Seeding Innovation for Economic Growth

Why and How Should State & Local Governments Cultivate Innovation Clusters?

As a key automotive manufacturing hub in the rust belt, Columbus, Ohio, faced challenges similar to other older industrial regions in the U.S. after the 1970s: a decline in competitiveness and jobs creation, and the closing of major plants. Today, Columbus stands as one of the fastest-growing and most innovative tech hubs in the U.S.[1] Connecting its industrial heritage to a bold vision for its future, the city pivoted its strategy toward the future of transportation and smart mobility, and unlocked domestic and foreign investment in new energy vehicles.[2] Columbus' combination of bold public leadership, purpose-driven collaboration with the private sector, and top engineering talent pipeline shows a pathway for the development of future-proof innovation clusters in the U.S.

The transition to a knowledge-based economy creates opportunities for large and smaller cities to enhance their competitiveness through high-value innovative specializations. Compared to traditional manufacturing, they lead to higher wages and higher productivity over time. Innovation clusters, with their focus on R&D, dynamic spillovers between firms, and ability to level up in value chains, represent a key opportunity for long-term growth and resilience. State and local governments must build from existing assets, support industry specializations geared toward advanced manufacturing and digital technology, and attract and retain highly skilled, entrepreneurial, and creative workers.

The time is now, with billions of dollars in new federal funding designed to rebuild U.S. infrastructure and establish new regional innovation hubs through initiatives such as the Build Back Better Plan. The attractiveness of alternative hubs to Silicon Valley in luring away talent has created an opportunity for other locations across the U.S. to attract tech talent, investments, and venture capital.[3]

How do innovation clusters emerge? What can local and state government do to support and nurture innovation-driven ecosystems in their region?

To answer these questions, this paper explores the benefits and drivers of innovation clusters and provides considerations to help local leaders gear their interventions toward long-term innovation and resilience.

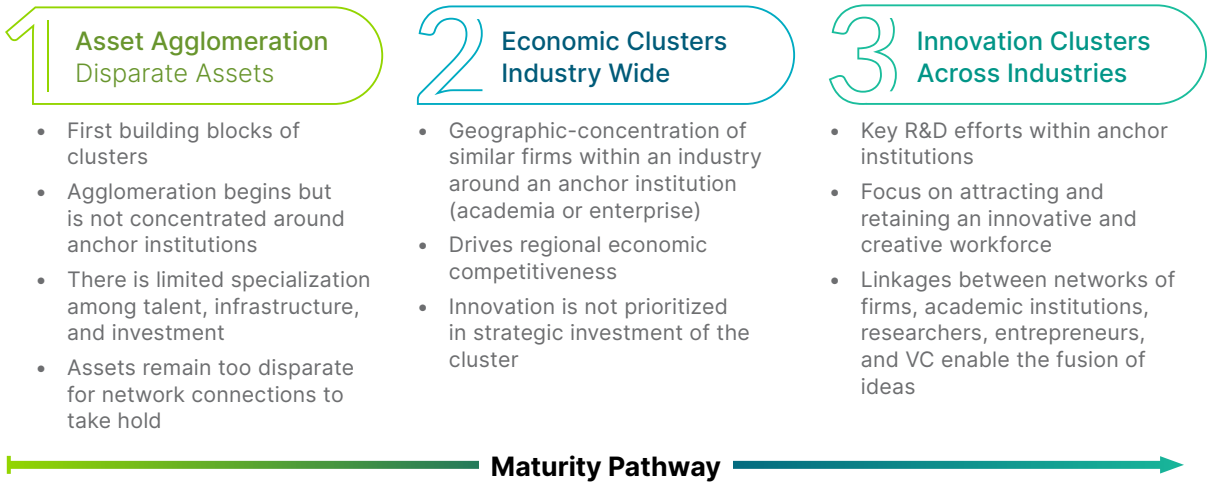
SECTION I

What are innovation clusters?

