1 Assessment and recommendations

The United States (US) is a leader of high-tech innovation amongst OECD countries, containing 14.6% of total global scientific publications in 2021, the largest share of any OECD country (OECD, 2023[1]). Such high-tech innovation, however, tends to be concentrated mainly in urban areas. For example, in 2019 while metropolitan counties in the US recorded on average 13.2 patents per 1 000 innovative occupations, this share was less than half (5.6 on average) in rural counties.

Innovation in rural areas, however, happens in different forms beyond high-tech innovation, often shaped by rural entrepreneurs to overcome challenges and harness opportunities. This means that a more broad-based definition of innovation is warranted to understand innovation in rural areas than the traditional, narrowly defined definitions based on patents or investment in research and development. Many of these types of high-tech indicators of innovation often overlook the broad-based definition of innovation that identifies innovation as the development of new products and processes that can, critically, be either *new to the market or new to the firm*. As of today, we know that many forms of innovation are relevant for rural well-being, such as public-sector innovation and community-based (or non-governmental organization based) innovation. As such, innovations to rural "markets", not only can take the form of completely new products and processes, but also the adoption of such pre-existing innovations adapted to the local context.

Innovation also occurs to overcome rural-specific challenges—for example in access to basic government services such as infrastructure, finance education and health – or to provide services tailored to the diversity of different rural communities. Often, this type of innovation may happen through *new firm creation*, or through local entrepreneurial ingenuity and risk-taking. As such, the local conditions such as the structure of the economy and labour market, and the linkages places have with each other, can be a substantial enabler for innovation.

This report presents the state of rural innovation in the United States going beyond the science and technology lens. Through a combination of desk research and case study visits to Gallup, New Mexico, Pine Bluff, Arkansas, and Columbiana, Ohio, the report identifies the strengths and challenges of promoting innovation in rural areas. The distinct nature of these three regions offers a glimpse into the challenges of promoting rural innovation when the underlying factors and characteristics are vastly different. The report examines the drivers of rural innovation, placing particular emphasis on geographic disparities, and identifies policy responses to support rural innovation and to promote opportunities for education and entrepreneurship. It provides an overview of policies and financial initiatives aimed at supporting entrepreneurs and promoting rural innovation, as well as an assessment of the state of broadband connectivity and access to quality education in rural areas of the United States.

Assessments

Rural counties are growing but disparities between places are increasing.

In the United States, 15.6% of individuals lived in non-metropolitan and rural regions in 2020, down from 16.1% in 2010.[1] This share is relatively small when compared to most OECD countries, where close to

29% of individuals live in non-metropolitan and rural regions, based on OECD-wide harmonised definitions.[2]

There is strong evidence of economic growth in rural counties in the States. They have had, in particular, high per capita GDP growth in the decade to 2020. This is the case even when counties with a strong oil and gas sector are excluded, due to the outlier effects exerted by price fluctuations and volatility of outputs.

However, this trend masks increasing social and economic disparities between top performing and bottom performing counties in the United States. The gap between the top- and bottom- performing counties is 12% greater than the average of OECD countries. Of the regions reported to be in the top 20% of GDP, 70% are in metropolitan regions[3] and 26% are in rural regions (NMR-R), against 26% and 61% for the bottom 20%, respectively.

There is convergence in productivity between rural and metropolitan counties

Convergence in labour productivity between counties is led by rural growth. Labour productivity in rural counties surged between 2009 and 2020, averaging 1.7% annually, as it converged towards that of metropolitan counties. Likewise, non-metropolitan counties adjacent to cities caught up to non-metropolitan counties *not* adjacent to cities, although at a slower annualised rate of 0.9%. Across the decade, productivity disparity remained the highest in rural counties, which have the greatest share of both the most and least productive firms.

However, structural change is impacting rural counties...

Structural change is a phenomenon of long-term change to the dominant industries, as indicated by the shift from primarily agriculture to primarily service-oriented activities. As a share of the total economy in 2020, rural counties in the United States are dominated by finance, insurance and real estate (24%),[4] agriculture (23%), and manufacturing (13%), a ranking unchanged from 2010. However, even these sectors are employing less workers in 2020 than in 2010, and 9 out of the 12 aggregated sectors[5] in rural counties have lost workers across the decade. In rural counties, the top employers are in education and social services (24%), manufacturing (13%), and retail trade (11%). Thus, despite rural counties often being viewed as agrarian, manufacturing and services employ more workers than the agriculture sector in rural counties. This is a consistent observation in many OECD countries.

…and, productivity growth is coinciding with a relative decline in employment

Productivity growth is coinciding with a relative drop in employment: 9 out of 12 sectors in rural counties have lost in terms of shares of workers across the decade, including in agriculture and construction. Despite the relative fall in labour resources, the remaining share of employment within non-metropolitan counties still leads to productivity gains. There is some evidence to suggest that most of the growth in productivity is due to more efficient use of pre-existing resources within each type of county, that also includes productivity gains from intangible assets such as intellectual property and social connections.[6] In fact, over the past 10 years, most of productivity growth in non-metro counties has been primarily due to more efficient use of resources, despite the measured negative impact of the reallocation of production factors, such as labour or capital.

Productivity gains, in part due to innovation adoption, is stronger in rural areas…

While high-tech innovation is more prevalent in metropolitan counties, there is some evidence to suggest that innovation absorption, as a driver of productivity growth, is stronger in rural and non-metropolitan counties. As mentioned previously, there are on average 13.2 patents per 1 000 innovative occupations in metropolitan counties, while this ratio is 5.6 on average in rural counties. At the same time, nearly

two--thirds of overall productivity growth from 2010 to 2020 was due to innovation absorption in non-metropolitan areas.

