

5 Innovation as a driver of opportunities for rural regions

This chapter first discusses the important role that social innovation plays for rural development. It then examines the effects of innovation on several dimension of well-being including on employment, productivity, household income and inequality in rural regions.

The association between innovation, long-term growth and productivity is well established, but its impact on economic and social outcomes is more nuanced and analysis within countries and for rural regions is far more limited. For example, innovation in the public sector is often attributed to improvements in the reach of public services to more remote areas, such as e-health and e-education but can lead to increasing disparities, which was the case during the COVID-19 crisis (Markey, Ryser and Halseth, 2020^[1]; OECD, 2021^[2]; 2020^[3]). In the short and medium terms, product and process innovation can result in the loss of jobs and income, increase the polarisation of jobs and inequality between frontier and lagging firms, and regions (Acemoglu and Restrepo, 2020^[4]; Akcigit, Grigsby and Nicholas, 2017^[5]; Goos, Manning and Salomons, 2009^[6]; 2014^[7]; Greenan, 2003^[8]; Thesmar and Thoenig, 2000^[9]; OECD, 2016^[10]). However, in the midst of growing fears of how the acceleration of human-replacing innovations affects workers, innovation still has the possibility of transforming opportunities for our economies (Autor, 2014^[11]).

The next part of the analysis focuses on outcomes associated with innovation and explores how social innovation is critical for rural areas. It then delves into associated outcomes on a regional level and concludes with more precise information from case studies. The analysis relies on data from the European Union Labour Force Survey (EU-LFS), OECD regional statistics and national sources of data. Rurality is defined as the share of rural populations based on large (TL2) regions.

Social innovation in rural regions

An important aspect of living in rural regions is initiatives that combine new and improved methods of delivering goods and services that have a social purpose. Often these types of innovation are not directly measurable but are increasingly growing in importance for policy makers. The outcome of social innovators often directly contributes to local welfare and increased provision of public services.

It is increasingly clear that societal challenges such as climate change cannot be addressed solely by one actor or through traditional governmental top-down responses. In this perspective, rural areas appear particularly challenged often due to limited financial resources, demographic change, infrastructure and availability of public services such as healthcare, transportation or access to education. Social innovation is seen as an opportunity to support social well-being, tackle marginalisation and trigger transformative changes through collective action; it can reduce social inequalities and disproportionate resource use and promote sustainable development.

The working definition of social innovation adopted within the framework of the OECD Forum on Social Innovations was that it “can concern conceptual, process or product change, organisational change and changes in financing, and can deal with new relationships with stakeholders and territories” (OECD, 2000^[12]). The OECD definition clearly links social innovation to local development, as social innovation is seen as a way to improve the welfare of individuals and communities and explicit reference is made to new relationships with territories (OECD, 2000^[12]). The research underlines that because social innovation responds to place-based challenges, it is sometimes difficult for these initiatives to grow beyond the community. It is typically locally embedded and its conditions can vary from one territory to another.

There are many examples where local action groups tackle issues of social exclusion and promote co-operative entrepreneurship or application of new digitalisation tools in rural areas.¹ Social innovation responds to challenges in a rural context:

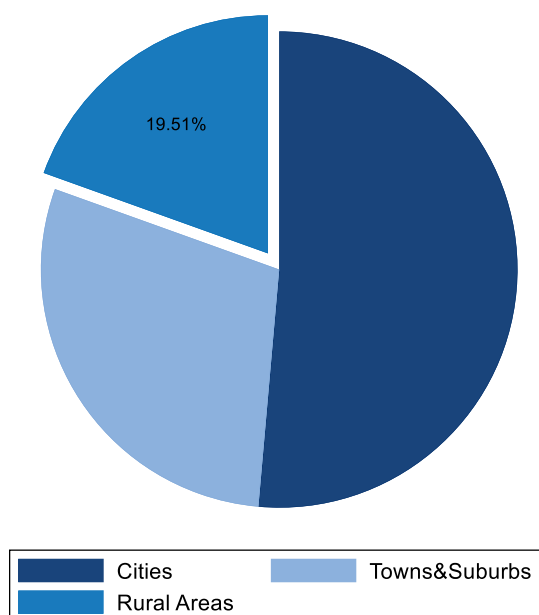
- *By activating the power of collective knowledge* involving various stakeholders, it identifies innovative ways of addressing societal challenges. Local actors, such as civil society, businesses or local government could work together with the objective to find novel practices to address specific local challenges; often these solutions involve new social relationships and collaborations, participative governance mechanisms along with economic opportunities.