1.1 The role of concentration and agglomeration in cluster dynamics

State and local governments are realizing that creating competitive clusters is really about growing ecosystems of firms and activities. At its core, an economic cluster is a concentration of specialized and related industries in a region. A critical mass of firms and activities in an industry (measured by a "Location Quotient") leads to a multiplier effect in productivity and competitiveness.

These economic advantages, referred to as agglomeration economies, stem from the spatial concentration of activities and the growing interdependencies between firms. Spatial concentration and inter-firm linkages enable productivity increases through the sharing of knowledge, workforce, tailored facilities, infrastructure, and suppliers. For example, Silicon Valley's software cluster and Boston's biotechnology ecosystem illustrate the benefits of this concentration of specialized knowledge and activities.



1.2. What sets innovation clusters apart?

While economic clusters tend to focus on one single industry, innovation clusters grow from the linkages and exchanges developed by networks of firms, research institutions, and researchers from different but often adjacent industries. Cross-industry linkages and exchanges between these actors create innovation and generate new knowledge at the intersection of their respective specializations.[4]

Innovation clusters rarely emerge from scratch. They require building from existing assets, intentionally targeting a specialization, and supporting the organic growth of firms and activities. Regions often benefit from a leading organization or an institutional infrastructure that guides these efforts. The structure of innovation clusters varies, depending on the number of organizations leading the cluster initiative.[5]

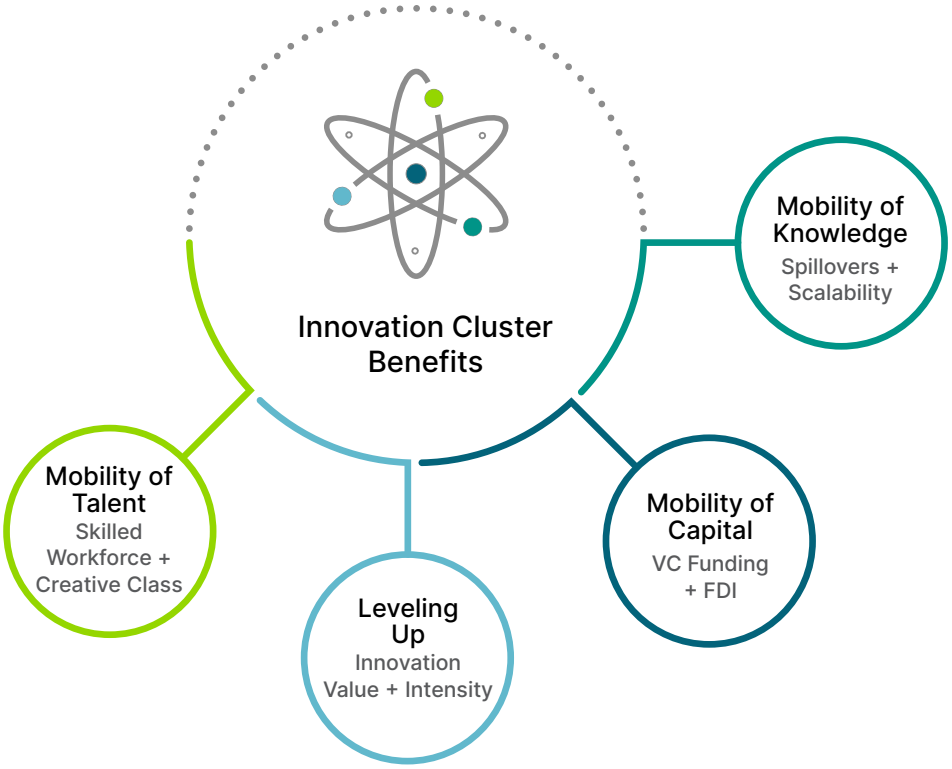
- **Single, clear lead** as the driver behind the cluster. *AgLaunch*, in Atlanta, Georgia, is a non-profit that focuses on agriculture companies and initiatives to pioneer methodologies and commercialize value-added projects through bringing together a network of diverse farmers, academics, and professionals to stimulate agricultural innovations and incubate new startups.[6]