…and, there still remains a margin of opportunity to invest in innovation in rural counties

There is more room for gains from innovation in rural and non-metropolitan counties. On average, rural and non-metropolitan counties have less patent intensity as compared to metro counties. Yet patent intensity in non-metropolitan counties is still positively correlated with R&D, firm intensity, and investment in education, whereas this is not as strongly the case in metropolitan counties. For every one percent increase in R&D spending, patent intensity increases by 0.7 units[7] in non-metropolitan counties, while it is close to zero in metropolitan counties. Investing in the education of the workforce is also associated with higher innovation outcomes, such as productivity, in non-metropolitan regions. While it is true that rural counties have lower traditional (high-tech) innovation outcomes as compared to metro counties, other equally positive outcomes such as increases in productivity, new innovations through research and development, and a more skilled workforce are still positive outcomes in rural places.

Equal opportunities for innovation and entrepreneurship across metropolitan and non-metropolitan counties is critical

The share of persistently poor counties is 5 times higher in rural counties than in metropolitan counties

Compared with 18 other OECD countries, overall inequality in the US is above average, driven by high disparities in rural counties and non-metropolitan counties not adjacent to cities. Inequality is also growing, with relatively high levels in the more remote counties. Strikingly, 20% of rural counties are considered persistently poor, as compared to only 4% of metropolitan counties.[8] Persistent poverty is associated with lower entrepreneurial opportunities and innovation outcomes across all types of counties, reinforcing the importance of socio-economic conditions to support innovation. Because a relatively larger share of persistently poor counties are also rural, federal and state priorities to support these areas should be re-enforced with a place-based approach, targeted at delivering equitable access to services to overcome generations of unequal access to opportunities.

Workers in rural counties are ageing faster

While the workforce in the United States is ageing, this trend is more pronounced in non-metropolitan regions and compounded by a lower share of primary-aged workers. For example, close to a quarter of the working age population in non-metropolitan rural areas was over the age of 55 from 2006-2010, while in the period of 2016-20, close to 29% of the population was over the age of 55. This aging trend was primarily due to a loss of prime aged workers (25-54 years of age), rather than a loss of younger workers (those between 15-24 years of age). This trend is expected to continue (Martinez-Fernandez et al., 2012[2]), aggravating pre-existing challenges in regional innovation that depend on a pool of qualified workers. As consequence, there is heightened need for programmes that encourage life-long learning and upskilling programmes for older workers for non-metropolitan regions. At the same time, programmes and policies to encourage entrepreneurship should consider the importance of involving the youth from an early age.

There is still room to improve innovation outcomes by drawing from a more diverse pool of talent. For example, promoting gender diversity can bring new skills and opportunity to rural regions. Despite progress, according to analysis in this report, between 2016 and 2020, men were on average paid 31% more than women in the US, and the farther away counties are from metropolitan regions, the more likely greater gender disparity in wages. More can be done to promote diversity initiatives for women, foreign workers and people of colour alongside policies to support counties identified as persistently poor.

The scale and scope of innovation in rural areas in the United States

Innovation in rural America is supported by direct and indirect funding and support from federal agencies

Rural policy in the United States has evolved from a focus on the agricultural sector towards a more multi-functional view of rural development. The United States Department of Agriculture (USDA) has a key role in supporting rural innovation, alongside the Economic Development Administration (EDA), the Small Business Administration (SBA) and the Department of the Interior, which oversees Tribal Lands. Because local governments in rural regions are fiscally constrained and typically depend upon transfers from other levels of government for a major share of their funding, these federal agencies have a large role to play in promoting innovation and entrepreneurship.

Support for rural innovation can be categorized as *direct* and *indirect*, with the latter subdivided as "rural business" and "ancillary" support. *Direct* support refers to the resources and programmes that specifically target rural innovation, such as the Build to Scale programme of the EDA's Office of Innovation and Entrepreneurship. *Indirect* support comprises support to the day-to-day activities of starting and maintaining rural businesses, for instance loans at low interest rates. *Ancillary* opportunities, which are also part of the indirect support, refer to factors that are necessary for businesses to thrive, such as high-quality broadband, transportation, and housing. One example is the USDA Rural Utilities Service, which provides financing for the construction, maintenance, improvement and expansion of telephone service and broadband in rural areas.

While each agency has its own areas of programmatic focus, it remains important that resources and interventions are coordinated, towards a more effective rural innovation ecosystem. One example of this is the Appalachian Regional Commission (ARC), a federal-state partnership for economic development which spans across 13 states and 423 counties – among them Columbiana.[9] The ARC adopts a collaborative approach to invest in rural communities, by providing grants, publishing research, and sponsoring learning experiences related to innovation, workforce training and business opportunities.

However, the focus on direct support for technology-based innovation is at odds with how rural innovation occurs

Innovations in rural places are in some cases disruptive, while in most other cases they serve the purpose of satisfying an unmet demand within the local economy. An example of disruptive innovation takes place in Columbiana, where Youngstown State University and the company Humtown Product partnered to develop new applications for additive manufacturing using 3-D sand printers. An example of a scenario where innovation satisfised an unmet need takes place in Gallup, New Mexico, where the company Sacred Winds Communication is applying fixed-wireless broadband within the Navajo Nation to connect widely dispersed settlements, which is a novel way to apply a well-known but little-used technology.

