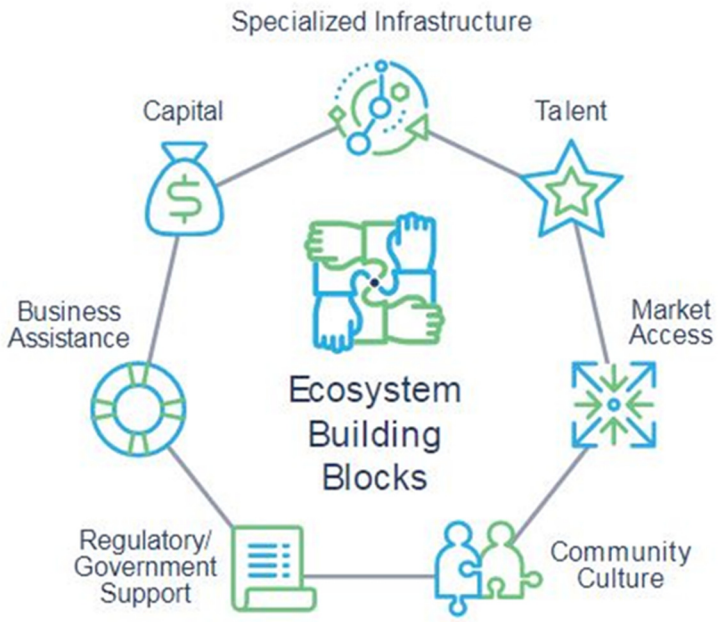

Entrepreneurial Ecosystems in Appalachia

Literature Review

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Prepared for:

ARC APPALACHIAN REGIONAL COMMISSION

EntreWorks Consulting with the Center for Rural Entrepreneurship and the Center for Regional Economic Competitiveness

About This Report

This report was prepared under contract to the Appalachian Regional Commission on a project entitled *Documenting and Strengthening Entrepreneurial Ecosystems in Appalachia* (CO-18608-2016). The project was led by EntreWorks Consulting, in partnership with the Center for Regional Economic Competitiveness and the Center for Rural Entrepreneurship. The Appalachian Regional Commission (ARC) is an economic development agency of the federal government and 13 state governments focusing on 420 counties across the Appalachian Region. ARC's mission is to innovate, partner, and invest to build community capacity and strengthen economic growth in Appalachia to help the Region achieve socioeconomic parity with the nation. www.arc.gov.

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This report is part of a larger project entitled *Entrepreneurial Ecosystems in Appalachia*. Additional project materials can be accessed at www.arc.gov, as well as the project's website: http://arceco.creconline.org.

Introduction

Over the past twenty years, supporting local entrepreneurs has become a core part of the economic developer's tool kit. This position actually represents a major shift from past practices, which placed a nearly exclusive focus on the use of tax breaks and other incentives to recruit relocating businesses to new locations. The Appalachian Regional Commission (ARC) played a big part in this policy shift. Its Entrepreneurship Initiative, which operated from 1997 to 2005, was one of the Federal government's first programs to invest significant funds into local, regional and state entrepreneurial development initiatives.[1]

Since its initial investments via the Entrepreneurship Initiative, the Commission has continued to support its partners in efforts to stimulate new and growing business development across Appalachia. Over this long two-decade period, the benefits of supporting local entrepreneurs have become better understood by elected officials, economic developers, community leaders and the general public. Meanwhile, the practice of entrepreneurial development has evolved. New ideas have emerged, based on new research and learning from ongoing projects in the field across the globe. The concept of the "entrepreneurial ecosystem" is at the heart of these new ideas and approaches to supporting and promoting entrepreneurship. This review of the literature examines the concept of the entrepreneurial ecosystem. It reviews the emergence and subsequent history of the concept. We begin by asking: What is an ecosystem and why does it matter? We next turn to a brief historical review of where and how the ecosystem concept and the overall focus on entrepreneurial development align with broader trends in the field of economic development in general and with a specific focus on Appalachia. Finally, we conclude with a detailed review of the characteristics and policy components that experts and practitioners consider to be the core building blocks of successful and sustainable entrepreneurial ecosystems.

What Is an Entrepreneurial Ecosystem and Why Does It Matter?

The concept of the entrepreneurial ecosystem is relatively new, first emerging about ten years ago and gaining more popular traction around 2010.[2] The concept emerged as part of a wider critique of

[1] For background, see Deborah Markley et al., *Creating an Entrepreneurial Appalachian Region: Findings and Lessons from an Evaluation of the Appalachian Regional Commission's Entrepreneurship Initiative, 1997-2005."* Report prepared for the Appalachian Regional Commission, 2006.

[2] Early popular discussions include Brad Feld, Startup Communities (New York: John Wiley & Sons, 2012); Daniel Isenberg, "The Big Idea: How to Start an Entrepreneurial Revolution," Harvard Business Review, June 2010; Victor W. Hwang and Greg Horowitt, *The Rainforest: The Secret to Building the Next Silicon Valley*, (Los Altos Hills, CA: Regenwald, 2012); Erik R. Pages et al., "The Rise of Entrepreneurship as an Economic Development Strategy," in David Hart (ed.), *The Emergence of Entrepreneurship Policy: Governance, Start-Ups, and Growth in the U.S. Knowledge Economy.* (Cambridge: Cambridge University Press, 2003).

economic and small business development strategies which had been primarily focused on increasing the number of start-up businesses. Increasingly, researchers were noting that small business policy and entrepreneurship policy were not synonymous. Thus, many traditional tools used to support small business, such as subsidized loans or business planning assistance, were helpful for new start-ups, but did not help these firms "scale up" to become high growth or gazelle businesses. Critics contended that this focus on the "quantity" of new businesses was misplaced, especially if job and wealth creation were viewed as core policy goals. They instead argued that policy makers should focus their attention on growth companies, i.e. ventures with high potential to grow, create jobs and generate positive economic spillovers.

This shift in attention from start-ups to growth entrepreneurs and from quantity to quality also led to a change in research and policy priorities.[3] Earlier entrepreneurship research, dating back to the 1970s and 1980s, placed heavy emphasis on issues such as an entrepreneur's motivation, personal characteristics, or key components of the entrepreneurial process such as business planning, raising capital or managing employees. All of these research emphases tended to focus on the entrepreneur or the company in isolation, neglecting key outside factors such as the emergence of new market opportunities or the role of networks in supporting company growth.

As researchers shifted their focus from personality traits and internal motivations of business owners to a new emphasis on external factors affecting business growth, a whole host of new insights emerged. These were further supported by the real-life experience of high growth companies and the emergence of technology-rich entrepreneurial hotbeds like Silicon Valley, Seattle and Boulder. Researchers examining these regions placed heavy emphasis on the role of local business culture in creating an "entrepreneur friendly" environment.[4]

All of these factors created an environment where the concept of the entrepreneurial ecosystem quickly took hold. The concept of the "ecosystem" was consciously adopted from biology for a variety of reasons. For some, the entrepreneurial ecosystem is similar to a biological ecosystem in that it is composed of "dynamically stable networks of interconnected organisms and inorganic resources that constitute their own distinct domain of analysis."[5] For most, the connection is slightly less specific, with ecosystems simply referring to the fact that certain environments are especially conducive to supporting new and growing companies. [6]

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[3] For recent reviews of the literature, see Erik Stam, "Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique," Utrecht University School of Economics Discussion Paper No. 15-07, 2015; and Yana Borisenko and Ron Boschma, "A Critical Review of Entrepreneurial Ecosystems: Towards a Future Research Agenda," Utrecht University Urban and Regional Research Center, Papers in Evolutionary Economic Geography No. 16-30, 2016.

[4] AnnaLee Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, (Cambridge: Harvard University Press, 1994)

[5] Philip E. Auerswald, "Enabling Entrepreneurial Ecosystems," Kauffman Foundation Research Paper, October 2015.

[6] Colin Mason and Ross Brown, "Entrepreneurial Ecosystems and Growth Oriented Entrepreneurship," Background Paper prepared for a Workshop organized by the Organization for Economic Cooperation and Development (OECD) LEED Program and the Dutch Ministry of Economic Affairs, January 2014, p. 8.

The concept of entrepreneurial ecosystem is not completely new, and it contains few new ideas or concepts. Many of the core elements or strategies around ecosystem development have been widely understood for decades. However, the concept of ecosystem serves as a useful organizing framework that emphasizes the importance of systems and networks in fostering entrepreneurship. In this view, there is no one single cause or factor that leads to an entrepreneur's (or a region's) success. It is the connections and interdependencies of multiple factors that matter.

Defining Entrepreneurial Ecosystems

Given the huge and growing research literature on entrepreneurial ecosystems, it is difficult to identify one consensus definition. For our purposes, we will use the all-encompassing definition developed by Mason and Brown in their research on behalf of the Organization for Economic Cooperation and Development (OECD). They define an entrepreneurial ecosystem as:

> *a set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organizations (e.g., firms, venture capitalists, business angels, banks), institutions (e.g., universities, public sector agencies, financial bodies) and entrepreneurial processes (e.g., the business birth rate, numbers of high growth firms, levels of 'blockbuster entrepreneurship', number of serial entrepreneurs, degree of sell-out mentality within firms and levels of entrepreneurial ambition) which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment.*[7]

This admittedly clunky definition captures many of the key components of entrepreneurial ecosystems which will be further explored below. First, it notes the wide variety of actors involved in the ecosystem, ranging from entrepreneurs themselves to various support institutions. Second, it acknowledges the importance of entrepreneurial processes and the different stages of new and growing businesses. Lastly, it recognizes that both formal and informal connections matter.

Why does it Matter? Benefits of Entrepreneurial Ecosystems

While experts may differ on specific definitions of entrepreneurial ecosystems, most agree that these ecosystems matter. They make a significant difference in terms of both the quantity and quality of entrepreneurial activity. Regions with strong entrepreneurial ecosystems tend to have higher start-up rates as well as more success in spawning larger numbers of high growth companies.

Analysts have long known that entrepreneurial ventures are the primary creators of new jobs in the US economy, but the latest research has further refined these results. When it comes to job and wealth creation, not all entrepreneurs are created equal. Haltiwanger et al. find that most small firms and

[7] Mason and Brown, p. 5.

start-ups fail or do not create new jobs.[8] However, a small portion of new firms do grow quickly and "account for the long lasting contribution of start-ups to job growth."[9] Together, new firms and high growth firms (defined as those growing employment by 25% per year) account for about 70 percent of US firm-level job creation in a given year.[10] Overall, this group of high growth companies represents about 15% of US firms and drives 50% of total gross job creation. Similar results can be found in other developed economies.[11]

Another way to consider the job-creating impact of entrepreneurs is by looking at employer firms – a subset of new firms that employ people beyond the owner/entrepreneur. Using both U.S. Census Bureau and Bureau of Economic Analysis data series, Reedy and Litan identified two important trends. One, employer firms are starting with fewer employees (an average of 7.5 jobs per new establishment in the 1990s vs. 4.9 jobs per new establishment in 2009). Two, businesses that survive beyond the first year are adding jobs at a historically slower rate.[12] They conclude that increasing self-employment, particularly associated with contract employment, is not the most effective target for entrepreneurship strategies, since many of these enterprises may not grow and employ others. Rather, "the clear challenge for the U.S. economy instead is to *start more employer businesses*, *ensure that they are starting larger*, and *nurture their growth.*"[13]

Beyond their benefits for job creation, entrepreneurial ecosystems also bring other regional benefits. As Auerswald has noted, ecosystems "promote diversity, encourage dynamism, and drive deal flow."[14] Ecosystems help regions spawn a larger number of entrepreneurs (diversity), which spurs more competition and innovation (dynamism), which in turn creates new opportunities (deal flow) for new entrepreneurs, as well as their employees, customers, and investors.