- **A single organization** that leads multiple clusters. *The Innovation Cluster Accelerator Program* (ICAP)[7] in the State of Washington supports innovations ranging from aerospace to IT, online shopping to coffee. ICAP supports clusters through funding, strategy, advisory services, and networking with global cluster leaders.
- **Two or three organizations** that function as highly collaborative joint leads. Conductor is a public-private partnership between the University of Arkansas and *Startup Junkie*,[8] an organization focused on Northwest Arkansas with a mission to improve lives through innovation and entrepreneurship by building entrepreneurial ecosystems.

SECTION II

Why should state and local governments support innovation clusters?

A new range of innovative cluster and growth centers are emerging in the U.S. in AI, cybersecurity, biotech, and other innovative sectors. Innovation clusters bring a wide range of benefits to regional economies by enabling a virtuous cycle that leads to economic expansions and the creation of higher-paying jobs.[9]



2.1 Generate innovation and ensure against irrelevance

Innovation clusters create the conditions for workers to interact and share knowledge across sectors and firms. Transfers of knowledge between network assets (such as firm leaders, entrepreneurs, researchers, academics) facilitate innovation from the fusion of once considered disparate fields.[10] Transformative combinations such as biotech and virtual reality stem from the cross-pollination of ideas from different industries and business needs. For example, innovations in fitness and wearable tech merged with the needs of sustainable farming to create *SwineTech*, or "Fitbit" for pigs, helping pig breeders develop healthier pork meat for consumption.[11]

Professor and urban theorist Richard Florida emphasized the importance of a skilled and creative population, what he calls the "creative class," and regional talent retention in his 2002 book, The Rise of the Creative Class. Florida expands on previous concepts of the knowledge economy, linking the emergence of a creative class to economic development through an increase in population, production, and innovative ideas. Florida argues that a creative class made up of skilled workers, techies, artists, and innovators attracts further creative types by developing a culture of experimentation and innovation.

A focus on the generation of innovative ideas provides regional economies with an "insurance against irrelevance."[12] As firms and investors prioritize lower costs, regions with innovation clusters stay ahead of the curve, and retain their competitiveness and jobs. For example, a focus on EV technology and self-driving vehicles through the University of Michigan's innovative cluster Mcity helps reindustrialize the American automotive industry in Michigan, returning it to its competitive position on the global stage.[13]

2.2 Attract and retain a creative workforce

Innovative regions are best positioned to attract and retain a creative class and a skilled workforce. Innovation clusters attract entrepreneurs, engineers, developers, and creative minds, allowing for the growth of new and mature firms.[14] As new fields emerge and innovation is turned into patents and commercial products and services, talent is incentivized to stay.

The connections between local research and academic institutions and firms develop a ready-for-hire pipeline of talent. A culture of innovation emerges and expands the initial industry-specific focus of the cluster to attract wider know-how. For instance, the Silicon Valley became a center for biotechnology, New York City turned into a publishing and insurance capital, and Boston developed an unprecedented biopharma hub.

2.3 Stimulate investment and attract capital

Innovation clusters are powerful magnets for investment and capital, both foreign and domestic. Foreign direct investment (FDI) and Venture Capital (VC) funding support new R&D, product development, idea testing, and innovation incubators.[15] Furthermore, increased access to funding encourages the re-purposing of local assets for innovation activities.

Increasingly, investors are willing to support firms farther than a stone's throw from their offices. VC funding is spreading from its former coastal epicenters to include newer innovation anchors like universities and small research institutes across the Midwest.[16] For example, Midwestern universities represent 33 percent of the nation's STEM graduates and firms are using new investment activity through these schools to stimulate new innovations in the technology space. Moreover, with increases in FDI allowing capital to be pooled across a variety of resources, innovation clusters create resiliency against economic downturns and increase regional competitiveness.[17]

2.4 Level up in value chains

The mobility of knowledge, talent, and capital resources through innovation clusters enable regional economies to level up their position in global value chains. Innovation clusters are an important development tool for increasing the innovation intensity and value of economic production within the region. Firms can increase the significance of their position in the lifecycle of a product within a global industry.[18]

Leveling up the value chain can also reduce regional inequality by generating greater value in local economic production and increasing local spending. While urban areas typically have the building blocks of an innovation cluster, surrounding rural regions often lack the local infrastructure to stimulate rapid economic growth.