In this sense, policies for encouraging entrepreneurship and innovation in rural counties may overlook the specific needs of the areas if they continue to focus primarily on technology-based innovation. *Product* and *process* innovation must be considered, along with connections to broader rural economic development actions. Innovation in the provision of public and private services is especially important in rural areas due to its under-provision relative to urban counterparts. *A broader rural innovation policy* that better reflects the complex innovation systems and territorial linkages across areas is needed.

The direct and indirect support mechanisms may also overlook challenges in multi-level governance and rural municipal capacity to apply for competitive funding. For example, the recent Inflation Reduction Act, a landmark federal legislation aiming to tackle inflation and promote the green transition identifies the agricultural sector to invest in innovations to reduce greenhouse gases, carbon storage and innovation absorption for increased productivity, as well as increase resilience of rural lands to climate impact, and

energy producing communities but, without specific considerations for alleviating challenges related to scale and capacity of rural municipalities, it is unclear whether rural communities will be able to receive equal support in applying for grants and support.

Eligibility for federal programmes varies across spatial scales, which hinders participation of local governments

Currently, a number of different spatial units are used to define eligibility for federal programmes, including counties, multi-county regions, and municipalities of differing sizes. Almost all USDA rural development support is capped at places of fewer than 50,000 inhabitants, while the majority of programmes are restricted to places of fewer than 35,000 inhabitants. It can be hard for local governments to apply to multiple forms of support and construct a development strategy when some of the specific programmes that they need are not available according to the existing selection criteria. One option for the government is to consider adapting the existing eligibility criteria to make programmes more widely available for areas in need, including by creating more opportunities for joint applications. Moreover, the bundling or stacking of programmes between agencies could help rural communities access funding for innovation and entrepreneurship, especially in persistently poor counties. In creating more joint programmes that involve the participation of several municipalities and regional authorities, the government could incentivize regional cohesion rather than competition between areas that are in proximity.

Rural innovators' barriers to finance can be overcome by involving a wider pool of stakeholders

Non-bank financial intermediaries can help overcome barriers for access to finance

Although most rural communities have access to various options of bank credit, they often are focused on consumer or household credit and can be reluctant to fund new businesses. In rural places where incomes and wealth are low, business creation is often blocked by an inability of the enterprise to assemble sufficient equity funds to allow a bank or other lender to provide a loan. Access to finance and credit is particularly difficult for small and medium enterprises (SME) that represent the lion's share of enterprises in non-metropolitan areas. The typical challenges for SMEs already include under-collateralisation, high transaction costs, and lack of financial skills. In communities with high rates of persistent poverty and where discrimination has a long history, the problem of access is even greater.

In this respect, new forms of financial intermediation can help bridge rural "capital access gaps". The OECD identified non-traditional financing instruments as particularly helpful for SMEs that share a large part of rural economies in the G20/OECD High Level Principles on SME Financing (OECD, 2015[3]). In addition, rural entrepreneurs may need to work with financial intermediaries that better understand the risks in rural areas. Non-bank financial intermediaries include community development corporations, small business investment corporations, rural-focused venture capital firms, credit unions and cooperatives, rural loan funds, and angel investors. These actors tend to have a good understanding of the local economy and are able to provide targeted services to their clientele. However, given that their services are not widely available, greater support for this type of financial innovation could make a significant difference in rural areas.

With more support, non-governmental organisations (NGO) and community-based organisations can continuously contribute to foster community development

Where access to resources from government are limited, or not in the mandate, NGOs and community-based organisations can help develop solutions to challenges and take advantage of opportunities. The presence of non-profits in the three case study counties – Columbiana, Gallup and Pine Bluff – seemed to be instrumental to the success of community development strategies. Nonetheless, inadequate access to

finance, programmes and services can limit the capacity of non-profits, community-based organisations and NGOs to support such endeavours.

Programmes and services that support civil society, or are delivered through them, should be considered as a priority approach in rural communities. Additional funding and capacity building opportunities for community-based organisations, non-profits and NGOs can be provided by reinforcing legal status for such entities as delivery partners of innovation and entrepreneurship programmes, expanding federal or state agencies' "boots-on-the-ground" work. Support may be targeted to entrepreneurs, local community outreach organisations, NGOs that work in rural areas and other community outreach organisations, as well as to various forms of social enterprise (OECD, 2022[4]). Because each state administers its own programmes to support rural development, opportunities for aligning federal and state efforts have to be built into policy and programme design.

Broadband connectivity is an important condition for innovation, yet there are substantial gaps to high-quality broadband access in rural and Tribal Land areas, in comparison with urban areas

Rural areas in the United States have lower broadband coverage, less choice of internet providers and lower speed rates than urban regions

As in other OECD countries, rural areas in the US have a higher proportion of population without access to internet or with limited digital literacy skills, which is known as the digital divide. In terms of broadband coverage, 21% and 22% of the rural and Tribal Land population, respectively, live in areas without coverage of fixed broadband offers at 100 Mbps download speeds, while in urban areas this rate is 1%. Moreover, even if they are covered, they often have a limited choice of providers. Broadband adoption rates reveal even starker contrasts. In terms of experienced speeds, there was a 51-percentage point gap in download broadband speeds experienced by users between urban (metro) and rural regions by state in Q1 2021. This was similar to the findings on rural and urban areas in G20 countries, where there was, on average, a net 52-percentage point deviation in fixed download speeds between rural areas and cities in Q4 2020. This impacts opportunities for rural communities to grow, and is a key condition for the adoption of increasingly digital services being provided in education, labour, health and other services activities.

