

# Innovation Issues

A research brief series that examine innovation in rural businesses and communities



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## Innovation, Broadly Measured, and Its Effects on Business and Community Economic Health

A summary of "Firm and Regional Economic Outcomes Associated with a New, Broad Measure of Business Innovation," by Brian Whitacre<sup>a</sup>, Devon Meadowcroft<sup>b</sup>, and Roberto Gallardo<sup>c</sup>, *Entrepreneurship and Regional Development* June 2019, 1–23.

<https://doi.org/10.1080/08985626.2019.1630486>.

### What's the Issue?

Innovation has long been recognized for its importance to business success. However, little data exists on the innovation activity of businesses in the U.S.<sup>1</sup> Thus, research on domestic innovation has traditionally been limited to large firms, and tends to focus on their research and development (R&D) expenditures and patent applications. Yet, smaller and rural businesses innovate in ways that are often missed by traditional measures of innovation and, as a result, little is known about their innovation activity. Knowing more about their innovativeness and the impacts of their innovation activities may help policy makers develop policies that are tailored to small and rural business's potentially unique needs.

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<sup>1</sup> We use the terms business, firm, and establishment interchangeably.

### Key Takeaways

- Using a broad definition of innovation allows researchers to compare the innovation activity of businesses across different industries and locations, including rural and urban.
- Innovation, even when defined broadly, is positively associated with economic benefits at both the business and the regional level.
- Therefore, future policies should promote innovation activities that are included in the broader measure of innovation described here.

### Research Objectives

Using data from the Rural Establishment Innovation Survey (see page 2), the researchers developed a new measure of innovation that captures a broader range of activities than patent applications or R&D expenditures. Then, using this new measure of innovation, they wanted to determine the business-level and region-level economic impacts of innovation.

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## About the Rural Establishment Innovation Survey

In 2014, the USDA Economic Research Service (ERS) conducted a Rural Establishment Innovation Survey (REIS) – a comprehensive and nationally representative survey of more than 10,000 business establishments that employ five or more employees. Survey respondents reported on their business's innovation technologies and practices, along with other relevant establishment data such as human resource and finance information. Because the survey over-sampled from rural areas, it provides the researchers the ability to address questions about the ways in which business innovation is happening in rural areas, and its dependence and impact on rural communities and regional economies.

In 2016, through a cooperative agreement with the ERS, the Northeast Regional Center for Rural Development administered a competitive funding program that provided three research teams the opportunity to utilize REIS data to study pressing issues related to rural innovation and economic development. The funded research teams presented papers on their projects at the North American Regional Science Council in Vancouver, BC, in November 2017. This research brief, prepared by Kristen Devlin and Stephan J. Goetz, describes one of the funded research projects.

### Research Methods

The researchers conducted this research in three distinct phases:

1. They developed an "innovation index" to measure a broad range of innovation activities at the firm level.
2. They conducted statistical analyses to determine the relationship between a firm's innovation index score and its economic health.
3. They conducted statistical analyses to determine the relationship between the innovation scores of businesses in a region and the economic health of that region.

To create the innovation index, the researchers used 15 specific questions that were part of the REIS. The questions were particularly relevant to innovative practices and approaches used by businesses. For example, businesses were asked:

- Which sources [of information] have been most valuable for this firm?
- How often does this business monitor customer satisfaction...?
- How often are processes changed to fix problems identified through customer complaints?

- In 2013, what percent of this business's sales came from new or significantly improved goods or services?  
(For a complete list of the 15 questions used in this study, see: <http://bit.ly/2YiqBP4>.)

Using a statistical technique known as factor analysis, they crafted a single "innovation index," which allowed them to look at a business's responses to these questions as a collective measure of its innovation activity. They assigned each business an innovation index score from 0 to 1, with 1 representing the most innovative businesses.

Next, the researchers examined the relationship between a firm's innovation index score and its economic health, measured as hourly wage paid to workers, market growth for the business's products/services, and benefits that the business provides its workers.

