

# Regional Entrepreneurial Assessment Project:

## Final Briefing Report

### *Region 9: Piedmont Opportunity Corridor*

December 2018

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# Overview

The purpose of this briefing report is to provide a high-level baseline assessment of entrepreneurial development and identification of potential priority actions in GO Virginia Region 9 – the Piedmont Opportunity Corridor.

TEconomy Partners, LLC was engaged by the GO Virginia Statewide Board to provide each GO Virginia region an independent and objective assessment of its entrepreneurial development position, to facilitate a situational assessment of the region's entrepreneurial ecosystem, and to help identify with local leaders priority actions to help strengthen the ecosystem.

## *Setting the Context: Importance of Entrepreneurial Development for Regional Growth*

- In 2017, there were 1,317 surviving traded sector startups formed since 2007 in Region 9
- 7,856 jobs in 2017 were found in these 1,317 surviving startups
- By comparison, over the 2007-2017 period, total traded sector industry employment grew by a mere 769 jobs in Region 9.
- So without entrepreneurial growth, Region 9 would have had a decline in its traded sector industry employment

# Project Work Plan

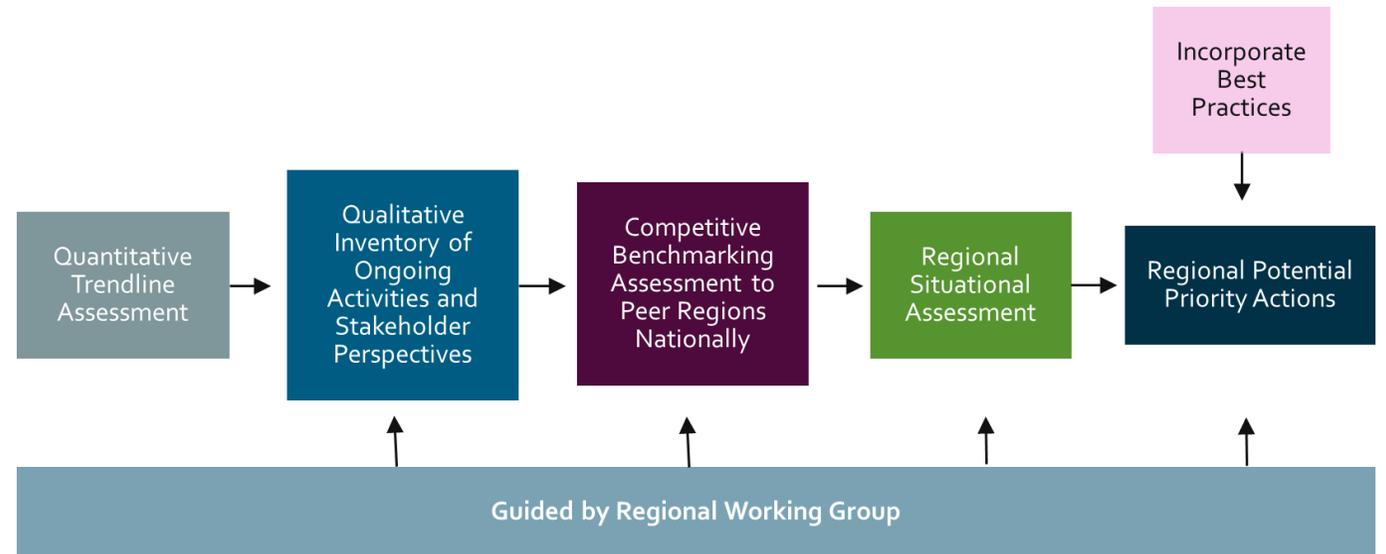
The work plan for preparing this Region 9 entrepreneurial development assessment involved examining:

- Recent data trends in entrepreneurial development
- Ongoing entrepreneurial activities and stakeholder perspectives
- Competitive position to peer regions nationally

These analyses were then utilized to develop a situational assessment of gaps and weaknesses to address and strengths and opportunities to build upon.

Based on the situational assessment and informed by best practices nationally, a set of potential priority actions has been identified for further development by GO Virginia Region 9 to catalyze the development of a robust innovation ecosystem.

## Overview of Work Plan for GO Virginia's project:



See Appendix A for listing of Working Group members from Region 9

# Strategic Framework: Focus on Entrepreneurial Development Stages Across Traded Sector Industries

## Stages of Entrepreneurial Development

Entrepreneurship is a process involving an interconnected set of development stages supported by public and private resources and services that generates successful new startup businesses to drive regional economic growth. If a region is underperforming in any stage of entrepreneurial development, then it will not realize its full potential in traded sector industry development.



Activities at Each Stage	Ideation	Commercial Viability	Market Entry	Growth & Scalability
	Idea development/invention, possibly involving lean startup approaches for identifying end users, market assessment and (if appropriate) IP creation	Customer discovery, new product development, proof-of-concept testing, prototype development, and validation/market testing	New firms that finalize commercial products, add key team members, execute business plans, marketing plans, manufacturing plans, develop supply-chains, and generate early revenues	Critical mass of firms that generate operating capital to expand markets, scale manufacturing, re-examine team member mix, generate new employment, and begin new product development through virtuous cycle supporting vibrant industry clusters
Type of Assistance to Entrepreneurs Needed	Guidance/coaching on gathering insights for business concept development	Domain specific market knowledge on differentiation, positioning, timing to complete and validate a full business model	Execution of business plans, investor outreach, product launch and business development for first customers	Building management team, positioning for IPO, entry into new markets and expanding market presence
Likely Sources of Risk Capital	Sweat equity; friends and family	Proof-of-concept; SBIR; accelerator angel investment, pre-seed	Angel investors; Formal VC investments including seed, Series A and Series B.	Later rounds of venture capital funding; mezzanine/SBIC; SBA (7)a loans