The United States government has recognised the importance of broadband connectivity for all, regardless of where they live

To avoid deepening existing digital and economic divides, access to high-quality broadband at affordable prices in rural areas of the United States is paramount. As such, the United States Government has a myriad of programmes. The Infrastructure and Investment Jobs Act (IIJA) allocates USD 65 billion to expand broadband infrastructure and bridge digital divides by funding digital equity and inclusion programs. The National Telecommunications and Information Administration (NTIA) will manage around USD 48 billion in the context of the IIJA through four programmes to expand access, affordability and adoption of high-quality broadband services (i.e. the Broadband Equity, Access and Deployment [BEAD] programme, the Digital Equity Act, the Tribal Connectivity Technical Amendments, and the Enabling Middle Mile Infrastructure programme). Out of the four, the largest is the BEAD programme, which provides USD 42.45 billion to be distributed among states and territories to expand broadband deployment and adoption in underserved and unserved areas. Through the Digital Equity Act, administered by the NTIA, USD 2.75 billion will be allocated to promote digital inclusion, including the promotion of digital skills and digital literacy. Measures to reduce broadband deployment costs and address affordability from the consumer side, such as the Affordable Connectivity Program, are also on the agenda. Close collaboration across agencies and levels of government should amplify the impact of such measures.

Access to quality education has been a barrier for many rural counties

Access to education in rural counties is more expensive and of lower quality than in urban counties

In the United States, 57% of school districts and 32% of public schools are rural, and they educate about 12 million (24%) students, however, the quality and delivery of educational services is often more limited in rural regions (OECD/EC-JRC, 2021[1]). This is rooted in the territorial challenges of rural counties; whereby lower density makes services less cost efficient, and challenges related to providing adequate staff are persistent. While having more teachers per pupil is often associated with better conditions for learning, the shares of student-teacher ratios are lower in regions (TL2 level) that have a lower share of individuals living in functional urban areas. In the Pine Bluff School District, Arkansas, it has been reported that students could go through the whole K-12 (early education) system without interacting with a certified teacher. Addressing these challenges is necessary for rural school districts to increase quality of education and contribute to building a skilled workforce.

Skills training needs to match local labour market demands

Skills are one of the biggest challenges for rural communities, which often starts from early education. Challenges are proliferated through difficulties in teacher recruitment and certification, and lack of well-targeted skills training programmes. In the Pine Bluff School District, only 12% of the high school students tested at or above the proficient level for reading, and 8% tested at or above that level for math. This limits their ability to benefit from vocational and entrepreneurship training in the first place, and therefore to contribute to the local economy and workforce. It is necessary to provide a basic education that motivates students to study, training to give them skills for working, and opportunities for some to pursue higher education.

Moreover, the curricula of vocational training and education institutions need to be adapted to the needs of the local labour market. Regular consultations can be held between state education boards, departments of commerce and local business leaders to better understand the demand. Anticipatory skills plans can be jointly developed to trace a strategy. These measures could contribute to increase workforce retention in rural places, boosting the local economy.

Higher education and R&D institutions can have a positive impact on local innovation

Higher education institutions have a key role in promoting innovation. Universities and colleges are well placed to develop initiatives to improve workforce development, knowledge generation and dissemination. Currently, there is an unequal role of Higher Education and Research and Development (HERD) institutions across counties. While an increase in the number of HERD institutions is associated with a 1.6% increase in productivity in metropolitan regions, it is not similarly associated with productivity in non-metropolitan regions. Its effect on patent intensity is positive in metropolitan counties, but non-significant for both metropolitan and non-metropolitan counties. Evidence on the impact of Land Grant universities in the United States suggests that higher education institutions with close ties to the economy in rural counties may have a more positive impact on local innovation. Furthermore, evidence from outside of the US in the Québec province of Canada, has similar findings. In Québec, community colleges (CEGEPs) and their technology transfer centres (CCTTs) combine applied research with industry support and workforce training in rural communities and there are other examples of higher education universities such as the University of Quebec at Rimouski that are especially designed to connect with territories. In Québec, the university incentive system for researchers is tied to how well they serve needs of local (and in some cases rural) communities (OECD, forthcoming[5]).

Regions that contain an important share of institutional innovation partners, such as educational institutions, research universities or laboratories, tend to have an advantage in building connections and sharing of resources. However, it's not only the existence of the institutional innovation partners that matters but also how to cater to the needs of rural areas, including through Vocational Education and Training programmes. As such, such institutions are better positioned to take advantage of resources and knowledge spill-overs that can often lead to economic growth and innovation. In Gallup, New Mexico, the Navajo Technical University provides opportunities for tribal youth to gain a university degree in a STEM related discipline. Its Center for Advanced Manufacturing provides job-focused experience for students in additive metal manufacturing.

In addition, encouraging joint initiatives between universities and firms can drive rural and regional innovation. Governments can support these types of linkages through a variety of tools that include subsidies for joint endeavours, creating platforms to connect entrepreneurs and research institutes, networking events, or other kinds of in-kind and programme support. One example is EDA's University Center programme, which offers grants to create centres of expertise, applied research, and technical assistance that can help develop and implement regional strategies for innovation. Programmes such as this can considerably support innovation across rural places. Another example from outside of the US comes from Scotland, where a national programme, Interface, is a platform for bringing rural entrepreneurs and institutional research partners together. Similar initiatives linking rural firms to research institutes, often through the help of regional development agencies, also exist in the provinces of Quebec and Ontario in Canada, and within the mandate of the Regional Innovation System in Switzerland.