- *By developing resilient and sustainable solutions* as a result of the alignment of multiple interests of various stakeholders towards a common goal. This leads to positive systemic change, especially in marginalised rural areas, which must reinvent their role and their capacity to innovate.
- *By increasing a sense of belonging to a local area and community* as well as a desire to prevent excessive emigration through finding solutions to local challenges and creating more vibrant and active rural societies (Zivojinovic, Ludvig and Hognl, 2019^[13]).
- *By improving the impact and value for money* through finding alternative ways to deliver the same service and especially by introducing preventive approaches, social innovation addresses the issue of limited financial resources and cuts future costs by explicitly reducing the negative externalities of economic activities.

There is momentum for change in rural areas through social innovation. Until recently, the prevailing view was that not all local contexts are capable of nurturing social innovation (Moulaert et al., 2014^[14]), suggesting that social innovation is more likely to happen in urban areas. However, a growing number of academics argue the contrary and find momentum in rural areas (Aldea-Löppönen, 2011^[15]; Bock, 2016^[16]; Lindberg and Jansson, 2016^[17]; Neumeier, 2017^[18]), in particular thanks to the progressive advancement of digitalisation and novel practices (Christmann, 2017^[19]). Examples include homecare or online training, which have particularly been picked up during the COVID-19 crisis, as well as rural mobility solutions through an e-car sharing initiative in a village in Germany (Dorf mobil Barsikow, 2020^[20]). The outcome of social innovators often directly contributes to improved local welfare and more efficient provision of public services. The OECD paper “Building local ecosystems for social innovation: A methodological framework” (2021^[21]) explores the approach to enhance the capacity of social innovation at the local level, to grow, scale as well as develop evidence-based policies around this subject.

The quality and diversity of the social innovation community constitute the basis for the success of the social innovation ecosystem in a particular territory. Community is built by the actors of social innovation, including the private sector, public sector and civil society organisations, which can comprise a variety of social economy players and citizens who play different and interchanging roles in the initiation and development of social innovations. This multi-stakeholder perspective is crucial for social innovation and helps to reinvent the traditional roles of the actors. For example, civil society actors – such as associations or citizens – are often taking the lead in the process of initiation (as well as development) of social innovation because their missions are strongly associated with social or environmental purposes (Bekker et al., 2013^[22]).

The presence of active civil society in a territory and a relatively higher density of civil society could indicate a higher propensity for initiation of social innovations. Specifically, in rural areas, research (Jungsberg et al., 2020^[23]) on social innovation refers to civil society as the most important actors during the social innovation initiation phase, even if they are often less present in rural areas (see Figure 5.1). Social entrepreneurs (Richter et al., 2019^[24]) or older people (Noack and Federwisch, 2020^[25]) are also specifically highlighted by some researchers as particularly active sub-groups in relation to rural social innovation. Similar to the distribution of the labour force in different territories, in European countries, close to 20% of employment in associations is located in rural regions, with close to 30% in towns and suburbs. Nevertheless, the share of individuals working in associations as a primary occupation is only marginally lower in rural areas, as compared to towns, suburbs and cities. Understanding employment in association shares alone is not sufficient for capturing the growing importance of social innovation in rural areas but allows us to provide at least a relative understanding of some types of social innovation. The growing importance of social innovation makes it necessary to explore ways how metrics can be applied in order to measure it and in order to analyse ways to overcome the narrow focus of metrics on economic-only issues.

Figure 5.1. Employment in associations

Note: Share of individuals employed in Nomenclature of Economic Activities (NACE) categories Arts, Entertainment and Recreation (R) and Other Service Activities (S) in a first or second job.

Source: Eurostat (n.d.^[26]), *European Union Labour Force Survey (EU-LFS)*, <https://ec.europa.eu/eurostat/web/microdata/european-union-labour-force-survey>, 2018 or the latest available data.

Social innovation is a source of new arrangements and co-operation modes for specific regions and rural areas. One such example is the region of Navarra, Spain, one of the pioneers of promoting social innovation over recent years. The region has put a number of initiatives in place to promote social innovation. The Social Innovation Unit was created in 2017 as an important action under the government of Navarra's Integral Plan for Social Economy 2017-2020. The unit's first output was a dedicated ecosystem for social innovation with a customised methodology at the local level which promoted over 35 local social innovation projects, including initiatives to improve the quality of food in schools and access to health via online services in rural areas. Another example is Coompanion Blekinge, Sweden, which works with the local county government, acting as a co-operatively owned intermediary with public funding and 25 physical sites that support for-profit or non-profit initiatives that serve a social purpose (OECD, forthcoming^[27]).

In sum, social innovation is an increasingly recognised form of innovation building on the specific attributes of local economies, in particular where access to public services is lacking. However, the quality and diversity of the social innovation community constitute the basis for the success of the social innovation ecosystem in a particular territory. Finally, the presence of an active civil society in a territory could indicate a higher propensity for the initiation of social innovations.