Entrepreneurship researchers view regional ecosystems as providing both short-term and long-term benefits. Over the short term, entrepreneurial ventures are more likely to start and more likely to grow in regions with robust ecosystems in place. This dynamism brings many other benefits beyond economic growth; it also generates a "buzz" about the region, attracting more entrepreneurs, more investment, and more attention. Over the long term, this virtuous cycle feeds on itself, as early

[8] John Haltiwanger, Ron S. Jarmin, Robert Kulick, and Javier Miranda, "High-Growth Young Firms: Contribution to Job, Output, and Productivity Growth," National Bureau of Economic Research Working Paper, September 2016. Available at: http://www.nber.org/chapters/c13492.pdf.
[9] *Ibid*, p.1
[10] Ryan Decker, John Haltiwanger, Ron Jarmin, and Javier Miranda, "The Role of Entrepreneurship in U.S. Job Creation and Economic Dynamism," *Journal of Economic Perspectives*, Vol. 28, No. 3, Summer 2014, pp. 3-24. Available at: http://econweb.umd.edu/~haltiwan/JEP_DHJM.pdf.
[11] Organization for Economic Cooperation and Development, *Entrepreneurship at a Glance 2016*, (Paris: OECD, September 28, 2016) p. 26. Available at: http://www.oecd.org/std/business-stats/entrepreneurship-at-a-glance-22266941.htm.
[12] E.J. Reedy and Robert E. Litan, "Starting Smaller, Staying Smaller: America's Slow Leak in Job Creation," Kauffman Foundation Research Paper, July 2011.
[13] Reedy and Litan, 2011, p. 16
[14] Auerswald, p. 10.

generations of entrepreneurs spawn successors and generate other spillover benefits in the form of new companies, new jobs and other economic and cultural benefits.

Entrepreneurship and Economic Development

This growing recognition of the importance of entrepreneurs and their critical role in spurring job and wealth creation soon spilled over into both the theory and practice of economic development. In the words of Indiana University's David Audretsch, entrepreneurship became a critical cog in the "strategic management of places."[15]

The process of altering economic development priorities and practices moved slowly, and it is still underway today. [16] Researchers and analysts of the history of US economic development policies often refer to different "waves" of policy priorities (See Figure 1).[17] The first wave, which emerged in the 1930s and dominated the field for decades, emphasized business recruitment and attraction, i.e., what critics often referred to as "smokestack chasing." In this phase, typical policy tools included low cost loans or grants, tax incentives and other inducements to encourage firms to relocate facilities and operations.

Second-wave economic development strategies first emerged in the 1980s and focused on how best to retain and support existing companies. Policy tools took many forms, including R&D investments, technical assistance to businesses, capital access and business incubation, among others. Pennsylvania's Ben Franklin Technology Partnership program, started in the early 1980s and still operating today, serves as a paradigmatic example of a second wave economic development effort.[18]

Third wave efforts first emerged in the 1990s and take a variety of forms. In fact, there is some dispute in the literature about what constitutes third wave economic development.[19] While some debate persists, most observers agree that the third wave embraces a more holistic approach that seeks to create a more supportive economic development marketplace. This environment is intended to be more supportive and nurturing to new and existing firms. Key third wave policy tools include public-private partnerships, local networks, industry cluster strategies and workforce-focused sectoral strategies.

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[15] David E. Audretsch, *Everything in its Place: Entrepreneurship and the Strategic Management of Places*. (Oxford: Oxford University Press, 2015).
[16] For a brief history of this process, see Pages et al in Hart (ed) *The Emergence of Entrepreneurship Policy*.
[17] This concept of waves first emerged from work of Peter K. Eisinger, *The Rise of Entrepreneurial State*. (Madison: University of Wisconsin Press, 1988).
[18] To learn more about the Ben Franklin Technology Partnership, visit www.benfranklin.org
[19] For a discussion, see Ted K. Bradshaw and Edward J. Blakely, "What are 'Third Wave' State Economic Development Efforts? From Incentives to Industrial Policy," *Economic Development Quarterly*, Vol 13, No. 3 (1999), pp. 229-244. Some experts also posit the emergence of a 4th or even 5th wave of ED thinking that incorporates some of these new ideas.

FIGURE 1: Waves of Economic Development Approaches

Era	Industrial Recruiting (1950s to 1980s)	Cost Competition (Early 1980s to Early 1990s)	Regional Competitiveness (Early 1990s to Present)
Driver	Export base	Scale Economies	Innovation & Entrepreneurship
Strategies	Financial incentives to firms Industrial parks	Industrial consolidation and cost cutting Deregulation	Entrepreneurship Clusters Commercial research`
Keys to Success	Government funds for subsidies and tax breaks Industrial infrastructure	Health of existing industries	Distinct regional assets such as industry specializations, human capital, higher education & amenities

Source: Adapted from Mark Drabenstott, "A Review of the Federal Role in Regional Economic Development," Background Paper, May 2005.

The various strategies and policy tools used in each of these "waves" are not mutually exclusive. They co-exist and seek to address different policy goals and support different types of companies and customers. Indeed, successful economic development organizations typically deploy a mix of strategies that deploy tools from all three "waves."

Ideas from each of the "waves" have some relevance to entrepreneurial development strategies. Efforts to recruit entrepreneurs, such as found in the Startup Chile program, hail from the first wave, and traditional business incubation programs hail from the second wave. Local networking programs and new approaches to talent development can be traced to ideas and policies from the third wave of economic development thinking.

The concept of an entrepreneurial ecosystem thus embraces ideas from a variety of sources and is typically considered part of what some analysts call next wave thinking in economic development.[20] While it includes many policy tools and ideas from other "waves," it envisions a different approach that targets different "customers," using different policy tools, and seeks to generate different kinds of policy outcomes.

When compared to earlier waves of economic development practice, entrepreneur-focused economic development efforts target a different customer: the entrepreneur. Previous economic development efforts focused on encouraging the relocation of existing firms or the development of new greenfields locations by larger corporate players. Different tools are also deployed. The traditional economic development tool kit of tax incentives and other strategies to reduce business operating costs offers less direct benefits to new and emerging entrepreneurial firms who tend to have more interest in local

[20] Bradshaw and Blakely.

quality of life, access to talent and strong connections to customers and partners.[21] Finally, desired policy outcomes also differ. Entrepreneur-focused economic development certainly seeks to support job creation, much like traditional business recruitment efforts. Yet, it also seeks to support other outputs and outcomes, such as increasing business start-up and growth rates, increasing local investment in local firms and building a more robust regional ecosystem to support entrepreneurs.

Unique Challenges Related to Rural Entrepreneurship

Many of the basic ideas and concepts related to entrepreneurial ecosystems were developed to describe aspects of high-technology hotspots or densely populated metropolitan areas. In fact, for many researchers, density is itself a key characteristic of effective ecosystems.[22] As a result, few of the best known studies of entrepreneurial ecosystems include a specific focus on rural ecosystems. However, there is a robust literature that examines broader issues related to rural entrepreneurship.[23] This research stream is especially relevant to the Commission's work as 42 percent of the Appalachian Region is considered rural. In comparison, only 20 percent of the US is deemed rural.

Rural entrepreneurship research typically emphasizes a number of core themes. First, the research often stresses the unique characteristics of rural entrepreneurs. Rural entrepreneurs are more likely to run smaller businesses or to operate multiple businesses at the same time. Rural entrepreneurs are also more likely to start businesses out of necessity, as opposed to the desire to capture new market opportunities. As such, issues such as self-employment, microenterprise or the needs of necessity or lifestyle entrepreneurs are commonly studied. [24]

Second, researchers typically review and assess unique constraints facing rural entrepreneurs. Pressing constraints include distance to markets, challenges in accessing peer networks, and more difficulty in finding a skilled workforce and accessing other specialized services and sources of finance.[25] A recent review of numerous rural-targeted entrepreneurship initiatives concludes that, while the benefits of promoting entrepreneurship in rural places may be great, the costs are high as well. Rural places lack the agglomeration economies that often benefit entrepreneurs – access to robust input markets,

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[21] Endeavor Insight, "What do the Best Entrepreneurs Want in a City?" Endeavor Insight Research Report, February 2, 2014. Available at: https://issuu.com/endeavorglobal1/docs/what_do_the_best_entrepreneurs_want.

[22] Dane Stangler and Jordan Bell-Masterson, "Measuring an Entrepreneurial Ecosystem," Kauffman Foundation Research Report, March 2015.

[23] For recent examples, see Stephan J. Goetz, Mark Partridge, and Steven C. Deller, "Evaluating Rural Entrepreneurship Policy," Northeast Center for Rural Development Paper No. 46, June 28, 2009; Maria Lucia Pato and Aurora A.C. Teixeira, "Twenty Years of Rural Entrepreneurship Research: A Bibliometric Survey , University of Porto FEP Working Papers No. 516, December 2013.

[24] Anil Rupasingha and Stephan J. Goetz, "Self Employment and Local Economic Performance: Evidence from U.S. Counties," Papers in Regional Science, Vol. 92, Issue 1 (March 2013), pp. 141-161.

[25] Maria Figueroa-Armios, Brian Dabson and Thomas Johnson, "Rural Entrepreneurship in a Time of Recession," *Entrepreneurship Research Journal*, Vol 2, No. (2012), pp. 1-29.

knowledge spillovers from working in close proximity to other entrepreneurs – placing rural entrepreneurs at a relative disadvantage.[26]

Third, a robust research literature assesses the development of key industries and industry clusters that often present promising entrepreneurial opportunities in rural America. In recent years, a number of important books and articles have assessed entrepreneurship-related prospects in sectors such as tourism, health care, manufacturing, recreation and food systems.[27] Numerous researchers have assessed the role of scenic amenities in spurring rural development.[28]

Finally, researchers are especially interested in the impact of entrepreneurship on rural development and wealth creation.[29] Here, the evidence is mixed. Much evidence suggests that entrepreneurship and self-employment rates are higher in rural America. However, when compared to their urban counterparts, rural businesses are much less likely to grow and generate significant community benefits in terms of job or wealth creation. Thus, the primary challenge facing most rural US regions involves this issue of supporting growth entrepreneurs. In other words, most rural economic developers want to support scale-up businesses, not just start-up businesses.

Economic Gardening is a prime example of an intervention targeted to growth versus startup entrepreneurs. Developed in Littleton, Colorado and now an initiative of the Edward Lowe foundation, economic gardening focuses on providing the resources and assistance needed by Stage 2 businesses, defined as firms with 10-99 employees and annual revenues of at least $1 million.[30] Several Appalachian communities are using this model. For example, the GROW Kentucky program provides growth entrepreneurs with access to market research and intelligence designed to help them access new markets and more strategically allocate resources needed for growth. In order to make these resources more accessible to rural entrepreneurs, economic gardening services are offered through both the Small Business Development Centers and the Community and Economic Development Initiative of the University of Kentucky, which has an effective network through Cooperative Extension that reaches into more rural communities.

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[26] See Goetz, Partridge and Deller.

[27] See, for example, Sarah A.Low, Aaron Adalja, Elizabeth Beaulieu, Nigel Key, Steve Martinez, Alex Melton, Agnes Perez, Katherine Ralston, Hayden Stewart, Shellye Suttles, Stephen Vogel, and Becca B.R. Jablonski. Trends in U.S. Local and Regional Food Systems, AP-068, U.S. Department of Agriculture, Economic Research Service, January 2015; Association for Enterprise Opportunity, Regional Flavor: Marketing Rural America's Unique Assets," AEO Report, 2006. (Available at: http://fieldus.org/Publications/RegionalFlavor.pdf); Appalachian Regional Commission, "Entrepreneurial Appalachia: Case Studies in Evolving Economic Sectors," ARC Report, November 2013.

[28] See, for example, Jason R. Henderson and Kendall McDaniel, "Natural Amenities and Rural Economic Growth: A Sector Analysis," *The Review of Regional Studies*, Vol. No. 1 (2005), pp. 80-96; Richard Reeder and Dennis Brown, *Recreation, Tourism and Rural Well-Being*, USDA Economic Research Service Report ERR-7, August 2005.

[29] For a review, see Sarah A. Low, "Entrepreneurship and Rural Wealth Creation," in John L. Pender et al, *Rural Wealth Creation*, (New York: Routledge, 2014.)

[30] Chris Gibbons, "Economic Gardening, *Economic Development Journal*, Summer 2010, Vol.9, No. 3, 5-10.

What's Unique about Supporting Entrepreneurship in Appalachia?

These unique challenges found in the field of rural entrepreneurship are often more pronounced in Appalachia. [31] Many Appalachian communities are home to strong regional support ecosystems and have succeeded in spurring significant upticks in entrepreneurial activity. However, other regions have struggled to develop effective support systems for business start-up and scale-up. For example, many regions in Central Appalachia continue to struggle with economic challenges reflected in low business start-up rates and higher rates of business failure. Meanwhile, several regions, especially growing regional centers like Asheville, Chattanooga, and Huntsville, are developing reputations as start-up hubs.