Recommendations

The United States has a strong ecosystem for innovation, with funding for technological development, involvement of higher education institutions and market support. However, policies and programmes for innovation in the country do not always consider the specific needs and challenges of rural areas – for example, that innovation may not be STI-related and that economies of agglomeration may not be present. As such, a strategy that adopts a broader based definition of innovation while working to overcome challenges of scale should be prioritized. By definition, the low density and in many cases, large distances, in rural places create a less optimum environment for benefiting from advantages that come with agglomeration including innovation and productivity spill-overs. Nevertheless, a strategy that takes into consideration a functional approach and builds scale for small cities and towns can, in part, overcome some of the challenges related to scale and networks. An example of a strategy that takes this kind of approach into consideration is in Korea, the only OECD country that does not have major gaps in labour productivity among rural and urban regions, and where rural regions display higher levels of labour productivity than urban regions (OECD, 2021[6]).

Co-ordination on investments in jobs, the green transition, broadband connectivity, other infrastructure, housing and education are the backbones to sustain long-term progress in rural innovation. There are already several direct and indirect federal and state agencies in place to support innovation and entrepreneurship in rural areas. However, support for innovation requires support for direct, indirect and auxiliary mechanisms. To improve outcomes for implementation of such programmes, federal departments need to pay more attention to coordination efforts with other federal departments, and local governments need to work on co-ordination across levels of government. For example, the recent federal Infrastructure and Investment in Jobs Act (IIJA) as well as the Inflation Reduction Act (IRA), are two laws that create competitive federal grants to which municipalities can apply. The IRA is unprecedented in scale, however, as in the case of the post-global financial crisis stimulus, their effectiveness depends on the capacity of local governments to tailor investments for real progress and, in this case, the transition to net-zero (or green transition). It can be more difficult to access for rural counties who may lack the trained manpower needed to carry out intensive contracting processes, and the capacity to absorb funding. For example, the

Notice of Funding Opportunities (NOFOs) related to the IRA funding could be a.) streamlined to increase programme uptake – encouraging joint municipal applicants – and b.) encouraged through collaborative partnerships across federal government agencies. Such a collaboration, for example between the Department of Commerce and the United States Department for Agriculture, could be built to foster place-based visions for rural innovation.

Based on the findings of the report, key recommendations include developing policies and programs that are tailored to the unique needs and challenges of rural areas, expanding access to capital and resources for entrepreneurs in rural areas, investing in physical and digital infrastructure to improve connectivity, and supporting skills development and entrepreneurship as a means of addressing service delivery and well-being challenges in rural communities. By doing so, the US can unlock the full potential of rural innovation and entrepreneurship, contributing to the overall economic and social well-being of the country.

Improving policy design and implementation for rural innovation

The United States is a federal country with strongly devolved powers to the states. Devolution is also a characteristic of the regional development arms of the major agencies that support rural innovation, the USDA and the EDA. In this context, the recommendations below offer guidelines to the different agencies in charge of rural innovation but also to state agencies with regional development mandates.

Promoting a broader view of innovation policy for diverse rural areas

To ensure that policies for innovation are place-based and contain the appropriate scope and target, the government should encourage that investments related to encouraging innovation and entrepreneurship should:

- **Broaden the scope of "innovation"** in criteria for programme design and eligibility for funds to include social innovation, public sector innovation and innovation that goes beyond science and technology -related types of innovation.
- Reinforce **place-based programmes** to support innovative behaviour in all types of rural business, but including those that produce tradable outputs.
- Expand **"boots-on-the ground" financial support initiatives,** including revolving loan funds, that enable true partnerships where programmes are built with and are flexible enough to respond to local communities and NGOs, to improve awareness and programme uptake.
- Account for the **challenges of rural areas**, such as persistent poverty, demographic change, aging workforce, migrant workers and the gender wage gap, by:
  - streamlining such concerns in the design of policies and programmes that seek to encourage innovation and entrepreneurship, or
  - working with local and community development organisations to consult on the best way to address the challenges for each category through bottom-up initiatives.
- Follow the **G20/OECD High-Level Principles on SME Financing** (2022) using a rural lens in order to develop cross-cutting policy strategies to enhance SME access to finance. This can be applied to strategies for financial institutions such as Community Development Financial Institutions (CDFIs), State Small Business Credit Initiatives (SSBCIs), Small Business Innovation Research (SBIR) or Small Business Technology Transfer programmes (SBTT). Among other principles, this can include:
  - Identifying SME financing needs and gaps to improve the evidence base in rural areas.
  - Strengthening SME access to traditional banking finance in rural areas, for example through rural finance roundtables, as is the case in the rural regions of Gaspé, Québec.

- Promoting financial inclusion for SMEs and easing access to formal financial services, including for informal firms, for example, through local brokers and community-based bank partnerships.
- Enhancing SME financial skills and strategic vision, in partnership with local rural education and skills providers.
- Designing public programmes for SME finance which ensure additionality, cost effectiveness and user-friendliness for rural entrepreneurs,

Implementing programs in accordance with different scales of intervention

Building in consideration for the scale of interventions can create new opportunities. Rural innovation programmes should take into consideration both differences in size of place and the availability of linkages to other places. To illustrate, areas in proximity to urban counties may have different opportunities than those in remote areas, and economic opportunities vary across the nation. To ensure the territorial aspects of rural and non-metropolitan regions are continuously reviewed and addressed, the government should:

- **Simplify eligibility criteria** to increase programme uptake, **or consider bundling programmes.** Consider harmonising the spatial unit (county, multi-county region or municipality) that is used as eligibility criteria for federal programmes. While statutory eligibility rules may be difficult to change, the bundling or stacking of programmes could be another option to increase rural communities' access to funding for innovation and entrepreneurship.
- Consider **delivering programmes at a higher level of spatial aggregation**. For creating scale and overcoming fragmentation of small areas, the government could promote strategies across key government agencies relevant for rural development to deliver programmes at a higher level of aggregation, such as is done by the EDA's Economic Development Districts (EDDs).
- Foster **collaboration among local governments to create economic development strategies.** In rural America, many local governments serve populations that are too small to have a viable economic development strategy on their own. EDA's approach of fostering collaboration within regions could serve as a model for other agencies to move towards.