Effects of innovation on several dimensions of well-being in rural regions

This report has identified several reasons why we should reconsider our understanding of innovation and its drivers in rural regions. In the following section, the analysis estimates the effects of innovation on employment, productivity, productivity growth, household income and indicators of regional income inequality (Gini index). The report uses a two-step regression analysis depicted in Figure 5.2 to explore

changes in observable characteristics over the 2000 to 2019 period for OECD countries as they are associated with innovation. Further details of the regression analysis are provided in Tables A C.1 and A C.2 of the Annex. In this instance, innovation is proxied through population-weighted patent intensity indicators and outcomes are variables taken from the OECD Regional Database. Unfortunately, data on relevant occupations was not available across all TL2 regions. As a first step, working on analysis on a TL2 level requires accounting for the degree of rurality using shares of non-metropolitan populations within large TL2 regions. While it is less preferable than analysis on a level of small regions (TL3), it allows for wider usage of available controls and statistics. As such, the analysis focuses on a two-tail analysis that ranks TL2 regions by the degree of rurality and categorises two groups, those whose shares of non-metropolitan populations are less than the 25th percentile of regions and those above the 75th percentile of regions that identifies TL2 regions as having a relatively high share of non-metropolitan populations.

Regions with relatively higher shares of non-metropolitan populations observe a positive correlation between innovation and real household income, elderly dependency ratios, population density and population density growth² (as observed in the first and seventh column of Tables A C.1 and A C.2 of the Annex). When using patent ratios (patents per population employed in high-technology [high-tech] industry) to proxy innovation, trends in regions with relatively higher density and those with relatively lower density are similar for all the same variables except for population density growth. This finding is not surprising, as growth in populations increases opportunities for innovative interactions in formalised settings. For regions with relatively more rural characteristics, the demographic challenge remains a key factor in creating the environment for innovation.

Considering the first step, innovation is associated with increases in employment, productivity, household income and growth in productivity in the following year (Figure 5.2). The trends related to key outcomes of interest for policy makers suggest that pursuing policies focused on increasing innovative activities in rural regions has a relatively stronger response for areas with more rural characteristics than in more dense regions, at least in the first year. This is in line with the literature on innovation and short-term outcomes. Given the arguments made in the first part of the chapter about occupational structure, we expect this outcome to be lower-end observations.

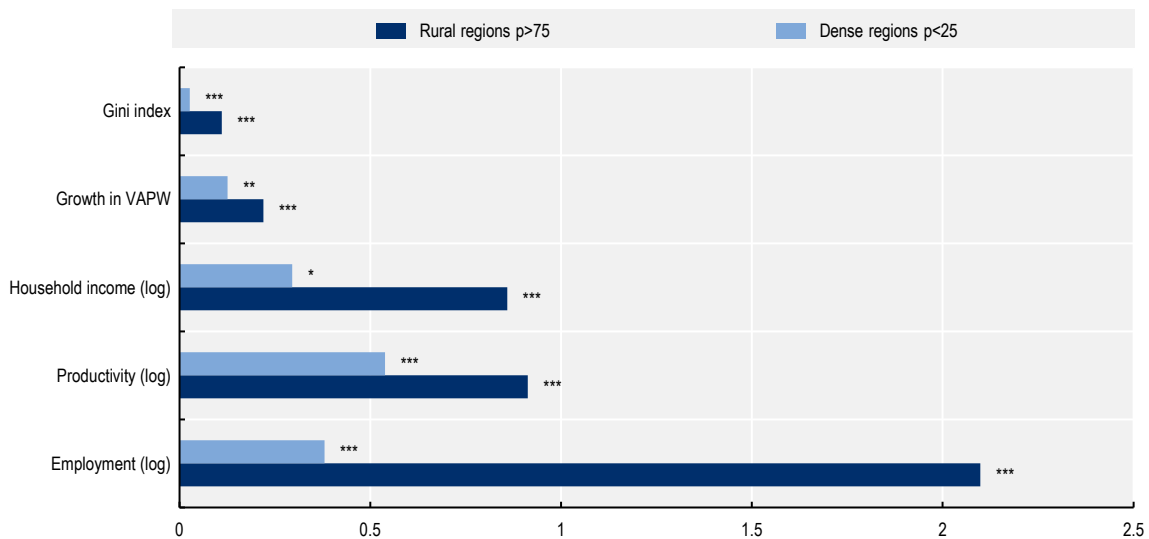
The benefits of innovative activities are stronger for regions with more rural characteristics. In Figure 5.2, the benefits of innovation to employment in areas with more rural characteristics are higher than in denser regions by a factor of 5.5. A one-unit increase in the ratio of patents to population results in a twofold increase in employment for a high share of individuals living in non-metropolitan regions, while it only results in a 40% increase in employment for individuals living in regions with the least share of non-metropolitan populations. Household incomes increase by 86% in regions with a relatively high share of non-metropolitan populations, while they increase by 30% in regions with relatively fewer non-metropolitan populations. A one-unit increase in patent intensity is associated with a 91% increase in productivity in regions with relatively high shares of non-metropolitan populations. This impact is lower, at 54%, in regions with a lower share of non-metropolitan populations. Furthermore, productivity growth (value-added per worker) is also positively associated with increased intensity of innovation and patenting activities, and relatively stronger for areas with larger shares of non-metropolitan populations. The higher level of impact for rural regions suggests that there may be larger gains to innovation, traditional or otherwise, in areas with higher shares of non-metropolitan populations that can help bridge the geography of discontent.