However, with sufficient government support and investment, innovation clusters can succeed in previously considered lower income or depressed areas. According to research from the University of Kentucky, an average industry worker in an innovation cluster produced at least $100 more per year than the same worker elsewhere.[19] This suggests that by supporting the development of innovation clusters in disinvested areas, regional inequality can be reduced.[20]

SECTION III

What are the building blocks of cluster development?

Innovation clusters do not emerge spontaneously; they emerge when certain enabling conditions are met. They require several ingredients to grow and maintain their innovative capacity. They also require symbiotic relationships between a wide range of actors, from academia, business, non-profits, and government, working toward the same goal.

Principles	
Bold Vision	A bold vision for the future of the regional economy helps activate the emergence of an innovation cluster. Local leaders, from both the public and private sectors, must articulate a long-term strategy for the economic growth of their region and make a series of bets toward innovation and transformation. Cluster development plans often fail due to unclear objectives, low buy-in, and misalignment between ambition and existing assets.
Appetite for Risk and Experimentation	Innovation rewards risk-taking. Firms, researchers, investors, and governments accept the risks of investing and making bets in new technology and unexplored fields. Experiments and failures are crucial for spurring innovation.
Collaborative Mindset	At its core, an innovative cluster requires a culture of collaboration, ideas-sharing, and bridge-building across sectors. While competition is inherent to their activity, firms within the cluster cultivate a win-win competitive spirit over aggressive win-lose poaching and acquisition instincts. A common sense of mission and purpose connects actors across sectors around a shared goal geared toward the growth and prosperity of the region, with firms understanding that their own business development will only go as far as the strength of the local economy.

For example, in Arizona, leaders from Phoenix and Tucson are executing a strategy to establish a world-class water technology cluster, connecting the region's issues of water scarcity, to a bold vision of providing the world with technology and solutions to address similar issues. Collaboration with the University of Arizona (UA) leverages talent, research, and operations from state-of-the-art wastewater reclamation facilities. The initiative has brought together water and energy experts, the public, and government and private corporations to work on technology development and education in water and energy sustainability.[21]

Purpose-Driven Ecosystem of Actors	
Anchor Institutions	Innovation clusters often develop around an anchor or legacy institution, such as a university, a research laboratory, a hospital, a large corporation, a military base, or a government agency. The anchor institution provides a starting point: it may bring visibility to the area, attract and develop talent, train the workforce, and be a space where innovation and entrepreneurship aggregate.
Diverse Businesses	A combination of highly specialized startups and large, established corporations bring value to innovative clusters. Larger firms possess the resources necessary for not only conducting R&D but also scaling and applying patents and innovation into market-ready solutions. They often provide support and financing to smaller firms geared toward innovation.
Enabling Government	Government plays a key role in allocating funding to the cluster. It also creates the enabling environment for the innovation clusters to be viable in the long term, through regulation and infrastructure investments. Local governments must also remain aware of market needs, identify opportunities, and provide a connective tissue between actors of the cluster to work toward the same direction.
Capital Providers	Capital providers such as private equity firms, venture capitalists, and institutional investors provide the necessary funding to create and sustain a cluster. A strong mix of sources of capital serves a multifaceted purpose. Not only do these firms provide funding, they also serve as a beacon, attracting new potential startups, and additional capital providers.
Incubators and Accelerators	Incubators and accelerators support startups and new ventures, by providing a nurturing environment, as well as workspaces, access to equipment, and training. These actors also provide the space to collaborate, experiment, test new ideas, and to fail, without the serious implications that come with testing or developing innovative ideas directly in the market.