Ensuring effective co-ordination mechanisms across levels of government and capacity for multi-level governance

Building on the federal structure of the United States, the role of co-ordination mechanisms is critically important to reduce duplication and encourage more efficient programme implementation. Alongside co-ordination mechanisms, ensuring municipalities in rural areas have the capacity to implement policies, programmes and get access to federal grants is critical. Ensuring co-ordination mechanisms are in-line with best practices and updated to reflect changes in demographics and priorities across regions is important. Foresight practices could likewise revisit co-ordination mechanisms to ensure they are able to adapt to change. In order to better ensure vertical and horizontal co-ordination mechanisms and adequate capacity between state, federal and local governments, the government should:

- **Increase regular collaboration between regional EDA and USDA offices** to facilitate greater impact on innovation and entrepreneurship, including with state economic development agencies.
- Draw lessons that scale-up from successful programs that provide **direct funding** to local governments, instead of reliance on sub-allocation or competitive processes.
- Implement the principles of the ***OECD Recommendation of the Council on Effective Public Investment Across Levels of Government*** (2014) on how to co-ordinate public investment across levels of government and policies. This can occur, for example through:
  - Early-stage co-ordination on federal level strategies for innovation and regional development. An example of this related to regional and rural innovation comes from Switzerland, where

innovation strategies and the new regional development policies are coordinated with each other at an early consultative stage.

  - Creating incentives for bundling programs, or incentivizing cross-municipal coordination for accessing funding, as was the case in the $1B Build Back Better Regional Challenge in the United States. An example of this in Scotland, can be found through region-city deals, which are local government collaborations that facilitates jointly attaining government funding for shared local priorities.

- **Build capacities of municipalities and programme delivery partners for accessing competitive federal grants in rural areas**. This can include stipulations facilitating accessing grants at a larger scale (jointly with other municipalities; supporting rural communities to identify complementary programs that can help leverage or maximize federal and state funding and programmes, such as for broadband investments; and direct funding available specifically for building municipal capacity. As demonstrated with the 2008 Financial crisis recovery initiatives, distressed and small municipalities have less capacity and face absorption challenges for large competitive grants (Mizell and Allain-Dupré, 2013[7]; OECD, 2011[8]). This is the case especially for those in persistently poor counties that could most benefit from innovation and entrepreneurial support through competitive federal grants of large programmes such as infrastructure and relief funds. Two recent examples of large federal competitive initiatives that may be more difficult for rural municipalities to apply to and access include the Inflation Reduction Act (IRA) and the Infrastructure and Investment in Jobs Act (IIJA).
- Create **online one-stop shops to facilitate access to resources** related to innovation for entrepreneurs and NGOs. In Scotland, for instance, entrepreneurs looking for support can turn to *Business Gateway*, an online platform for entrepreneurial support, as a point of first entry.

Building a culture of experimentation in rural entrepreneurship

A culture of experimentation can enable businesses and local governments to develop innovative solutions to local challenges related to public service delivery and quality of life in rural areas. In order to build a culture of experimentation in the public sector and among entrepreneurs, the government should:

- **Foster rural development networks** to encourage mutual learning from best practices across the federal and state public sector.
- **Support regional hubs and networking hubs** among rural leaders and potential entrepreneurs that can enable them to share expertise and create business opportunities. An example is Go Forward Pine Bluff, a Public-Private partnership lead by community organisations that encourages the development of new firms by youth.
- Continue to **encourage open competitions** for rural entrepreneurs, such as hackathons and other challenge-based initiatives, as is done through Innosuisse's Innovation Booster initiatives in Switzerland.
- **Foster partnerships** between universities and rural colleges on one side and entrepreneurs and business owners on the other side to increase innovation matched to the needs on the ground. For example, this can be done through:
  - support for *early access to research internships and apprenticeship programmes* in accessible rural areas, such as Columbiana, Ohio, or more remote, but well-connected areas, such as Gallup, New Mexico.
  - *research partnerships* for more remote rural areas further from relatively larger population centres.

Improving access to high-quality broadband in rural areas

Expanding high-quality broadband connectivity in rural areas can help alleviate the barriers of increased geographical distance and transport costs. It leads to greater access to opportunities and services in a remote manner, such as health, education, banking, and government services. Broadband connectivity also helps to prepare rural economies for the digital transformation, boosts rural innovation, and aids them in disaster relief and emergencies, which in turn increases their resilience and productivity. This could contribute to the regional appeal of rural communities, for example by attracting private sector investments or encouraging regional mobility. To this end, the following section outlines recommendations to expand broadband connectivity in rural areas, which are directed to the Federal Communications Commission (FCC), the National Telecommunications and Information Administration (NTIA), the United States Department of Agriculture (USDA) and the Economic Development Administration (EDA).