However, innovation is a precursor to inequality in the short run for all regions. High-tech innovation breeds inequality in the short run in both rural and dense settings. A one-unit increase in the patent intensity results in an 11% increase in wage inequality (Gini indicator) in regions with higher shares of non-metropolitan populations but only a 3% increase in wage inequality in areas with lower shares of non-metropolitan populations. The estimates demonstrate that patent-based innovation is a precursor to higher levels of inequality in rural areas than in denser settings. But this should be observed with caution. Using measures of innovation through patenting (creation) cannot capture the wage impacts of the adoption of innovative

goods and services in industries that more accurately capture the rural economy. There is a further avenue to understand what types of innovation lead to increases in inequality versus those that are more distributive.

Figure 5.2. Effects of innovation on inequality, productivity, productivity growth, income and employment

Comparison between regions with various degrees of rurality, 2000-19



Note: Rural regions ($p > 75$) refer to TL2 regions that are characterised as regions above the 75th percentile of the TL2 rurality index. Dense regions are TL2 regions with a degree of rurality that is less than the 25th percentile of all TL2 regions. Values include linear projections for years with missing values. VAPW refers to value-added per worker. The output in the figure is the result of a two-step least-squared fixed effects model estimating the impact of a one-unit change in the ratio of patents to the population on various outcome variables using the variation of aggregate statistics from previous years. The first-step estimation model is a fixed effects model on the level of TL2 with lagging independent variables. The second-step estimation captures the variation in outcome variables, which is explained by the patent-per-population innovation proxy. Controls include lags and shares in gross value added and employment in each major NACE sector. F-tests for instruments are above 10 and all are statistically significant to the 0.001 level. They are reported in Tables A C.1 and A C.2 of the Annex. The symbols in the graph correspond to the following: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: OECD (n.d.^[28]), *OECD Regional Demography (database)*, https://stats.oecd.org/Index.aspx?DataSetCode=REGION_DEMOGR.

In sum, innovation is important for long-term growth, jobs and welfare outcomes. However, outcomes are not the same across regions. In general, regions with the highest shares of non-metropolitan populations tend to have a more positive link between increased innovation intensities than others. This finding suggests that there is a relatively larger opportunity for growth through innovation in regions with more non-metropolitan populations than regions with a smaller share of less non-metropolitan populations. Second, welfare-enhancing innovation is not automatic. While there is a positive correlation between real household income and innovation in regions with a higher share of non-metropolitan populations in the short run, there is also a larger increased association with growing inequalities.

Conclusions

The report sets the scene for establishing a framework for understanding innovation in rural areas through a rural lens, explores how to promote a relatively more important proxy for rural innovation and young entrepreneurship and finally provides some guidelines for how innovation impacts regions differently.

Governments looking to reduce territorial disparities may consider understanding challenges from the point of view of rural communities.

Understanding how to address some of the challenges in rural areas starts with setting the scene but needs to address critical issues that hinder innovation and entrepreneurship because of framework conditions and barriers to interlinkages between regions and abroad.

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Notes

¹ A full chapter focused on social innovation in Scotland is explored in OECD (forthcoming^[29]), *Enhancing Innovation in Rural Regions: Scotland (UK)*.

² Unfortunately, a more precise estimate of patents per patentable occupation was not available for OECD countries on a regional level. The estimates here are therefore based on innovation as measured by patents per working-age labour force participant. Based on the descriptive analysis, we should interpret the estimates based on patents to high-tech occupations as a lower bound estimate. Regions with relatively more rural characteristics are defined as those that have a degree of rurality above the 25th percentile of the index distribution. Controls for this analysis include sectoral and employment shares in sectors, including in mining sectors. The model is a fixed effects regression, which accounts for regional and other time-invariant characteristics. Age groups are excluded, as the regressions already report the elderly dependency ratios which are relatively important for understanding the share of active population.



From:
Unlocking Rural Innovation

Access the complete publication at:

<https://doi.org/10.1787/9044a961-en>

Please cite this chapter as:

OECD (2022), “Innovation as a driver of opportunities for rural regions”, in *Unlocking Rural Innovation*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/efb55a78-en>

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