For example, the State of Minnesota geared the region's innovation growth on health-tech activities by leveraging Rochester's Mayo Clinic talent and research strengths. The Mayo Clinic itself operates a number of large-scale funding programs, focused directly on clinical innovation and validation.[22] The *Mayo Clinic Venture Co-Investment Fund* provides venture capital up to $5M, and growth capital up to $20M for qualifying firms. The availability of substantial funding has attracted more than 100 healthcare startups, which collectively secured over $475M in venture capital funding in the first quarter of 2022.[23] These firms are the product of high caliber entrepreneurs and innovators, seizing the necessary capital for pursuing innovative ideas.

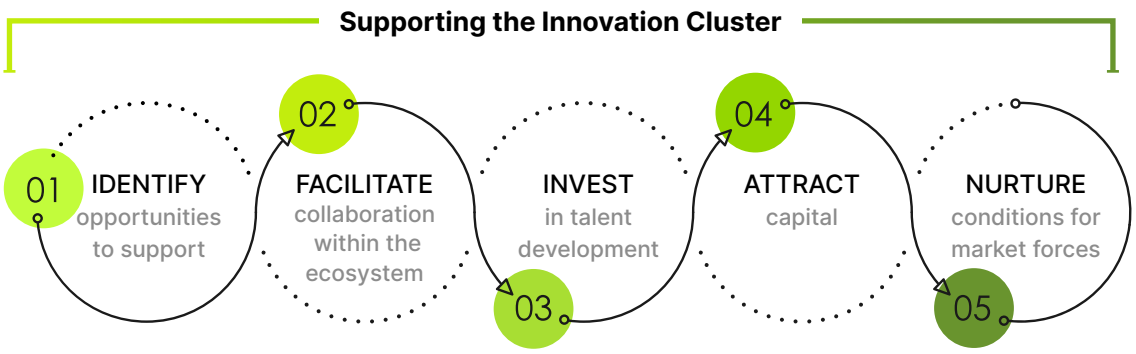
Assets for Durability	
Concentration of Talent	The technical skills, education, specializations, and aptitude of the local workforce play a fundamental role in the emergence and growth of an innovation cluster. Universities and other academic institutions can help produce the skills required to apply knowledge, innovate, and identify tangential opportunities that support cluster growth.
Industry Activity	Cluster development requires a critical mass of firms and activity levels in a particular industry or specialization. Clusters often have a high "Location Quotient" (i.e., a high concentration of an industry within an area compared to the concentration of the same industry nationwide).[24]
Infrastructure	The economic activity of clusters requires affordable and reliable energy, broadband, a strong local infrastructure network, and connectivity with other domestic and foreign locations (i.e., gateways, airports, flight connections).
Appeal and Livability	As innovative clusters rely on the attraction and retention of talent, the sense of place, desirability, and livability of the location are key drivers of success. Affordable housing, walkability, good school districts, green spaces, and top medical facilities have become key selling points for locations seeking to attract the creative class.

For example, Greenville, South Carolina, has emerged as one of the fastest growing cities in the U.S., attracting IT professionals through a focus on quality of life and affordability; boasting a vibrant downtown, culture, arts, and recreational venues. It also has regional access to strong anchor educational institutions and active economic development and workforce partners. Such assets position the city to attract and retain a creative class and skilled workforce to continue to prosper.

SECTION IV

What can state and local government do to support and nurture innovation clusters?

There is no cookie-cutter approach nor single-policy solution to supporting innovation clusters. Still, amidst the organic drivers of innovation, state and local governments can support and nurture the conditions that enable the growth and durability of innovation clusters.



4.1 Identify strengths and weaknesses of existing assets

In collaboration with the business community, state and local government leaders must identify existing regional assets and global market needs to help determine the best "bet" or type of innovation cluster with the greatest potential for the targeted geographic region. Market studies help determine the market demand for a product or services. These studies evaluate factors influencing demand, including price, location, competition, substitutes, and general economic activity.

