity, more refined measures, that adjust for occupational composition, find a different picture. In the United States, adjusting for occupational composition reduced the disparity between metropolitan and non-metropolitan regions by 75%.
- Rural entrepreneurship and young start-up rates, important indicators of innovation, are lagging in rural areas. Young entrepreneurs need to have equal access to education and training resources in rural areas as compared to their peers in cities, towns and suburbs. They would also benefit from policies that could level other socio-economic disparities, especially those that disproportionately affect women.
- Innovation is positively associated with increasing income and employment in rural regions; however, it can also be associated with increasing wage inequalities. Working on policies that can level the playing field between territories means taking a place-based approach. In particular, for rural areas, social innovation and entrepreneurship offer solutions to challenges that the public sector has a more difficult time addressing.

This report is structured into three main sections following this introduction. The first section focuses on measuring and broadening the measurements of innovation beyond science and technologies to better capture innovation in rural places. The second section examines entrepreneurship in rural places. The last section focuses on outcomes associated with innovation.

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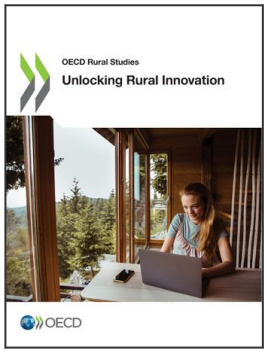
## Notes

[1] This refers to, for example, shifts in age structure of economies and ageing of societies, among other traits.

[2] This includes management and marketing practices.




**From:**

## Unlocking Rural Innovation

**Access the complete publication at:**
https://doi.org/10.1787/9044a961-en

**Please cite this chapter as:**

OECD (2022), “Introduction”, in *Unlocking Rural Innovation*, OECD Publishing, Paris.

DOI: https://doi.org/10.1787/080933f5-en

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