A number of factors appear to be impeding the development of strong entrepreneurial ecosystems in many parts of Appalachia. These include limited resources in terms of funding, staffing and outside support resources such as coaches, consultants and other specialists. In addition, the comparatively low educational attainment levels found in many Appalachian communities also contributes to lower start-up and business growth rates. [32] Finally, Appalachia faces many structural challenges, such as distance to markets, which often impede rural entrepreneurship more generally.

These challenges and impediments co-exist with a number of structural advantages for Appalachia's entrepreneurs. Relative proximity to large population centers may be a core advantage for Appalachia. In this case, distance offers both constraints and opportunities for Appalachian entrepreneurs. They may lack the dense markets and large workforce found in urban centers of the East Coast, but many parts of Appalachia can easily reach these urban centers within a few hours. In addition, the region can capitalize on its world class scenic, recreational and cultural amenities which are in high demand across the US and worldwide. Finally, the relatively lower cost of doing business in Appalachia can serve as a competitive advantage in terms of attracting/supporting entrepreneurs and established businesses.

The Commission's recent investments in entrepreneurship have consciously tied entrepreneurial support to specific local assets or competitive advantages. This linkage is made explicit in ARC's 2016-2020 Strategic Plan which calls for investments to "support the start-up and growth of business, especially in targeted sectors . . . (such as) manufacturing, diversified energy, tourism, local food systems, and health care."[33] Examples of this approach abound across Appalachia. Southwest Virginia's Crooked Road Music Trail is one of the best known examples. Efforts to promote the trail as a tourist destination have been accompanied by large scale investments in helping local people start new businesses in tourism, recreation and food-related businesses.

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[31] For background, see Markley et al., 2006.

[32] Kelvin Pollard and Linda A. Jacobsen, *The Appalachian Region: An Overview from the 2010-2014 American Community Survey*, Report prepared for the Appalachian Regional Commission, April 2016. Available at: https://www.arc.gov/research/researchreportdetails.asp?REPORT_ID=129.

[33] "Investing in Appalachia's Future," *The Appalachian Regional Commission's Five-Year Strategic Plan for Capitalizing on Appalachia's Opportunities 2016–2020,* p. 9

Characteristics of Entrepreneurial Ecosystems

The research literature makes a compelling case that entrepreneurial ecosystems matter, but it is also essential to specify the key characteristics of these ecosystems. How do we define these ecosystems and how do we measure and assess them? Unfortunately, there is no consensus answer to this question. Researchers agree that an entrepreneurial ecosystems approach focuses on "the role of social context in allowing (or restricting) entrepreneurship."[34] Beyond this basic agreement, they offer differing assessments of key components or factors. For example, Isenberg presents nine principles for creating an ecosystem, while the World Economic Forum presents eight pillars for successful ecosystems. In contrast, Feld offers his own list of nine key attributes.[35]

There is much overlap in these varied listings and many of these pillars or principles refer to policy or program elements which will be discussed later in this review. But, before discussing these policy elements, we must address a broader question. What characteristics define a robust ecosystem? In terms of characteristics or attributes, we will utilize a methodology promoted by the Kauffman Foundation in its 2015 report entitled *Measuring an Entrepreneurial Ecosystem*.[36] This analysis identifies four indicators of entrepreneurial ecosystem vibrancy: density, fluidity, connectivity and diversity. Density refers to the number of entrepreneurs in a given location. Entrepreneurial density refers not only to sheer number of entrepreneurs, but it can also include additional measures that focus on the number of businesses in certain categories, such as new firms, high-growth firms or firms operating in certain industries or clusters. Places with a higher relative density of entrepreneurs are more likely to benefit from a similar density in a higher quality workforce, peer networks and other support mechanisms. Density provides many other benefits for entrepreneurs who have access to larger markets and a larger scale of activities. For rural areas, the correspondingly lower density levels represent one of the primary challenges in supporting entrepreneurial development.

Fluidity refers to the ability of entrepreneurs to connect with one another and with other partners, stakeholders or customers who can contribute to company start-up and growth. This measure typically assesses several regional characteristics, including population flux, labor market allocation and the number of high growth firms. Fluidity may be strongly affected by regional "cultures," i.e. are local business practices and mores open or closed to new ideas and practices? Saxenian's contrast between the open culture of Silicon Valley and the more closed business culture of Massachusetts' Route 128 Corridor represents a classic depiction of the importance of fluidity in spurring innovation and

[34] Stam 2015, p. 5

[35] See Isenberg, Feld, and World Economic Forum, "Entrepreneurial Ecosystems Around the Globe and Company Dynamics," Report Summary for the Annual Meeting of the New Champions, September 2013.

[36] Stangler and Bell-Masterson. The Kauffman Foundation has subsequently funded a number of case studies that use this typology to assess the strength and vitality of US regional ecosystems. For an example, see Caroline Taich, Merissa Piazza, Kara Carter, and Alexa Wilcox, "Measuring Entrepreneurial Ecosystems," (2016) Cleveland State University Urban Publications, 12-2016.

entrepreneurship.[37] In more robust ecosystems, firms are more likely to collaborate with one another and the flow of talent, ideas and businesses across firms is more pronounced.

At the national level, open labor markets are especially important. Nations with restricted labor mobility also tend to rank lower on various measures of entrepreneurial activity. For example, a number of researchers point to labor market factors as a core factor in France's comparatively lower levels of entrepreneurial activity. Rigidity in hiring and firing rules complicate a new business' ability to grow and also restrict the ability of the unemployed and underemployed to start new companies.[38] Recently, some researchers have pointed to reduced labor mobility rates as one factor contributing to the US's recent slowdown in business dynamism.[39]

Fluidity is often associated with the concept of entrepreneurial spawning or recycling,[40] i.e. a process whereby an existing company gives birth to other ventures started by former employees or partners. Places with robust ecosystems can often trace their development back to a small handful of entrepreneurs or company leaders who in turn helped spawn new firms as serial entrepreneurs, investors, mentors or partners. The research literature contains numerous case studies of these patterns in diverse communities including San Diego, Silicon Valley, Kansas City, and even in smaller communities like Boise or Portland, Oregon.[41] In these regions, entrepreneurial champions have been a key part in the development of strong and sustained ecosystems.

Connectivity is a close corollary of fluidity. Fluidity tracks the ability/capacity to move ideas and concepts in a region; connectivity reflects the presence of networking organizations or individuals who serve nodes or hubs of the regional ecosystem. Kauffman Foundation researchers suggest that ecosystem connectivity can be measured in the number and density of regional support programs, the region's history of business spinoffs and the presence of regional deal-maker networks.

Connectivity refers to a relatively complex set of assets. Sheer numbers of programs matter less than the connections between them. As Stangler and Bell-Masterson note:

> Recent years have seen a proliferation of entrepreneurship education and training programs around the world, but the mere existence of programmatic resources is not the same thing as effectiveness, let alone vibrancy. Connections matter, and a dense network of connections, among a small number of programs, is arguably more important than a sparse network among a

[37] Saxenian.
[38] David B. Audretsch, Roy Thurik, Ingrid Verheul, and Sander Wennekers, *Entrepreneurship: Determinants and Policy in a U.S.-European Context,* Springer US, 2013.
[39] Mike Konczal and Marshall Steinbaum, "Declining Entrepreneurship, Labor Mobility and Business Dynamism: A Demand-Side Approach," Roosevelt Institute Research Report, July 21, 2016.
[40] Paul Gompers, Paul, Josh Lerner and David Scharfstein. "Entrepreneurial Spawning: Public Corporations and the Formation of New Ventures, 1986-1999." *Journal of Finance* 60, 2 (April 2005): 577-614.
[41] Heike Mayer, *Entrepreneurship and Innovation in Second Tier Regions.* (Elgar, 2011). For a timeline of Silicon Valley's historical development, visit http://www.pbs.org/wgbh/americanexperience/features/timeline/silicon/?flavour=mobile.

larger number.[42]

Connectors or hubs can vary greatly by region or industry sector. In some communities, a specific individual may serve as a core connector. In other regions, an organization—formal or informal—plays this role. In all cases, the best connectors serve in an "honest broker" role that seeks to build a broader culture of give back and sharing which in turn helps sustain the further development of the regional ecosystem.

Figure 2: Mapping Ecosystems

Many regions have developed maps of their entrepreneurial ecosystems. An example from Kansas City can be seen below. (Source: http://wikikc.org/)

Measuring the connectivity of a region can be challenging. Recent advances in social network analysis are now being used to better understand how ecosystems help build and capitalize on this connectivity. Examples of research using this methodology include Feldman and Zoller's work on "deal makers" and Holley's work on network weaving in Appalachia Ohio. [43]

Diversity refers to a region's entrepreneurial vibrancy. Is the community or region open to a diverse mix of specializations, businesses and people? Several measures matter here: the presence of multiple economic specializations, the immigrant share of the local population and the region's economic mobility.

[42] Stangler and Bell-Masterson p. 5

[43] Maryann Feldman and Ted D. Zoller, "Dealmakers in Place: Social Capital Connections in Regional Entrepreneurial Economies," *Regional Studies*, Vol. 45, Issue 1 (January 2012), pp. 23-27; June Holley, *Network Weaving Handbook*, 2012. Available at: http://www.networkweaver.com/product/network-weaving-handbook/

A region's economic diversification remains an essential part of this aspect of ecosystems. Regions with multiple specializations present opportunities for entrepreneurs in multiple industries and disciplines. Moreover, these regions may also enjoy the benefits of opportunities and connections that span disciplines and which combine ideas and concepts from multiple industries and focus areas. Past research sponsored by the Commission suggests that regions with higher levels of economic diversity do perform better on many measures of economic growth and activity.[44]

In addition to diversity in economic specializations, effective ecosystems also tend to be home to more diverse populations. They are often attractive locations for new immigrants and for those who work in creative class occupations and fields.[45] An ability to attract new immigrants is especially important as immigrants are most likely to start new businesses. They also show evidence of a higher than average propensity to build high-growth businesses when compared to native residents.

Diversity need not always refer to one's background or ethnicity; it can also refer to a diversity of ideas. Does a region encourage and support different ways of thinking or behaving? Openness to diverse ideas is also an important characteristic of robust ecosystems. For this reason, university or college towns tend to have strong capacities related to entrepreneurial ecosystems. Within Appalachia, communities such as Knoxville, Starkville, Pittsburgh, and Clemson all rely on university assets as core building blocks for entrepreneurial development.

Many regions of Appalachia still face particular challenges on this measure of ecosystem diversity. Many Appalachian communities, especially in Central Appalachia, are among the least diverse in the US in terms of economic diversity.[46] In addition, many parts of the region suffer from significant outmigration. While this outmigration is often characterized as a "brain drain," it might be more accurately described as a loss of entrepreneurial talent. Those inspired to leave a rooted community may have a higher acceptance of risk and other characteristics associated with entrepreneurial talent.[47] While there is more research to be done to explore this phenomenon, population loss may create an even more challenging environment for ecosystem development if those leaving have a high propensity for entrepreneurship. Similarly, many of these less diverse places struggle to attract new residents or new immigrant populations. These shortcomings create additional challenges for the development of stronger ecosystems in Appalachia.

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[44] For data on economic diversity across the Appalachian region, see http://www.arc.gov/assets/research_reports/EconomicDiversityinAppalachiaCompilationofAllReports.pdf. Hereafter referred to as *Economic Diversity in Appalachia*.

[45] For background, see Max Nathan and Neil Lee, "Cultural Diversity, Innovation, and Entrepreneurship: Firm Level Evidence from London," *Economic Geography*, Vol. 89, No. 4 (2013), pp. 367-394; Vivek Wadwha, AnnaLee Saxenian, and F. Daniel Siciliano, "America's Immigrant Entrepreneurs: Then and Now," Kauffman Foundation Research Report, 2012; Richard Florida, Patrick Adler, and Charlotta Melander, The City as Innovation Machine, University of Toronto Martin Prosperity Research Paper Series 2016-MPIWP-002, July 2016.

[46] *Economic Diversity in Appalachia*.

[47] For discussion of these issues, see Patrick J. Carr and Maria Kefalas, *Hollowing Out the Middle: The Rural Brain Drain and What it Means for America*, (Boston: Beacon Press, 2009).