An analysis of existing state and regional programs will help identify where such programs can be leveraged to bridge industry needs, such as developing a long-term workforce pipeline. For example, the Virginia Department of Education's Career and Technical Education program offers courses for students in Grades 6–12.[25] Programs like this may be expanded to an adult workforce to better meet an industry's long-term need for well-trained and industry-certified technical workers.

4.2 Facilitate collaboration

State and local governments can use their convening power to facilitate connections within the ecosystem. They can host meetings and symposia through which knowledge and information are shared between business leaders and industry experts and professionals in academia, public agencies, and non-profits. For instance, the Twin Cities Startup Week is an immersive festival that connects innovators and corporate leaders at events covering all facets of business. The state hosted the event for two days at the Science Museum of Minnesota. A privately owned brew house that was, itself, a startup[26] hosted the final three days.

State and local governments can also support the international connections of their innovative clusters, by exploring partnerships, hosting delegations from foreign counterparts, and sending trade missions to locations sharing similar specializations. For instance, the State of Maryland is prioritizing exchanges with the Midlands region in the United Kingdom to develop FDI, trade, and innovation exchanges to support their cybersecurity clusters.[27]

4.3 Invest in talent development

State and local governments can incentivize hiring from local educational institutions (e.g., universities, trade schools, community colleges) or entice a range of workers to the area. For example, in Oklahoma, aerospace companies hiring engineers receive a tax credit equal to five percent of the engineer's compensation or 10 percent if the engineer graduated from an Oklahoma college or university.[28]

Academic institutions can be encouraged to build entrepreneurship programs that support innovation. MIT's LaunchX, the Berkeley Business Academy for Youth,[29] and San Francisco's Leangap[30] all offer intensive programs that teach teens how to establish a startup. Such programs can be used as guides to develop programs tailored to the industry being nurtured within a specific region.

4.4 Attract private capital to blend with public funding

State and local governments can attract federal fundings available to support innovation. Place-based policies from the Economic Development Administration (EDA), such as the $1 billion Build Back Better Regional Challenge (BBBRC), support the development of new growth centers. The U.S. Small Business Administration (SBA) provides support to businesses seeking loans and additional capital. The SBA offers several resources such as the Lender Match Tool to connect small business owners to local lenders; access to microloan intermediaries, which are SBA-backed non-profit organizations with authority to issue microloans up to $50,000; and, in particular, certified development companies that provide support to business owners with purchasing real estate or buildings or looking to expand their business with new equipment.[31]

Specific to research and development (R&D), state and local governments can promote **federal research funds** that entrepreneurs and local businesses can leverage to further their R&D efforts. Federal funds for R&D increased 18% in 2020, alone, and the federal government shows no signs of slowing funding for R&D. State and local governments can encourage private capital such as VC through re-purposing state funds to match private capital investment. For example, Pennsylvania's Act 24 of 2021 established the Angel Investment Venture Capital Program that requires lending an amount that must be matched four times by VCs or angel funders.

4.5 Nurture and maintain the conditions for market forces to thrive

State and local government leaders need to provide the enabling environment for cluster growth:

- Infrastructure, green spaces, and public amenities. While this may not be an obvious economic development tool, research shows that creative classes no longer seek suburban business parks, but dense urban environments with a high quality of life: including school district quality, access to green spaces, and public amenities. Proximity to restaurants, local shops, and cultural activities are important livability assets sought by creative workers.
- Foster workforce mobility. Non-compete agreements in states like Washington and New York that restrict workers' ability to change jobs within the same industry and state oftentimes hinder knowledge flows among workers and the ability for firms to benefit from their accumulated training and experience.[32] Government and business leaders should work together to balance the need for protecting legitimate business information with protecting the ability of workers to change employers within their region instead of seeking employment in other states.
- Environmental & social impacts. As they seek to attract talent, government leaders must remain abreast of the impacts of population and industry growth on the environment. Increased demands on water resources, air quality, and waste disposal, among others, must be managed with policies that mitigate any negative impacts of such growth. State and local leaders need to avoid exacerbating social inequities that may arise as byproducts of their attraction efforts, such as gentrification, increases in the cost of living, lack of affordable housing, or insufficient access to public transportation.
- Zoning laws can be leveraged to attract startups, bring together creative entrepreneurs, or open incubators for collaboration in a concentrated geographic area. Local leaders should review their zoning ordinances and look for where they hinder innovation. Alternatively, they may want to make it easier for innovation cluster firms to secure non-conforming use permits, which can excuse innovation cluster key actors from following a specific portion of the zoning laws.[33]