Better assessing the state of broadband connectivity

To accurately assess the state of broadband of connectivity as a compass for broadband policies as a tool to strengthen end-user transparency, the FCC, NTIA, USDA and EDA should:

- Continue the laudable efforts to **improve broadband maps** in the United States in terms of availability and quality of broadband, as the efficient use of public funds depends on them.
- Develop a government-sponsored tool to **inform end users on broadband prices** (both fixed and mobile) available in their area, which although a complex endeavour, will be important moving forward.

Extending connectivity by easing barriers to infrastructure deployment and complementing measures through local bottom-up approaches

To narrow the rural-urban connectivity divide, the government needs to ease barriers to infrastructure deployment by involving local governments and continuing to promote efficient spectrum management. It also needs to support bottom-up approaches, such as municipal and community-led initiatives, known as small Internet service providers (ISPs). To this end, the FCC, the NTIA, the USDA and the EDA should:

- Build on existing efforts to reduce the **administrative burden** and costs associated with broadband deployment at the local level.
- Enhance collaboration at national, state, and local levels to **streamline access to rights of way**, for example, through a task force including representatives from local and state authorities.
- Increase the **transparency on public assets available** to be leased by communication operators to set up network infrastructure, such as towers.
- Continue to promote **spectrum management policies** that grant access to spectrum resources to users in rural areas and in Tribal Lands.
- Encourage states to reconsider **bans against small Internet service providers** (ISPs), given that municipal and community-led broadband initiatives are important players in extending broadband access in rural areas. State bans are a significant barrier for competition and may contribute to higher prices for broadband services at lower quality of service.
- Increase access and interconnection to **"middle-mile" fibre wholesale connectivity** and promote **regulatory forbearance** (e.g. leaner reporting obligations) to create an enabling environment for local networks to flourish.

Making the most out of existing funding and programmes for broadband connectivity

To amplify the impact of current broadband deployment initiatives and funds to rural areas, and considering local capacity constraints, where relevant, the FCC, the NTIA, the USDA and the EDA should:

- Continue supporting states in implementing **Broadband Equity, Access, and Deployment (BEAD) funds**, in particular regarding the dimensions of affordability, open access obligations and preferences for future proof broadband access technologies, such as fibre, as part of the selection criteria.
- **Leverage synergies** of programmes undertaken by the Federal Communications Commission, such as the Rural Digital Opportunity Funds (RDOF) and universal service provisions, with existing grants of the Infrastructure and Investment Jobs Act.
- **Assist small rural communities** in navigating, building capacity for applying to the different broadband funding programmes, and determining the ones that best fit their local needs. Initiatives from the NTIA, such as the State Broadband Leaders Network (SBLN), are a welcomed development in this regard.

Supporting students in skills development and entrepreneurship training

Access to education is a framework condition for innovation. In this respect, strengthening the early (K-12) education system can be a turning point for rural communities. Investing in vocational education in rural areas should be a priority to enable more diverse training options. Providing skills training, guidance and new partnership opportunities to develop entrepreneurial skills can create new opportunities. Finally, higher education institutions have a role to play in promoting innovation, but the offer of services that they provide needs to be aligned with labour market demands. The following sections provide recommendations to strengthen education in rural areas in the United States.

Improving skills needed for the local labour market and for higher education

To ensure that education services are apt to reinforce locally based skills programme, the United States, through state education boards, the Department of Education and regional development agencies in USDA and EDA, should:

- Consider resources to reinforce basic education by encouraging partnerships between the provide sector, community organisations and high school level students to motivate students to **learn skills** for the local labour markets and to pursue higher education.
- Direct funding and resources to support education programmes **driven by demand for skills needed to develop Indigenous business** in Indigenous communities.
- Reinforce **quality controls for teacher recruitment and certification** in rural communities.
- Reinforce **vocational skills training programmes** in rural communities, in line with the **OECD Skills Strategy** (2019) and in consultation with local Indigenous community representatives when relevant.
- Require states to promote **consultation and joint collaboration** with civil society and local leaders, especially in counties and communities with strong Indigenous populations, so that the offer of local skills upgrading is aligned with opportunities in the local market.

Promoting education for entrepreneurship

To promote education for entrepreneurship in rural communities, state education boards, the Department of Education and regional development agencies in USDA and EDA, should:

- Support regular **consultation mechanisms** between state education boards, leaders from the local private sector, business associations and departments of commerce, to develop anticipatory skills plans for students from a young age to engage in entrepreneurship.
- Build more **local partnerships with secondary schools** to provide programmes for entrepreneurial training, including challenge-based programmes. An example is Columbiana, Ohio where local companies regularly work with secondary schools to provide challenge-based programmes in entrepreneurial courses, among other initiatives.
- Provide local and regional opportunities for **on-the-job training, internships and summer jobs** for youth to gain experience.
- Implement the **OECD Recommendation of the Council on SME and Entrepreneurship Policy** (2022) to developing coherent, effective and efficient SME and entrepreneurship policies.

Tackling the challenge of measuring innovation in rural areas

Innovation in rural areas is less dependent on the direct effects of R&D investment than in urban areas. This does not mean, however, that innovation does not occur in rural places. Innovative processes and products happen even when they are not associated with patent-generating activity or when they involve high-tech sectors. In fact, innovation absorption was one of the main causes of productivity growth in rural counties in the past decade. Yet, it remains challenging to measure innovation outside of these proxies. As a consequence, the opportunities to adjust policies to encourage entrepreneurship and innovation in light of the characteristics of rural innovation remain limited. To encourage a better understanding of innovation in rural regions and therefore increase access to public services, including for innovation and entrepreneurship, the government should:

- **Monitor demographic and economic changes in rural areas,** for example through a Rural Observatory or similar cross-agency initiative, with the aim of better aligning the definition of innovation in rural areas with their characteristics.
- Measure, identify and adopt **indicators that are more appropriately associated with innovation priorities of rural counties**, such as indicators of new firm activities (firm births and deaths) or via community innovation surveys that have an adequate coverage of rural firms. Examples include:
  - encouraging statistical departments such as the Census Bureau to administer regular and timely questionnaires on innovation, with a large enough sample size, through the American Community Survey, or other surveys administered through the Bureau of Economic Analysis, or
  - co-ordinating on administering surveys on innovation and entrepreneurship with the state-level economic or labour analysis agencies.
- Mainstream **policy evaluation methods** that differentiate between metropolitan and non-metropolitan regions across the various government departments that work with rural areas.