All of these characteristics contribute to a core aspect of successful entrepreneurial ecosystems: they are information-rich. The region has a strong base of knowledge about the business start-up and growth process. This information typically resides in the minds of entrepreneurs, business support providers, educators and investors. This knowledge is also easy to access via networking, access to support organizations and technical assistance, or via connectors and network hubs that serve to link entrepreneurs to the information, tools and resources needed to support business growth.

Policy and Entrepreneurial Ecosystems

The concept of entrepreneurial ecosystems refers to a region's "framework conditions" that serve to support or impede the start-up and growth of new companies. Numerous factors influence a region's "framework conditions," and many of these factors, such as local history and culture or geographic location, are not easily or quickly influenced by public policy or other types of public or private interventions. In this sense, ecosystems share some characteristics with the concept of industry clusters. The most successful and robust ecosystems (and industry clusters) emerge organically, based on a region's history, culture and industrial development patterns. They are rarely planned from above or designed in advance. Silicon Valley or Hong Kong offer classic examples of this kind of "natural" development pattern, where history, location, and culture coalesce to build an "entrepreneur friendly" place.

Social context matters greatly in the development of strong entrepreneurial ecosystems, and the literature contains extensive and ongoing debates about the role of community in ecosystem development. Ecosystems are, by definition, rooted in and specific to a place. Researchers have argued for a systems approach to entrepreneurial development that takes into consideration the community and regional context. [48] This approach moves beyond supply side elements of the ecosystem, such as capital, incubators or technical assistance provision, which we will discuss below. The systems approach also stresses demand side factors, arguing that "the community is an active participant in establishing the community milieu within which the development of entrepreneurial talent takes place."[49] Communities serve to build the connections (i.e., social capital) between entrepreneurs and ecosystem resources and to create a focus on the intended outcomes of building a stronger entrepreneurial ecosystem – community prosperity. A recent case study of NetWork Kansas' Entrepreneurial Communities partnership highlights the positive effects of addressing both demand and

[48] Maryann P. Feldman, "The Character of Innovative Places: Entrepreneurial Strategy, Economic Development, and Prosperity." *Small Business Economics*, Vol. 43, No. 1 (2014), pp.9-20; J. L. Flora, J. Sharp, C. Flora, and B. Newlon, "Entrepreneurial Social Infrastructure and Locally Initiated Economic Development in Nonmetropolitan United States," *The Sociological Quarterly*, Vol. 38, No. 4 (1997), pp. 623-645.

[49] Deborah M. Markley, Thomas S. Lyons and Donald Macke, "Creating Entrepreneurial Communities: Building Community Capacity for Ecosystem Development," *Community Development Journal*. Vol. 46, No. 5 (2015), pp. 580-598.

supply side issues in ecosystem development. In Kansas' case, the performance of local ecosystems was greatly enhanced by the presence of strong and organized support community.[50]

Beyond these important social context contributors, a number of public policy factors do serve as core factors that help shape entrepreneurial ecosystems. Researchers have highlighted a number of essential policy inputs/contributors that are closely associated with robust and effective regional ecosystems. They include policies that support:

- *Market Access*: Helping entrepreneurs identify, access and succeed in new markets
- *Capital*: Providing diverse sources of capital to help firms start and grow
- *Workforce/Human Capital*: Building a regional talent base
- *Business Assistance*: Providing easy access to technical assistance
- *Specialized Infrastructure and Facilities*: Meeting the unique space needs of entrepreneurs
- *Community Culture*: Honoring and embracing entrepreneurship
- *Effective Regulation*: Cutting red tape and promoting flexibility

Market Access

Market conditions are perhaps the most important factor influencing the success of an entrepreneurial venture. Without a ready and accessible market for goods and services, entrepreneurial ventures lack the ability to prosper. Their success is similarly affected by other market conditions, such as the level of local competition, and the type and level of goods and services produced in a given market.

Many of these market condition factors are influenced by local culture and history. For example, regions located near ports, rivers, or transportation centers benefit from easier access to markets when compared to less centrally located regions. In some cases, policymakers can take actions to help mitigate historical disadvantages. Strategies that build strong local broadband capacity, such as Chattanooga's Gig City initiative, or various programs to build regional transportation hubs, are designed to address these kinds of market access concerns.

Robust ecosystems also benefit from various types of programs that seek to directly aid entrepreneurs in accessing new markets. This market identification and development work is especially important in regions like Appalachia where start-up rates are relatively high, but the ability to support high-growth ventures is more limited. In some cases, regions lack ambitious entrepreneurs. Local firms limit themselves to local markets, and do not consider selling outside of the region, state, or country.

Market access programs help local firms think bigger, and succeed in markets outside of the local region. Economic gardening programs are one well known example of such market access programs targeted to

[50] Deborah Markley and Ahmet Binerer, "Creating Entrepreneurial Communities in Kansas," Center for Rural Entrepreneurship Research Report, May 2014.

helping entrepreneurial ventures.[51] In the 1980s and early 1990s, economic gardening initially promoted a broad refocusing of local economic development away from business attraction to a renewed emphasis on business retention and expansion and support for start-up businesses. Over time, the approach has evolved and now places heavy emphasis on providing new market intelligence to new and growing companies. Second stage ventures, firms with between 10-99 employees, are a special focus of this approach. Michigan's Lowe Foundation, home to the National Center for Economic Gardening, describes its method in the following way:

> . . . Economic Gardening specialists leverage sophisticated corporate databases, geographic information systems, SEO and Web marketing tools to help second-stagers:
>
> - Identify market trends, potential competitors and unknown resources.
> - Map geographic areas for targeted marketing.
> - Raise visibility in search engine results and increase web traffic
> - Track websites, blogs and online communities to better understand competitors as well as current and potential customers.
> - Refine their core strategy and sustainable competitive advantage.[52]

Economic gardening models are now being deployed across the US, and have been especially popular in rural areas. Numerous regions of Appalachia are using this approach, including programs in Floyd, VA, the state of Kentucky, and Southwest Virginia.

Economic gardening programs provide market intelligence and other assistance to firms in a variety of sectors or seeking to access a wide array of new or growing markets. Other types of support programs offer more focused or specialized assistance. Examples include state and local export promotion programs, procurement assistance via the Procurement Technical Assistance Center (PTAC) network and other local partners, and targeted support for the development of specific sectors or industry clusters.

Export promotion programs can be especially important in helping firms achieve high growth. Across the US, very few new or small businesses do a good job in accessing overseas markets. In fact, according to the US Department of Commerce, less than one percent of US firms export. Effective export promotion programs, such as statewide initiatives operating in Pennsylvania and Virginia, help take some of the risk out of entering overseas markets. They train firms in how to do business overseas, link them to trade shows and other opportunities, and assist with other regulations such as export licenses or in dealing with overseas tax issues.

In Appalachia, sector-focused programs have enjoyed success and have received active encouragement from the Commission and its partners. In fact, the Commission's strategic plan places special emphasis on "emerging opportunities" in sectors including manufacturing, diversified energy, tourism, local food

[51] For background, see http://edwardlowe.org/entrepreneurship-programs/economic-gardening/
[52] *Ibid.*

systems, and health care.[53] Support for the Crooked Road and 'Round the Mountain initiatives in Southwest Virginia provide two examples of such sector support. Both are tourism efforts that build on unique Appalachian assets – music and creative crafts, respectively. Through active promotion and support for enterprise development, these initiatives are connecting artisans, once isolated from potential tourism markets, into a robust network of visitor sites and market outlets.

Food systems development has been a strong focus for recent ARC investments in ecosystem support. Via the federal Local Foods, Local Places Initiative (LFLP), the Commission has invested in 22 different local food systems projects.[54] West Virginia's Greenbrier Valley highlights how food systems investments can help spur entrepreneurial activity as well.[55] Via the Greenbrier Valley Local Foods Initiative (GVLFI), community leaders support efforts to develop regional branding for food products, and a Sprouting Farms Project to support new and beginning farmers.

Technology development and commercialization is another arena where specialized business services can be core aspects of entrepreneurial ecosystems. This category does not refer to unique facilities, such as maker spaces (which will be discussed below), but instead refers to technical assistance to help new and existing companies turn new ideas into new technologies, services, or products. Specific support efforts include design and prototyping services and proof of concept centers.

In Appalachia, these technology support services are typically associated with a college or university. They often provide space in an incubator facility or shared lab/work space, but other services are available to any company or individual seeking support. Examples in the Appalachian region include Ohio University's Innovation Center,[56]which provides access to 3D printers and other rapid prototyping services in addition to its incubator space. At West Virginia University, two new projects—the Launch Lab and the Health Sciences Innovation Center, are providing specialized technology services to West Virginia-based entrepreneurs more generally and to those with a focus on health sciences' related opportunities. In South Carolina, the Clemson Inventor's Club seeks to link local entrepreneurs to university researchers with an interest and track record in commercializing new technologies.

Capital

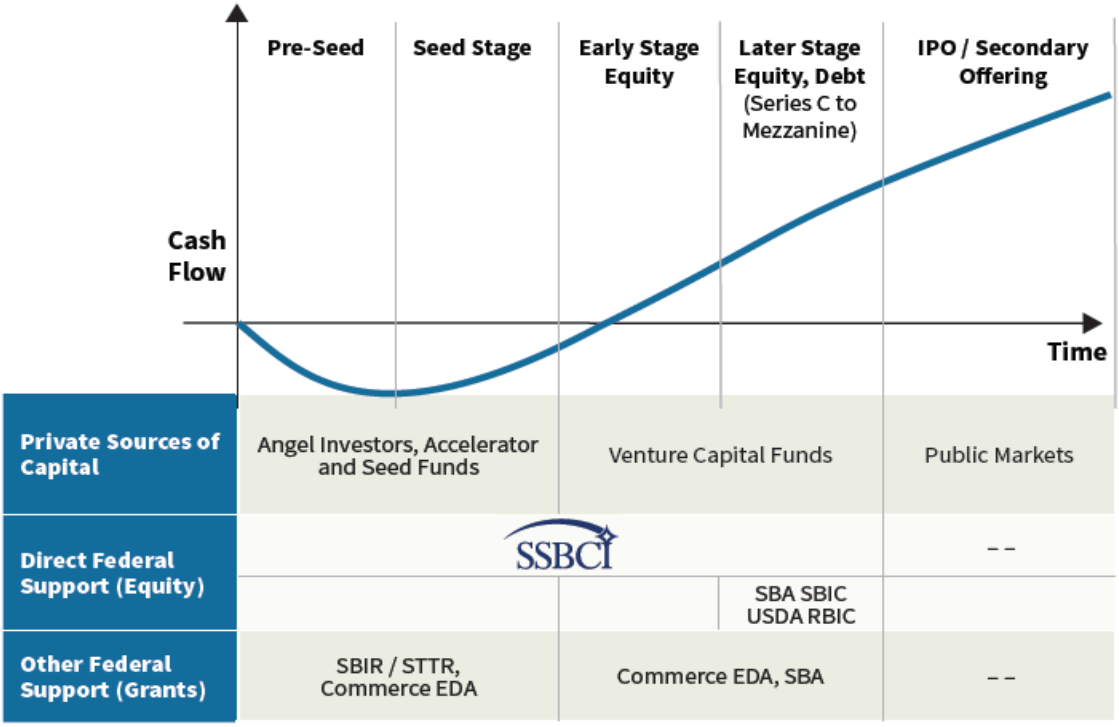
Access to capital is one of the most frequently cited components of entrepreneur ecosystems in both academic and policy literature, and in the popular press. For many observers, venture capital (VC) and entrepreneurship are synonymous. It is assumed that a region with lots of venture capital will have lots

[53] "Investing in Appalachia's Future," *The Appalachian Regional Commission's Five-Year Strategic Plan for Capitalizing on Appalachia's Opportunities 2016–2020,* p. 9.
[54] Appalachian Regional Commission, "Local Foods, Local Places: Revitalizing Communities by Growing Local Food Economies," Summary Report, January 2016. Available at: https://www.arc.gov/noindex/programs/localfood/lflp_summary_report_jan2016.pdf.
[55] *Ibid.*
[56] National Business Incubation Association, *Best Practices in Rural Incubation*, (Athens, OH: NBIA, 2013).

of entrepreneurs, and vice versa. The reality is much more complicated, and many researchers now argue that "venture capital lags rather than leads the emergence of entrepreneurial activity; it is not part of the initial environmental conditions."[57]

Robust entrepreneurial ecosystems are often home to venture capital investors, but they also attract and support a diverse array of investors and investment vehicles. Figure 3 depicts this mix. The diversity of funding sources and the connections between them are the critical factors for successful regional capital networks. Both debt and equity capital are needed. Suppliers of debt capital provide a range of financing from microlending to expansion and working capital to large scale project financing. Equity capital financing ranges from resources for product development to startup and seed capital to growth stage and expansion/mezzanine capital.