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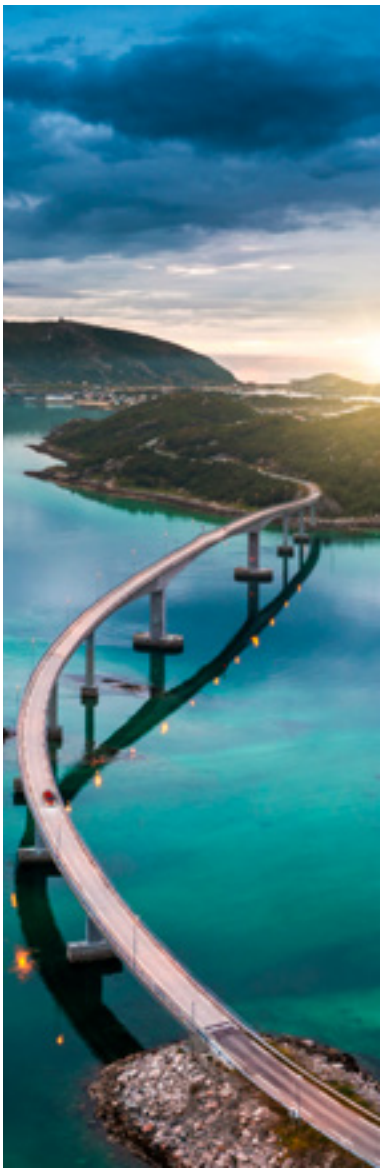

Conclusion

Not all regions can become the next Silicon Valley or Boston's biotechnology hub. Innovation clusters are not the panacea for every region — a number of places still need to do the hard work of growing essential services and care-sector jobs, and creating pathways to middle-income employment for their populations.

Seeding innovation clusters remains a lever in the economic developer's toolbox to put their communities on the map, plug into regional and global value chains, and grow economic productivity and incomes. With a bold vision for their future and a clear understanding of their local strengths and industry needs, state and local governments can cultivate robust ecosystems of activities and invest in their most strategic assets for the future: their workforce and communities.

Why Guidehouse

Our perspectives on economic cluster design are based on Guidehouse's considerable breadth of experience in helping cities, states, and regions navigate important economic, societal, and technological challenges. We have developed economic cluster approaches for regions seeking the next step on the value chain after industrialization, states seeking to equitably spread economic success from urban areas to rural, and cities looking to position themselves as global knowledge hubs.

Our recipe for success is simple. We take a data-driven approach, we thoughtfully engage with and consider the voices of the community, and we ensure that the right stakeholders are equipped with rich insights to make informed choices. This comes together in an intimate collaborative model with the states, cities, and regions we work with to deliver ecosystem-wide strategies that multiply the effect of our clients.

Guidehouse is dedicated to addressing the needs of the public sector. Our purpose is to act as a trusted advisor to our clients in solving the central challenges facing their societies and economies.

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About Guidehouse

At Guidehouse, we combine unequaled expertise, specialized resources, and deep domain experience to solve problems that cross sectors, industries and geographies for clients of the public sector and the regulated commercial markets they serve. Guidehouse is the only scaled consultancy in the world to fully integrate commercial and public or government businesses within each of our industry segments because complex problems require both perspectives to address and outwit. We see this integrated model as the future of consulting and the only way forward reshaping the future together with our clients.

Resources

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