Lastly, they examined the relationship between a region's economic health and the innovation scores of the businesses located in that region. They did this for 581 multi-county regions, focusing on: median household income, unemployment

rates, poverty rates, and the percent of the population employed in creative sectors.<sup>2</sup>

## Research Findings

### *Innovation Index*

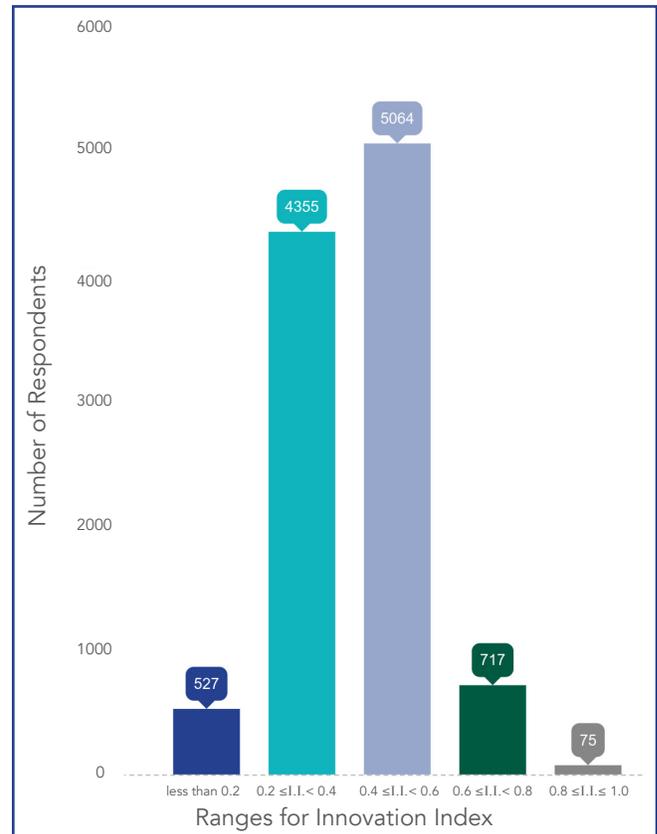
The Innovation Index developed in this study differs from more traditional measures of innovation, because it captures a wider array of activities that may result in new goods or services. The index also allows for comparisons across industries and geographies. For example, businesses in the information technology sector scored higher on the innovation index than all industries on average, while mining and transportation firms scored much lower. The researchers also found that while urban businesses were not more innovative than the national average, rural businesses were significantly less innovative.

The innovation index also allows for innovation to be measured along a continuum. Table 1 shows the distribution of innovation index scores for all the businesses in their sample.

### *How does innovation relate to the economic health of a business?*

The researchers found that innovation was positively correlated to all three indicators of business economic health (hourly wages, market growth, and employee benefits). For example, a high innovation score was associated with higher hourly wages. However, the effect was not as strong in rural areas. In other words, the returns to innovation as measured by wage rates, although still positive, tend to be lower in rural areas than in urban areas. On the other hand, rural businesses with high innovation scores were more likely to be in a growing market than urban businesses with

Table 1. Distribution of Innovation Index



high innovation scores. Thus, the research demonstrated that there are meaningful differences in the relationship between innovation and firm-level outcomes across rural and urban locations.

### *How does innovation relate to the economic health of a region?*

The researchers used multiple approaches to identify the relationship between innovation and a region's economic health. They found that a higher innovation index was associated with higher median household income, more population engaged in creative-class occupations, and lower poverty levels. The researchers also found that spillover effects from innovation may occur, with a region benefitting from high levels of innovation by its neighbor. The results indicate that several positive economic outcomes at the regional level are associated with businesses being engaged in more innovative activities as defined by the innovation index.

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<sup>2</sup> From the paper: "The USDA-ERS (2014) defines the creative class as those employed in 'creative' occupations, specifically occupations 'developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.'"

## Conclusion/Discussion

This study provides a new tool for measuring innovation across a wide variety of businesses, industries, and geographies. Innovation, even when defined more broadly than it has been historically, is found to be associated with economic benefits at both the business and the regional level. These findings do not indicate that innovation causes these benefits, as this research only demonstrates correlations. Still, the findings have important implications for policy makers at all levels of government.

The authors write:

*“First, the types of innovation supported by federal, state, and local initiatives should not focus solely on traditional avenues such as formal research and development or patent-oriented programs... This research has shown that defining innovation in a broader context (with activities more typical of many small businesses) is still associated with positive impacts for both firm-level and regional-level economic measures. Thus, future policies should consider how to promote several of the specific factors in the ‘innovation index.’”*

For example, given the weight that customer interactions played in the development of the innovation index, the authors encourage companies to foster new methods for assessing customer satisfaction to promote innovation. ❖

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