FIGURE 3: Equity-based Capital Continuum for High-Growth Businesses



(Source: Center for Regional Economic Competitiveness and Cromwell Schmisseur.)

Figure 3 demonstrates that the diversity of capital sources – and the attendant ability to fund firms at all stages of the business lifecycle – matters. For example, without effective angel networks, startup ventures, even those with growth potential in sectors attractive to equity providers (e.g., high tech, energy development, biomedical) may be starved for growth capital. Without large and well-managed revolving loan funds, it may be difficult for small rural manufacturers or main street businesses to find the $50-$250K in expansion capital they need. Yet, even in well-served markets, persistent capital market gaps exist. In an assessment of rural capital markets for USDA, researchers identified a

[57] Mason and Brown, p. 16

mismatch between traditional sources of capital and capital needs across the business lifecycle.[58] In most regions, firms in the product development and startup phases nearly always face fundraising challenges.

Capital alone does not constitute an ecosystem. The other critical actors are those who provide the business or advisory services that help business owners and entrepreneurs effectively connect to and use capital for growth.

In Appalachia, and in rural America more generally, equity capital typically presents the biggest shortfall in ecosystem development. Venture capital is in especially short supply as the institutional venture capital industry is heavily concentrated in few regions and targets investments in a few core industries. The desired value proposition and industry mix for the typical venture investor is most often located on either the East or West Coast, with more limited investments in other metropolitan areas and even less in rural markets.

Because the venture capital industry's market dynamics limit the attractiveness of deals in rural regions, regional leaders have sought to co-invest in the development of local venture funds. The Commission has backed some of these efforts, such as the creation of several New Markets Venture Capital funds in the early 2000s. Other efforts have emerged from the Community Development Venture Capital (CDVC) movement. However, some analysts have noted that a large share of CDVC dollars still flows to centers of traditional VC investment.[59]

Federal support has also helped spur creation of a number of new funding sources that make equity or equity-like investments in entrepreneurial ventures. These programs include the Community Development Financial Institutions (CDFI) program, the Small Business Investment Company (SBIC) program, the Rural Business Investment Company (RBIC) program, and a number of programs that were created and supported by the Treasury Department's State Small Business Credit Initiative (SSBCI).

Local funds supported via these investments operate across Appalachia and have become a critical source of funding for local entrepreneurs. They were particularly important in the midst of the Great Recession when other sources of equity finance were in short supply.[60] They are likely to remain important in the future as well. Kentucky Highlands Investment Corporation (KHIC) has a long and deep history in eastern Kentucky and the broader central Appalachia region. KHIC has provided capital and business support to entrepreneurs, effectively leveraging a wide range of federal programs. With ARC support, KHIC launched the first rooted venture capital funds to serve the region. More recently, the

[58] Deborah M. Markley, Erik R. Pages and Patricia Scruggs, *Access to Capital in Rural America*. Research Report prepared for the US Department of Agriculture, 2014.
[59] Josh Silver and Archana Pradhan, *Access to Capital and Credit in Appalachia and the Impact of the Financial Crisis and Recession on Commercial Lending and Finance in the Region*, Research Report Prepared for the Appalachian Regional Commission, July 2013, p. 225.
[60] Center for Regional Economic Competitiveness and Cromwell Schmisseur, *Program Evaluation of the US Department of Treasury State Small Business Credit Initiative*, October 2016, pp. 85-86. Available at: https://www.treasury.gov/resource-center/sb-programs/Documents/SSBCI_pe2016_Full_Report.pdf.

Natural Capital Investment Fund (NCIF) has been a key partner in supporting value chain and local food system development in West Virginia, again leveraging federal resources through the Rural Jobs Accelerator Program. Founded in 2001, NCIF is a subsidiary of the Conservation Fund, and finances companies in distressed regions across Appalachia. The NCIF team offers technical assistance, coaching support and access to capital for food and farm businesses as a way of advancing this sector throughout the state.

While venture investors get the headlines, most equity investments come from individual angel investors or organized angel groups. Angels are an essential source of funds for new firms. In the US in 2015, angels invested roughly $24.6 billion in more than 71,000 ventures. Nationally, there are more than 304,000 active angel investors in the US.[61] In 2015, the average angel investment deal was valued at $345,000, in contrast to the average VC investment in seed or early stage firms that can be valued at anywhere between $4 and $10 million.[62]

Because few firms need the large scale investments provided by VCs or private equity firms, angel investment dominates the equity funding landscape in Appalachia's entrepreneurial ecosystems. Individual angels matter, but organized angel groups also play important roles. A number of these groups have been seeded with ARC funds to support their start up and initial development. Today, at least 15 organized angel networks make investments in the Appalachian region. As part of the recent investments via the POWER program, more angel groups will be created throughout the region.

Equity investors are especially important players in regional ecosystems because they bring more than money to their portfolio companies. Successful investors are classic connectors who link entrepreneurs to partners, customers, and other investors. They serve as mentors and coaches, and generally help build and sustain a regional culture focused on creativity, innovation, and entrepreneurship. In successful ecosystems, these intangible roles are as important as the equity investors' role as a source of funding.

While equity investors receive much media attention, most small businesses and entrepreneurs still rely on traditional lending sources for both working and expansion capital. According to the Federal Reserve's annual Small Business Credit Survey, loans and lines of credit are by far the most desired form of business finance. In 2015, 89% of surveyed firms seeking finance opted to pursue loans or lines of credit. Meanwhile, only 4% of firms sought equity investments. [63] Banks, especially small banks, are

[61] Jeffrey Sohl, "The Angel Investor Market in 2015: A Buyer's Market," University of New Hampshire Center for Venture Research, 2016. Available at: https://paulcollege.unh.edu/sites/paulcollege.unh.edu/files/webform/Full%20Year%202015%20Analysis%20Report.pdf.

[62] 2015 data taken from PricewaterhouseCoopers/National Venture Capital Association *MoneyTree™ Report*, January 2016.

[63] US Federal Reserve, *2015 Small Business Credit Survey: Report on Employer Firms*, March 2016, p. 15.

the lender of choice for these firms. They are more likely to approve loan requests and they also enjoy the highest customer satisfaction ratings among small businesses.[64]

In addition to traditional banks, entrepreneurs can also tap into a host of other loan options. These typically include:

- Federally-backed loan programs supported by SBA (7a, 504), and USDA
- Microloan programs, supported with local, state or federal funds
- Revolving Loan Funds, typically supported by state or federal funds
- CDFI Lending

Recent trends in the field were extensively covered in the Appalachian Regional Commission/National Community Reinvestment Coalition 2013 Report, *Access to Capital and Credit in Appalachia*, and a deeper analysis falls beyond the scope of this review. However, when it comes to ecosystems, analysts emphasize a region's mix of capital sources as opposed to any one funding type or any one type of investor. In successful regions, entrepreneurs enjoy ready access to a host of different funding sources that can support their companies at varied points in the growth cycle. In contrast, less successful ecosystems are characterized by a more spotty capital infrastructure where the market is well served in certain segments (e.g., equipment loans for established business customers) but faces significant capital gaps in other areas (e.g., risk capital for new ventures).

Workforce/Human Capital

Access to talent is probably the most important building block in a regional entrepreneurial ecosystem. Without a deep base of skilled personnel, entrepreneurs will be challenged to develop fast growing ventures. This base of talent generally develops thanks to a culture that embraces learning, strong local educational systems and the local presence of major institutions, such as colleges, universities, or other large anchor institutions, such as a major corporation or research center.

These historical legacies are crucially important, and it is difficult to change the trajectory of a region that has not typically attracted outside talent or groomed its own home-grown talent. Nonetheless, regional leaders can and should take some steps to develop a human capital base that can support business start-up and growth. This should include investments in workforce and education programs, but it can also include some more targeted efforts to enhance the local ecosystem. Specifically, this work involves the expansion of entrepreneurial education programs.

Effective entrepreneurship education programs can and should be made available to individuals from all backgrounds and from all age groups. Much education and training can and will be provided by business

[64] *Ibid*, p. iii.

service providers, such as the Small Business Development Center Network, which will be discussed further below. But, education programs should also be offered in the formal education system and in related organizations that serve youth through adults.

Entrepreneurship education for youth is one of the most important facets of a robust regional ecosystem. In regional hotspots like Silicon Valley, an entrepreneurial culture emerged spontaneously. But, many other regions lack the necessary attributes, making cultural change slow and arduous. In these regions, residents may be averse to taking risks or to the concept of starting their own businesses. Changing long entrenched mindsets is tough, and youth entrepreneurship offers one means to help start the culture shift process. In addition to increasing youth entrepreneurship rates, this training also provides other educational benefits for young people.[65]

Youth entrepreneurship programs can take many forms, ranging from short summer camps or clubs to formal integration into the K-12 curriculum. Over the past decade, a growing number of states and local school districts have adopted formal guidelines for entrepreneurship education. At present, 42 states have adopted standards, guidelines or proficiencies for entrepreneurship education, and 18 states require that entrepreneurship education courses be offered in high school.[66]

Numerous other options exist to engage young people in learning about entrepreneurship. Groups like the YMCA/YWCA, FFA, 4H, the Boy Scouts, the Girl Scouts, Chambers of Commerce and others all offer trainings or other tools to learn about business. In addition, a number of non-profit organizations, like the Network for Teaching Entrepreneurship and REAL Entrepreneurship, help train teachers and offer their own programming for youth. The University of Kentucky's E-Discovery program provides K-12 students with the opportunity to learn and practice entrepreneurial and other business skills. Teachers are able to wrap E-Discovery components into their existing curriculum and provide hands-on opportunities for students to start a business.

West Virginia supports several innovative programs promoting youth entrepreneurship. The Governor's School for Entrepreneurship runs a three week intensive summer boot camp for high school students from across the state. Participants learn the basics of business, and also participate in start-up and pitch competitions. Similarly, the West Virginia Simulated Workplace introduces entrepreneurship to students in the state's career-technical education programs. In this project, students create simulated businesses in their respective fields, such as auto repair or cosmetology. Originally designed to teach soft skills, teamwork, and leadership, the simulated workplace also introduces students to the real life issues that come with running one's own company.

Beyond high school, entrepreneurship education at community colleges and at four-year schools is booming. Over the past decade, the field has grown rapidly and programs and curricula have migrated

[65] Aspen Institute Youth Entrepreneurship Strategy Group, "Youth Entrepreneurship in America: A Policymakers Action Guide," 2008.
[66] Junior Achievement USA, "The States of Entrepreneurship in America, " JA Research Report, 2015.

from the business schools to other schools and academic disciplines.[67] Today, leading edge programs do more than simply teach students about how to start and run a business. They offer an immersive experience where students learn new ways of thinking and doing, along with the basics of business. Close connections to regional ecosystems are the norm, as students engage with local entrepreneurs who offer coaching, mentoring, and other forms of support. Entrepreneurship is also becoming integrated into college career service programs via strategies first developed at the University of Miami in its Launch Pad programs.[68]

Much innovation is also happening at the community college level. For example, Eastern West Virginia Community and Technical College (EWVCTC) has become the regional hub for entrepreneurs in the area around Moorefield WV.[69] In addition to its classes, the College operates the Launch Pad accelerator program and the Institute for Rural Entrepreneurship and Economic Development that is supporting new business development in five industries: manufacturing, agriculture, arts and culture, tourism and technology. Community colleges in Kentucky, West Virginia, Virginia and Tennessee are also key partners in America's Entrepreneurial Schools initiative launched by the Consortium for Entrepreneurship Education with support from the Commission through its POWER funding program.