References

Marshalian, M., P. Chan and M. Bournisien de Valmont (2023), “Networks and rural-urban linkages for rural innovation”, *OECD Regional Development Papers*, No. 53, OECD Publishing, Paris, https://doi.org/10.1787/4928f26b-en. [9]

Martinez-Fernandez, C. et al. (2012), *Demographic Change and Local Development: Shrinkage, Regeneration and Social Dynamics*, Local Economic and Employment Development (LEED), OECD Publishing, Paris, https://doi.org/10.1787/9789264180468-en. [2]

Mizell, L. and D. Allain-Dupré (2013), "Creating Conditions for Effective Public Investment: Sub-national Capacities in a Multi-level Governance Context", *OECD Regional Development Working Papers*, No. 2013/4, OECD Publishing, Paris, https://doi.org/10.1787/5k49j2cjv5mq-en. [7]

OECD (2023), "OECD calculations based on Scopus Custom Data", OECD, Paris, https://stip.oecd.org/stats/SB-StatTrends.html?i=WPUBS_NBWHO&v=3&t=2007,2021&s=CHN,EU27_2020,JPN,KOR,OECD,GBR,USA. [1]

OECD (2022), *Recommendation on the Social and Solidarity Economy and Social Innovation*, OECD, Paris, https://www.oecd.org/mcm/Recommendation-on-the-Social-and-Solidarity-Economy-and-Social-Innovation.pdf (accessed on 19 May 2023). [4]

OECD (2021), *Perspectives on Decentralisation and Rural-Urban Linkages in Korea*, OECD Rural Studies, OECD Publishing, Paris, https://doi.org/10.1787/a3c685a7-en. [6]

OECD (2015), "G20/OECD High-Level Principles on SME Financing", OECD, Paris, https://www.oecd.org/finance/G20-OECD-High-Level-Principles-on-SME-Financing.pdf. [3]

OECD (2011), *Making the Most of Public Investment in a Tight Fiscal Environment: Multi-level Governance Lessons from the Crisis*, OECD Multi-level Governance Studies, OECD Publishing, Paris, https://doi.org/10.1787/9789264114470-en. [8]

OECD (forthcoming), *Enhancing Innovation in Rural Regions: Canada*, OECD Rural Studies, OECD Publishing, Paris. [5]

Notes

[1] A recent report from using postal code statistics on the movement of individuals across counties in the United States found that there was a particularly striking trend of urban outflow from the onset of the COVID-19 crisis in January 2020, that remained elevated until January 2022. After this time, requests to relocate out of urban areas slowed down drastically. Unfortunately, further information on county level statistics after the COVID-19 lockdown period was not available at the time of the publication of this report. For further information, please see Marshalian, M., P. Chan and M. Bournisien de Valmont (2023), "Networks and rural-urban linkages for rural innovation", OECD Regional Development Papers, No. 53, OECD Publishing, Paris, https://doi.org/10.1787/4928f26b-en.

[2] The report mainly uses the USDA's Rural-Urban Classification Continuum, which is a system of classification of rural areas based on counties (or municipalities). However, when comparative analysis with other OECD countries are conducted, the analysis refers to large regions identified as Territorial Level 3 (TL3). In the United States, the TL3 is associated with an economic development district, as defined by the US Department of Commerce. More information on classifications are outlined in Chapter 2.

[3] These refer to two categories of metropolitan regions, further elaborated in the report. They include small administrative regions (Territorial Level 3) that are classified as a large metropolitan region (MR-L) having

a functional urban area with a population larger than 1.5 million; or a metropolitan region (MR-M) classified as having a functional urban area with population larger than 250 000.

[4] Financial and real estate services also include imputed rents.

[5] The 12 sectors include Agriculture; Construction; Education and social services; Finance, insurance and real estate; Information; Manufacturing; Mining, oil and gas; Other services (non-public); Professional Services; Recreation; Retail trade; Transportation and utilities; and Wholesale trade.

[6] Factors like intangible resources such as intellectual property, as well as brand recognition and local relationships could also be deepening the gains to productivity of firms, even if products and services innovation have not further developed.

[7] This is close to 1 patent per 1 000 individuals in occupations that are more likely to file patents. Further details on how this is calculated is available in chapter 2 and its annex.

[8] The definition adopted for “persistently poor” counties is defined by congress and used by departments such as the US Department of Commerce. According to a Congressional requirement, a county (or a county-level equivalent) is experiencing Persistent Poverty if their most recent poverty rate estimate, within the margin of error, equates to 20 percent, while also evidencing poverty rates of at least 20 percent in the 1990 and 2000 decennial censuses (i.e., 20 percent or greater poverty over the last 30 years).

[9] Columbiana County is classified by ARC as "a transitional county in fiscal year 2023. The maximum ARC share for projects funded in this county is **50%**. This county has 4 distressed areas in fiscal year 2023.