Business Assistance

As noted earlier, fluidity and connectivity are core characteristics of robust regional ecosystems. To a large extent, these two concepts refer to the ease with which an existing or aspiring entrepreneur can access business assistance. Can he or she easily find the technical assistance or support needed to address a thorny business challenge? This is a simple task when a strong ecosystem is in place. In other regions, new business owners regularly complain that they do not know where to get help, or that they are confused by the plethora of groups who claim to support entrepreneurs.

The types of needed technical assistance can vary greatly, and can run the gamut from the basics of business planning to sophisticated support with finance, market access, or technology development. Strong ecosystems are characterized by a deep local base of talent that can provide support for most issues facing new and growing businesses. Yet, even the most robust ecosystem will not be home to every kind of expert or resource person. The ability to connect to other regions or outside sources of expertise is also an important component of robust ecosystems.

Business assistance can and should be available from multiple sources. Traditional business support organizations are typically the first place where entrepreneurs seek outside help. These groups would

[67] For background, see George Washington University Center for Entrepreneurial Excellence, "The National Survey of Entrepreneurship Education: An Overview of the 2012-2014 Survey Data," December 2, 2014; Kauffman Foundation, "Entrepreneurship Education Comes of Age on Campus," Kauffman Research Report, August 2013.
[68] To learn more, visit http://thelaunchpad.org/.
[69] "Charles 'Chuck' Terrell Named NACCE's 2016 Entrepreneurial President of the Year," *Community College Entrepreneurship*, Fall/Winter 2016.

include Chambers of Commerce, local economic development organizations, and programs specifically focused on small business support such as the SBA-backed Small Business Development Center network and local chapters of SCORE. More specialized efforts, such as those affiliated with the NIST-MEP or USDA Cooperative Extension programs, are also available in many regions.

Most of these resource organizations exist across the US, and are well-known in their communities. The quality of support provided by these groups can vary greatly, but many of them provide highly effective and low cost assistance to new and growing companies. However, these traditional forms of business assistance typically suffer from several shortcomings, many of which result from limited budgets and staffing. First, they provide generalized support that may not always be customized for the unique needs of a local entrepreneur. Second, their services typically target start-ups and lifestyle businesses, and may not be appropriate for scale-up companies. Finally, they may offer their services at times or via methods that are inappropriate or ineffective for some entrepreneurs. For example, many entrepreneurs prefer peer learning to formal training programs. Others lack the time or availability to access programs during the day, and instead prefer to use distance learning technologies. One entrepreneurial support organization that is addressing this latter challenge is Northern Initiatives (NI), a CDFI operating in northern Michigan. NI has created a blended learning approach to providing business assistance. This approach combines a web portal with assessment tools, training videos and other resources focused on financials, marketing and management with real-time support from business assistance coaches. Coaches are able to direct entrepreneurs to web-based resources, creating a customized learning plan, and then complement that learning with coaching session, in-person and virtually. The system is enabling NI to provide more customized and appropriate business support to a rapidly growing portfolio of loan customers.

Beyond traditional service providers, focused entrepreneurial networks are the support provider of choice for most business owners. These groups typically focus exclusively on issues facing start-ups and scale-ups, and have little or no formal role in other areas such as advocacy, economic development, or the provision of member services, such as insurance or health care.

These networks take many forms. Some are associated with national or regional networks like the Entrepreneurs Organization (EO) or the Young Presidents Organization (YPO). Others emerge naturally in response to local interest. They can also encompass many kinds of organizational types, from affiliation with a local Chamber of Commerce or economic development organization, links to a local coworking space, as an independent non-profit, or an informal Meet-Up group. Regardless of their organizational structure, they typically focus on a small set of activities. They support peer networking, professional education, and connections to coaches, mentors, partners, and investors. When successful, these groups often serve as the local “hub” or “spotlight” for regional entrepreneurship. In these regions, they are a core node of the ecosystem.

Regions may be home to a number of important peer networks for entrepreneurs. For example, in the Roanoke-Blacksburg region of Virginia, entrepreneurs can access a number of places to connect with

their peers.[70] The Roanoke-Blacksburg Technology Council serves as a central hub, with a particular focus on technology firms and scale-up businesses. But, the region's entrepreneurs also tap into other networks, such as the local Chambers of Commerce (in Montgomery County, Roanoke, and Salem), and they also tap into networks at local incubators and cowork spaces, such as Roanoke's CoLab or Blacksburg's New River Valley Business Center.

Many of these networks can operate in a very informal manner. The model used in the Kauffman Foundation's One Million Cups program is instructive. One Million Cups is a national program that is currently being deployed in 107 communities across the US, including Asheville, NC and Chattanooga, TN. Each region follows a similar template and convenes regular meetings where start-ups present business ideas and receive feedback from other attendees. These regular events help build a community of local entrepreneurs, and can often become central hubs of local ecosystems. Yet, beyond the actual convening and the provision of coffee, there is no "program." Instead, One Million Cups seeks to build a "supportive, neutral space welcoming entrepreneurs to be open and honest about their businesses and the challenges they face."[71]

In addition to networking with peers, entrepreneurs have a strong interest in finding mentors and coaches to support business growth. Mentors can be provided by traditional business service groups. After all, SCORE's primary function is to provide mentors and coaches. Yet, finding mentors and coaches can be a challenge. Networks play an important role in addressing this demand. Many national entrepreneur networks, like EO and YPO, view mentoring as part of their core missions. In addition, local mentor networks are also quite common across Appalachia and elsewhere. For example, Launch Tennessee operates a statewide mentor network focused on firms in the life science and energy sectors. This effort is modeled on the Springboard program first started by San Diego's CONNECT network more than 20 years ago.

Effective regional ecosystems provide businesses with a wide and deep base of entrepreneurial expertise. Some of this knowledge resides in economic development and business support organizations, but much of the expertise is found in private support providers, such as lawyers, accountants, and other consultants. The availability of specialist business services is a critical factor in successful ecosystems; a shortfall in such services is viewed as a major impediment by many entrepreneurs.[72] In successful ecosystems, these firms understand the unique challenges facing entrepreneurs, and are able to tailor their services and pricing practices accordingly. For example,

[70] See Sarah Lyon-Hill, Scott Tate, Maggie Cowell, Kushboo Gupta and Yaser Keneshloo, "Same Ecosystem, Different Entrepreneurs, " Virginia Tech Office of Economic Development Research Report, 2017.
[71] To learn more, visit http://www.1millioncups.com/.
[72] See for a review of these challenges in Kansas:, see J. Christopher Broberg, Gaylen Chandler, and James, Wolff, "The South Central Kansas Entrepreneurship Ecosystem," Wichita State University, Barton School of Business, June 2014. Available at: http://webs.wichita.edu/depttools/depttoolsmemberfiles/wsuresearchadmin/IMCP/The%20SC%20KS%20Entrepreneurship%20Ecosystem%20Entrepreneurship%20Assessment.pdf.

lawyers may provide reduced rates for start-up firms with the expectation that higher billing rates will follow as the firm grows.

The development of specialized business support networks presents something of a "chicken and egg" dilemma for regional leaders. These service providers "naturally" emerge in regions with dense entrepreneur networks or where there is a long history of start-up activity. Conversely, they are not present in regions that may need them the most, i.e. places with more limited levels of start-up activity. As such, less advanced regions typically rely on formal business organizations discussed above, or opt to build connections to service providers located elsewhere. Both Kansas and Maine have sponsored efforts to connect their local entrepreneurs with national sources of expertise and support. In Kansas, the Pipeline Entrepreneurial Immersion program began as a project of the now-defunct Kansas Technology Enterprise Corporation. It recruited top Kansas entrepreneurs, and enrolled them in a year-long fellowship/training program. It also linked them to coaches and mentors located in technology hotspots like Silicon Valley, Seattle, and Austin. This program, celebrating ten years in business, now operates with no public funds and has expanded to serve entrepreneurs in Kansas, Missouri and Nebraska. Maine's Top Gun program is modeled on Pipeline, and links Maine-based entrepreneurs and investors across New England, especially in the Boston area.

The use of innovation vouchers offers another model for linking local entrepreneurs to outside experts.[73] This approach is widely used in Europe and is starting to gain adherents in the US with current programs underway in Connecticut, Minnesota, and Rhode Island. Program specifics will differ, but the basic model operates as follows. Firms apply for a voucher which typically provides a small grant (of $10-$25,000 along with matching funds from the firm) that a company can use to seek consulting services from a list of local service providers. Requested services can vary greatly. In the US, most programs focus on technical issues, such as prototyping or design, but voucher programs have also been used to help with marketing, human resources support, and other issues.

When it comes to accessing a full suite of business services, many regions around the world are embracing the concept of business acceleration.[74] Business accelerators sometimes operate like business incubators (to be discussed below) or other business services, but they bring several unique attributes to the table. Figure 4 highlights some of these differences.

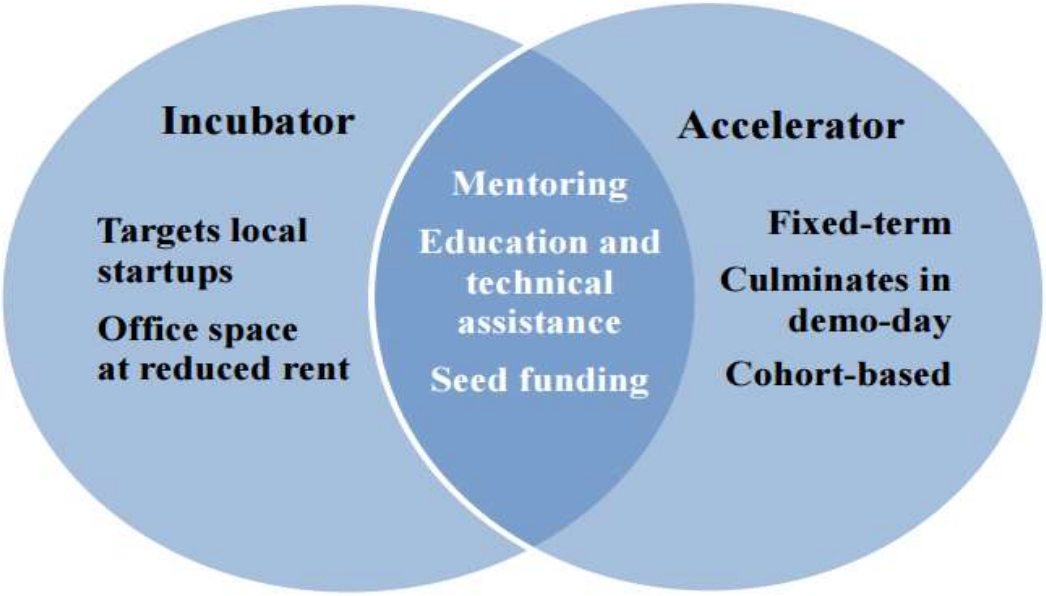
First, they typically focus on supporting start-ups or relatively new businesses. Second, accelerator programs recruit entrepreneurs via a competitive process. They may run a competition or use a formal application and review process. In most cases, the competition to enter an accelerator program can be

[73] For background on the concept of innovation vouchers, see Organization for Economic Cooperation and Development, "Innovation Vouchers," OECD Innovation Policy Platform, 2010. Available at: http://www.oecd.org/innovation/policyplatform/48135973.pdf.

[74] C. Scott Dempwolf, Jennifer Auer, and Michael D'Ippolito, "Innovation Accelerators: Defining Characteristics among Start-Up Assistance Organizations," Report prepared for US Small Business Administration Office of Advocacy, October 2014; Bart Clarysse, Mike Wright, and Jonas Van Hove, "A Look Inside Accelerators," NESTA (UK) Research Report, February 2015.

quite intense. Third, most accelerators provide investments in selected companies. These investments may be quite small and are designed to help seed a new company. In most cases, accelerators provide this seed capital in return for an equity stake in the company that might range between 4-8 percent. Fourth, accelerators provide services to cohorts of entrepreneurs or entrepreneurial teams. The training and support is normally provided over a short fixed period ranging from one to three months. At this point, entrepreneurs "graduate" in the sense that the new ideas fail or can be translated into a viable business enterprise.

Figure 4: Comparing Business incubators & Accelerators



(Source: Dempwolf et al.)

Many of the concepts around business acceleration have been used for years, but many of today's accelerator programs are modeled on Silicon Valley's Y Combinator and Boulder's Tech Stars. Y Combinator, which began in 2006, is perhaps the world's most successful accelerator, having played a role in spawning firms like AirBnB, Dropbox, and Reddit.[75] Meanwhile, Tech Stars has expanded to locations around the US and its founders actively promote their approaches to business acceleration in the business press.[76]

Over the past decade, the number of accelerator programs in the US and Appalachia has skyrocketed, growing by more than 50 percent every year between 2008 and 2014.[77] Today, it is estimated that the US is home to anywhere between 110 and 170 different formal business acceleration programs. [78]

[75] "Y Combinator, the X Factor of Tech, *The Economist*, November 5, 2015.
[76] For background on TechStars, see Feld.
[77] Jonathan Ortmans, "A Hard Look at Accelerators," Policy Dialogue on Entrepreneurship Blog, April 2016. Available at: http://www.kauffman.org/blogs/policy-dialogue/2016/april/a-hard-look-at-accelerators.

Appalachia has seen its own boom in business accelerator programs. The Accelerating Appalachia initiative has received significant acclaim in recent years. This effort serves a wide swath of Appalachia and is focused on nurturing new entrepreneurs operating in sectors such as food and agriculture, forest products, and outdoor industries. In 2016, the program supported ten regional businesses in markets such as herbal medicines and health products, cereal production, and food distribution. Other recently started examples include Gannon University's Northwest Pennsylvania Accelerator, the Athens (OH) Innovation Engine Accelerator, and Chattanooga's Co.Lab Accelerator.

Business accelerator programs are gaining attention because they have shown impressive results. Beyond the headline making companies birthed by Y Combinator and others, much data shows that firms supported by accelerators outperform comparable firms without such support.[79] Graduates of top accelerator programs are more likely to receive follow-on investments and to hit other company milestones, such as new market entry or company exits. However, many of these effects appear to be limited to the top quality accelerators and the effects may be less pronounced in less popular programs.

In addition, business accelerators are especially important because these programs typically view ecosystem development as part of their core missions. And, the regional spillover impact of accelerators appears to be positive. One recent study found that MSAs with accelerator programs tended to have higher levels of seed and early stage investing activity after programs have been put in place.[80] These impacts are not restricted to firms engaged in the programs; they also ripple out to early stage firms more generally. In Southwest Colorado, these spillover effects encouraged the Telluride Foundation to help create a local venture accelerator program. Donors funding the program often also serve as mentors to the selected entrepreneurs. The goal is to begin to create a culture of entrepreneurship in Telluride, a region that struggles with economic diversity, due to its heavy dependence on tourism and mining.

As much of the data suggests, the quality of business acceleration programs varies greatly. High quality programs have big impacts; lower quality programs may have little or no impacts. Thus, it is essential that regional leaders heed the lessons from the growing literature on what makes business accelerators work.[81] Key lessons include:

- Developing clear guidelines and tips to enhance the mentor connections undergirding these programs.

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[78] A number of different data sources track the accelerator industry. For recent background, see Ian Hathaway, "Accelerating Growth: Start-up Accelerator Programs in the United States, " Brookings Institution, February 17, 2016. See also Ortmans; the Seed DB database at http://seed-db.com/accelerators; the GUST USA-Canada Accelerator Report 2015 at http://gust.com/usa-canada-accelerator-report-2015/.

[79] Hathaway.

[80] Daniel C. Fehder and Yael V. Hochberg, "Accelerators and the Regional Supply of Venture Capital Investment," Working Paper, September 19, 2014. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2518668

[81] See Dempwolf et al., Hathaway, Susan Cohen, "What do Accelerators Do: Insights from Incubators and Angels," *Innovations Journal*, Vol. 8, No. 3-4 (2013), pp. 19-25.

- Creating a "culture" that keeps entrepreneurs engaged and involved in a process of continuous learning during and after the formal accelerator program ends.
- Be very clear on what the accelerator program can do for local entrepreneurs and also be clear on the role of the accelerator effort in the wider ecosystem.

Facilities and infrastructure

Most experts contend that soft or cultural factors are the essential components of effective ecosystems, but facilities and infrastructure can matter too. Entrepreneurs are like any other business in that they benefit from and want to work in regions that have strong infrastructure in the form of good transportation access across multiple modes, excellent water, sewer and power systems, and world class broadband access.

These types of physical assets are essential to business success, but are not necessarily unique attributes of entrepreneurial ecosystems. However, some types of facilities are especially relevant for start-ups and new companies. Business incubators often serve as key hubs in regional ecosystems. They are one of the first specialized approaches to supporting small businesses, and have long benefited from investments from federal, state, and local economic development agencies. Extensive research suggests that business incubation may help produce better business outcomes, such as higher firm survival rates and an increased likelihood that incubated firms will maintain local operations.[82]

Over time, many business incubators have altered their missions so that many programs now serve a wider diversity of companies, including more established firms. Many also focus less on ecosystem support and instead support a more general economic development mission. Meanwhile, some of incubation's past service offerings, such as subsidized office space, are of less interest to new ventures that may operate with a limited physical footprint. This shift has been one factor driving the growth of business accelerator programs.

In response, some incubator managers are adopting hybrid business models that utilize new tools, such as business accelerators, coworking spaces, and the like.[83] As these trends continue, the distinctions between incubators and other kinds of entrepreneurial spaces will erode. Examples within Appalachia include the Radius Cowork space in Erie, PA, and the Shoals Entrepreneur Center in Florence, AL. University centers are also moving in a similar direction that combines teaching, business coaching and acceleration services and specialized space for new and growing business. Examples include Virginia Tech's KnowledgeWorks and Apex Systems Center for Innovation and Entrepreneurship, the Invent Penn State initiative, and the University of Alabama's Entrepreneurship Institute.

[82] NBIA, pp. 126-130; US Economic Development Administration, *Incubating Success: Incubation Best Practices that Lead to Successful Ventures*, 2011. Available at: http://edaincubatortool.org/pdf/Master%20Report_FINALDownloadPDF.pdf.

[83] Kirstie Chadwick, "The Rise of Incubator Super-hubs in Unexpected Places," InBIA Blog, November 5, 2016. Available at: https://inbia.org/blog/incubator-super-hubs-reach-unexpected-places/.

The typical business incubator serves a wide variety of small businesses and entrepreneurs, but specialized spaces can also be important ecosystem components. Specialized space can take many forms, especially in areas targeting science and technology based firms. Laboratory space, such as wet labs and testing facilities, are important in regions with high concentrations of life sciences firms.

Other sectors also benefit from specialized facilities. For example, commercial kitchens or kitchen incubators are growing at a fast rate. A 2013 survey identified at least 135 commercial kitchens around the US.[84] Some of the earliest and best known kitchen incubators, such as facilities in Athens, OH and Florence, AL, are located in Appalachia. These facilities take many forms. Some serve a single industry or certain population, such as new immigrants. But, the typical kitchen incubator is designed to help start-up food entrepreneurs by providing access to large kitchens, cooking equipment, food storage, and perhaps some kind of loading and packaging support. The ACENet Kitchen Incubator in Athens, OH operates year-round and has spun off a number of entrepreneurial start-ups including Shagbark Seed & Mill. ACENet has provided technical assistance to other kitchen incubators in the region, including one in Nelsonville, OH and Blue Ridge Food Ventures, a shared use kitchen and natural products manufacturing facility in western North Carolina.

More recently, regions have sought to target other kinds of businesses and to support new ways of working. The past decade has seen a global boom in the development of new working spaces that have many names, such as makerspaces, hackerspaces or coworking facilities, and take many different forms. Makerspaces and hackerspaces are targeted to providing specialized equipment, support and workspace for collaborative work. It is estimated that 400 such facilities operate in the US, and the number of maker spaces worldwide has grown by 14 times since 2006.[85] These spaces vary in nearly every way, and they can be located in schools, libraries, other public facilities or operated by private business or non-profits. They can range from simple hackerspaces where like-minded people can meet to do collaborative work to more elaborate makerspaces that also provide training and access to specialized equipment like 3D printers, computer design tools, and various machine tools. The more advanced makerspaces serve as digital factories. Makerspaces are important not only because they provide a place where ideas and new businesses can form, but they also seek to transform their communities. Some analysts refer to them as part of a new "civic infrastructure" which will help create local cultures that embrace innovation and creativity.[86]

Coworking spaces are our final component of the "new entrepreneurial infrastructure," and are subject to growth boom of their own in recent years. Coworking spaces provide a work and meeting space for all kinds of independent workers. Many users of coworking space are freelancers, gig economy workers, or even telecommuters in traditional employment, but entrepreneurs also comprise a big share of coworking space users.

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[84] Econsult Solutions, *US Kitchen Incubators: An Industry Snapshot*, August 5, 2013.
[85] Nicole Lou and Katie Peek, "By the Numbers: The Rise of the Makerspace," *Popular Science*, February 23, 2016. The Maker Map (available at: http://themakermap.com/) provides an updated listing of sites across the US.
[86] Will Holman, "Makerspace: Towards a New Civic Infrastructure," *Places Journal*, November 2015.

The size of the coworking market is disputed, but no one doubts that it is large and growing. The 2015-2016 Global Coworking Census projected that worldwide, around 10,000 coworking spaces will be operated by the end of 2016, with more than half of these sites having opened in the past two years.[87] In 2005, the US was home to one coworking space. Today, there are thousands of these locations around the US. These facilities tend to cluster urban areas. According to surveys from DeskMag, an industry consultant, 77% of US coworking spaces are located in urban areas with 17% in suburban locations and 4% in rural areas.[88] Urban areas have large numbers of such facilities, averaging about 26 coworking spaces in cities with populations exceeding $1 million.

These spaces include many shared office companies operated by Regus, WeWork, and others. These locations typically have a minor role in supporting local ecosystems. Instead, they offer a new way of working. But, in other regions, coworking sites are also important hubs of the local ecosystem. Asheville, North Carolina, with a population of about 87,000, has 8 co-working spaces available, providing a range of space and services to start-up entrepreneurs. These include The Collider, specifically focused on firms seeking climate change solutions and the Hive AVL focused on creative entrepreneurs.[89] Chattanooga has proceeded even further with the 2016 opening of the Tomorrow Building, one of the first co-living/co-working buildings operating outside of major metropolitan areas such as New York or San Francisco.

Community Culture

The role of culture in entrepreneurial ecosystems is essential, but also among the most complicated to understand and influence.[90] Researchers and entrepreneurs themselves have always understood that there is something different about successful entrepreneurial regions, i.e. "there is something in the air." While these differences were widely understood, their relative effects were not clearly delineated.

In the 1980s and 1990s, researchers began highlighting the role of informal networks and social ties in entrepreneurial success, and this research ultimately culminated in works by Saxenian and others that assessed the histories and business cultures of regions or industries.[91] Subsequently, global cross-country comparisons, such as the Global Entrepreneurship Monitor, highlighted massive differences in national and regional entrepreneurship rates, which often occurred independently of other economic factors.

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[87] Deskmag 2016 Coworking Forecast, January 29, 2016. Available at: http://www.deskmag.com/en/2016-forecast-global-coworking-survey-results

[88] For recent data on coworking spaces in the US, visit http://coworkinghandbook.com/stats/#USA_Coworking_Stats_2016).

[89] See https://www.beverly-hanks.com/blog/coworking-spaces-asheville.

[90] For background, see Bosma and Holvaert, 2016; Michael Fritsch and Michael Wyrwich, "Persistence of Regional Entrepreneurship: Causes, Effects, and Directions for Future Research," Jena Economic Research Papers 2017-003, February 2017.

[91] See Saxenian, Mayer, Feld, and Mary Walshok and Abraham Shragge, *Invention and Reinvention: The Evolution of San Diego's Innovation Economy,* (Stanford: Stanford University Press, 2014).

Cultural factors seemed to be playing an important role in determining a region's or nation's capacities for successful ecosystem development Attitudes toward risk and failure are especially important. Are local residents willing to take risks? Is business failure viewed as a personal shortcoming or is it viewed as a learning experience? In addition, successful regions tend to champion innovation and entrepreneurship. They support a culture of research and inquiry, and view entrepreneurs—as opposed to big business or the government—as core builders of the local economy and local wealth.[92]

In general, the US performs extremely well in various global rankings of cultural support for entrepreneurs. Yet, this strong showing masks large regional differences. While careful to avoid overgeneralizations, researchers have noted that many rural regions may be hampered on a number of these cultural attributes. History plays an important role in determining entrepreneurial culture. Many rural regions have, for decades, relied on single industries to drive the economy – for example, mining, textile and furniture manufacturing, tobacco and other agricultural commodities. The dominant culture in these places was more "company town" than entrepreneurial ecosystem. Young people moved from high school into employment in these sectors, and successful careers. With their decline, more places are turning to entrepreneurship as a revitalization strategy but discovering the need to build a culture of risk taking, business ownership and innovation. However, rural regions are not unique in facing these challenges. They are often found in urban areas as well.

Figure 5: Building Entrepreneurial Cultures in West Virginia

Since 2007, Create West Virginia has been working to help make West Virginia into a more friendly and supportive location for innovators, entrepreneurs, and creative people more generally. An October 2016 newsletter highlighted Create WV's perspective on "what job creators want in communities." In this view, they want:

***Diversity**: They want all kinds of people around them. People with different ideas, philosophies, religion, experiences. A lot of creativity results from the cross pollination of cultures and ideas.*	***Education systems** that turn out innovators rather than recipe followers. They want cradle-to cradle opportunities to learn, to keep developing their own minds and skills, and they minds and skills of their families*	***Attitudes that allow failure**, that recognize failure as part of the process of succeeding.*	***Social scenes** enlivened by music, art, dance, literary scenes, and plenty of places where they blur the lines between work and play.*	***Access to fast, reasonably priced internet**, so they can work in home offices at any time of day or night.*

Source: CREATE WV EMAIL CAMPAIGN October 25, 2016. "Buy Your State a Beer"

[92] World Economic Forum (2014), pp. 12-13.

Some regions can simply rely on past traditions and current business practices to sustain a strong entrepreneurial culture. Others need to actively invest in efforts to help spur interest and enthusiasm about the possibilities associated with local entrepreneurship. Some of the more aggressive cultural change strategies have been embraced overseas, particularly in Europe where many believe that the local business culture impedes entrepreneurial activity. For example, the European Union's Entrepreneurship 2020 Action Plan notes that Europe is home to . . .

> (a) culture that that does not recognize or reward entrepreneurial endeavors enough and does not celebrate successful entrepreneurs, as role models who create jobs and income. To make entrepreneurship the growth engine of our economy Europe needs a thorough, far-reaching cultural change.[93]

Building an "entrepreneurial culture" is not a quick proposition; it requires years of work to change local attitudes and to introduce new generations to the benefits of entrepreneurship. Much of this work comes in the educational system via efforts and programs discussed earlier. Business accelerators and other programs also help spread a message about the economic benefits generated by local entrepreneurs.

A number of other public education and outreach efforts can help further spread this message. Business plan and award competitions are especially popular, as they can typically occur with limited investments of both time and money. Nearly every state and region is now home to regular business plan competitions, and these programs can target nearly every kind of entrepreneur or business idea. BizPlanCompetitions.Com, which bills itself as the world's most complete listing of entrepreneurship contests, currently lists 260 competitions in all 50 states, providing total prize monies that exceed $22.7 million.[94]

The range and scale of business plan competitions is extremely diverse. At one level is a program like the MassChallenge, which operates as hybrid mix of competition and global business accelerator. Each year, MassChallenge sponsors a global business competition. Winners receive large cash grants and millions of dollars in other forms of in-kind support. They also have access to accelerator programs, office space, and many other benefits. Contrast MassChallenge to West Virginia's Lemonade Day, an annual youth competition. For this event, young people from around West Virginia compete to develop new and better ways to operate a lemonade stand. They participate in local and regional competitions and the top performers compete in a statewide completion at the state Capitol. This effort now engages 5,000 youth across the state.

Beyond competitions, awards programs also garner a great deal of attention. Many of these programs have been in place for years and are viewed as significant markers of a business' success and growth prospects. Examples include the annual INC. 500 and 5000 lists, the Ernst & Young Entrepreneur of the

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[93] Communication from the European Commission to the European Parliament, *Entrepreneurship 2020 Action Plan: Reigniting the Entrepreneurial Spirit in Europe*, 2012, p. 4.

[94] See http://www.bizplancompetitions.com/.

Year Awards, and the Deloitte Fast 50 Awards Programs. Yet, not all awards programs need to gain national or even statewide attention. Many communities enjoy great success with smaller scale "Entrepreneur of the Year" awards that honor local business and spread a positive message about entrepreneurship. Opportunity Southwest Virginia, a regional entrepreneurship effort serving seven counties, has enjoyed great success with this approach. The project team developed a template and set of guidelines for local "Entrepreneur Challenges." These tools have in turn been customized by local town leaders who have sponsored dozens of local competitions across the region. These efforts in turn help seed the creation of numerous local businesses.

Award programs and business plan competitions directly target entrepreneurs; other related initiatives work at the community level by supporting or encouraging the creation of "entrepreneur-friendly communities" who provide support and a friendly welcome mat to new and growing businesses. Beginning in the mid-2000s, Georgia operated a state-wide "Entrepreneur Friendly Communities" program that certified 129 Georgia counties, including many in Appalachia, as entrepreneur-friendly. Certified communities underwent specialized training and followed a guidebook to help develop new programs designed to support local entrepreneurs. Similar community certification programs have been used in other regions, such as Western North Carolina, South Carolina, and Atlantic Canada. Through the ARC POWER initiative, coal-impacted communities in eastern Kentucky, southern West Virginia and Appalachian Ohio are working with coaches supported by regional development organizations and the Center for Rural Entrepreneurship to build their capacity to support entrepreneur-focused economic development and become entrepreneurial communities.

Regulatory/Government support

Entrepreneur-friendly regulations are an essential component of any entrepreneur-friendly community, and are thus an important ecosystem building block as well. There is much overlap between entrepreneur-friendly regulations and business-friendly regulations, but there are important differences as well. For entrepreneurs, the most important regulations are those that affect business entry and growth. Is it easy to start a business and is it easy to support that company's growth?

Creating effective regulatory regimes for entrepreneurs is a huge challenge around the globe.[95] The World Bank's annual *Doing Business* report is perhaps the best known of these efforts.[96] Annually published since 2002, the *Doing Business* reports rank 190 economies on their business regulation environments, covering a large number of indicators on start-up costs, labor regulations, tax regimes, and the like. This annual ranking has had large impacts, leading to significant policy change in numerous countries around the world.

[95] For background, see J.P. García Villarreal, "Successful Practices and Policies to Promote Regulatory Reform and Entrepreneurship at the Sub-national Level", OECD Working Papers on Public Governance, No. 18, OECD Publishing, 2010.
[96] The annual *Doing Business* reports and rankings can be accessed at: http://www.doingbusiness.org/

In thinking about "entrepreneur-friendly" regulations, it is important to assess what regulatory factors are most important to high growth companies. A number of organizations, such as the Small Business and Entrepreneurship Council, publishers of the annual State Small Business Tax index, contend that entrepreneurship thrives when taxes and regulations are limited.[97] Other researchers paint a nuanced picture, arguing that effective regulations vary based on the level of government and on the types of entrepreneurs operating in a given location.[98] In particular, high growth entrepreneurs and lifestyle entrepreneurs have much different needs as they relate to public policy and regulation.[99] High growth entrepreneurs are most interested in locations with a rich base of talent and easy access to customers, suppliers, and partners. They are less concerned about taxation levels and other regulatory concerns.

Regardless of their attitudes to government rules and regulations, all entrepreneurs have to deal with government agencies at some point in time. Successful regions make this process as painless as possible, and provide clarity, transparency and reliability to entrepreneurs.

A number of strategies and approaches help create a more "entrepreneur-friendly" regulatory system. A first step involves providing one-stop access for permits, business licenses, and other necessary business paperwork. These types of initiatives are gaining traction across the US, and have received strong support from efforts such as the SBA's Start-Up in a Day program.[100] Examples include Kentucky's One Stop Business Portal and Virginia's Business One Stop.

The creation of resource navigator tools is also commonly pursued. Many regions develop their own one-stop shop websites or resource guides, while others tap into national or regional tools developed by groups like SourceLink. NETWork Kansas is a good example of this resource. Their website, designed by SourceLink, provides entrepreneurs with access to over 500 resource partners across the state and includes an 800 number that is staffed by experienced business counselors who can help direct entrepreneurs to the right resource in real time. Numerous states in the Appalachian region have created gateway sites where entrepreneurs can easily access information about resource providers – where they are located and what services they provide. Examples include Business Link North Carolina, Georgia's SmartStart site, Kentucky's One Stop Business Portal, and Launch Tennessee network.

Other regions seek to streamline regulations or to install a regular review system to scrub these rules on a regular basis. A number of states designate regulatory review boards to address business complaints and to lead regular reviews of existing laws to eliminate wasteful, unnecessary or burdensome regulations. Examples include the Arizona Governor's Regulatory Review Council and Missouri's Small Business Regulatory Fairness Board. This process may have reached its zenith with Kansas Governor

[97] Raymond J. Keating, *Small Business Policy Index 2017*, Small Business and Entrepreneurship Council Research Report, February 2017.
[98] See the Kauffman Foundation's Policy Map at: http://www.kauffman.org/what-we-do/resources/policy/the-entrepreneurship-policy-map
[99] Endeavor Insight.
[100] For more information, visit https://www.sba.gov/about-sba/sba-initiatives/startup-day.

Sam Brownback's 2011 decision to create a statewide Office of the Repealer, with powers to respond to citizen and business requests to repeal unpopular state laws and rules.

Finally, a number of states and localities now appoint an ombudsman to serve as a primary point of contact for entrepreneurs and other business owners. In addition, the US Small Business Administration is also home to a Federal Office of the National Ombudsman (ONO) to bring a small business perspective to the regulatory review process. State and local ombudsman operate in a diverse mix of institutional structures. Some states support a statewide Small Business Ombudsman, who operates in a manner akin to ONO. In addition, many state regulatory agencies, especially environmental regulators, also offer ombudsman-like services for regulated business. A small number of states, such as Florida, Maine, and Rhode Island, support a Small Business Advocate office that combines both small business advocacy and ombudsman functions. All of them focus on the key missions of complaint handling and regulatory review, and some offices provide a range of other services.[101]

Conclusion—Principles for Creating Robust Ecosystems

As this review makes clear, the development and maintenance of robust regional entrepreneurial ecosystems involves a complex mix of culture, history, markets, policy, and environmental factors. There is no single recipe: what works in Appalachia may not work in London, Beijing or Silicon Valley, and vice versa. However, as this review also notes, diverse ecosystems also share similar characteristics. They may relate to characteristics such as fluidity or connectivity, or they may relate to policy building blocks such as peer networks, investment capital, or talent development.

These commonalities allow us to use the lens of entrepreneurial ecosystems to offer general guidelines and principles for policy making.[102] First, effective regional strategies embrace a holistic perspective. They encourage community leaders to move away from our past focus on what (or how) a specific firm or firms are doing to a new focus on the broader environment in which these firms operate. Good policy matters, but good policy is not enough. It must be combined with other components that often relate to a region's culture, history, or traditions.

Second, it encourages community leaders to place more policy emphasis on the local business climate or policy environment. Building an "entrepreneur-friendly" region should assume precedence (or at least equal billing) to the provisions of services and funding to specific companies. Effective policy interventions can emerge from multiple paths and venues, so all of a region's institutions and players—not just economic developers—must be engaged.

[101] For additional details, see Microeconomic Applications, Inc. *Research on State Regulatory Flexibility Acts*, SBA Office of Advocacy Research Paper SBAHQ-11 M 0205, May 2013. Available at: http://www.sba.gov/sites/default/files/files/rs413tot.pdf

[102] These concepts build on initial ideas presented in Mason and Brown, 2014.

Third, the concept of entrepreneurial ecosystems reminds us that all firms matter, regardless of size or industry. All firms have the potential to grow or to be an integral part of a regional ecosystem. Small firms—and big firms---matter to an ecosystem's health and vitality. Fast growing small firms may be the engine of new wealth and new jobs, but big firms help create the conditions for their success and help spawn new generations of business talent.

Finally, the biological metaphor of the ecosystem again emphasizes the essential role of growth. Ecosystems are not static things. In successful regions, the ecosystem grows and evolves just as the local ventures also grow, evolve and hopefully thrive.

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