## Focus on Entrepreneurial Development in Traded Sector Industries

Of particular importance to GO Virginia is focusing on those new start-ups in traded sector industry activities that serve customers and markets beyond their local communities, and as a result, can drive regional economic growth. It includes industries such as: manufacturing; professional, scientific and technical services; information technology; finance and insurance; transportation and warehousing; mining; and agriculture and food processing

US Cluster Mapping Project describes the critical importance of a strong base of traded industry sectors :

*"[Traded industry clusters] are free to choose their location of operation (unless the location of natural resources drives where they can be) and are highly concentrated in a few regions, tending to only appear in regions that afford specific competitive advantages.*

*Since traded clusters compete in cross-regional markets, they are exposed to competition from other regions...Traded clusters are the "engines" of regional economies; without strong traded clusters it is virtually impossible for a region to reach high levels of overall economic performance."*

# Assessment of Ideation in Region 9

## Overall Assessment:

*Generally positive trends and significant asset base to build upon, but significant opportunities for advancing new program activities.*

## Strengths and Opportunities:

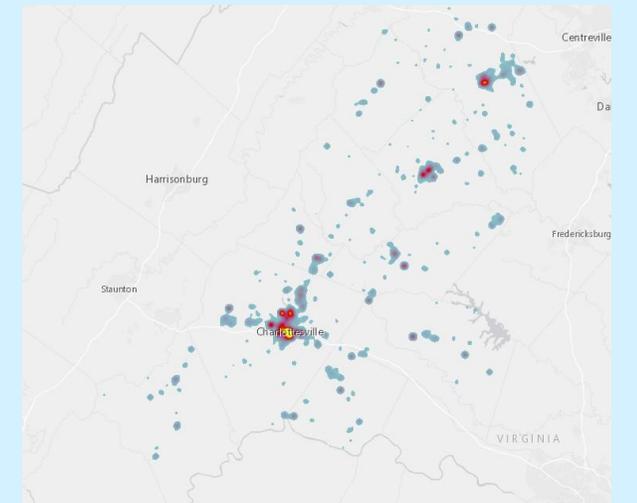
- **Competitive in overall levels of business formation** (both traded sector and non-traded sector) with peer regions through 2014 (most recent data available nationally),
- **Broad geographic footprint of traded sector startups across region**, with a major hub found in the Greater Charlottesville area – roughly 60% of the startups and jobs-from startups -- but significant entrepreneurial hubs found in Fauquier, Culpepper and other northern counties in the region.
- **Diversity in startup activities across traded sector industry clusters**, including each of the priority clusters identified by Region 9’s 2017 Growth and Diversification Plan
- **Significant annual generation of patents** – largely generated from private industry – averaging 481 patents per year over the past four years, with a focus on both IT and life sciences.
- **University research is sizable and growing strongly.** With approximately \$400 million in funded research annually, UVA is a large research university, though other peer rural regions with research anchors have even larger research bases to work from (nearly \$600 million at Purdue and over \$700 million at University of Florida).
- **Talent base of highly educated workers.** High education attainment compared to rural and mid-sized regional peers, with 28% of working age population having bachelor’s degree or higher. Plus, able to attract in-migration of highly educated talent from outside of Virginia – both inter-state migration and foreign in-migration – and overall highly educated workforce age population (25-64 years old) growing at a healthy 14%, which is competitive with peer regions.
- **A growing focus on creating entrepreneurial service hubs in region** – found both in Charlottesville (iLabs, iCorps, and CIC) and Fauquier County (with Mason Enterprise Center and Fauquier Enterprise Centers)

## Gaps and Weaknesses:

- **Significant volatility in business startups from year-to-year**, with a range from 148 startups (2017) to 301 startups (2013) in just the past five years.
- **Limited programming targeted to traded sector entrepreneurs outside of University of Virginia’s efforts** -- though these UVA efforts are seeking to reach out to broader community base of entrepreneurs.

**Region 9 has diversity in base of startups across traded sector industry clusters as well as across areas of the region**

Major Industry Cluster*** (those relating to regional priority clusters bold faced)	Number of Start-ups Since 2007 Surviving by 2017	Start-up Employment Levels, 2017
<b>Agriculture &amp; Food Processing</b>	<b>195</b>	<b>1,056</b>
<b>Business Services</b>	<b>637</b>	<b>2,653</b>
Energy, Natural Resources, & Finished Products	63	406
Engineering, R&D, Testing & Technical Services	97	654
<b>Financial &amp; Insurance Services</b>	<b>170</b>	<b>613</b>
<b>Health Care Services</b>	<b>28</b>	<b>710</b>
<b>Information Technology &amp; Communications Services</b>	<b>74</b>	<b>577</b>
<b>Life Sciences</b>	<b>42</b>	<b>389</b>
<b>Manufacturing</b>	<b>58</b>	<b>608</b>
Ship Building, Aerospace, & Defense	4	78
Transportation, Distribution and Logistics	231	1,438



# Assessment of Commercial Viability in Region 9

## Overall Assessment:

*Specific strength in university research commercialization for life sciences that can be expanded to other fields, plus opportunity to better position base of innovative companies found in region for success in commercializing products.*

## Strengths and Opportunities:

- **Sizable base of SBIR funding to small innovation based companies** in the region with 308 awards from 2010-2017, well outpacing peer regions.
- **University technology transfer performing above national average** in key metrics of disclosures, licenses and startups, normalized by size of research base. Still room for improvement compared to the top performing universities such as Purdue and University of Florida.
- **University of Virginia's success in technology commercialization to validate technologies and business models in life sciences.**

## Gaps and Weaknesses:

- **Missing toolbox for supporting technology commercialization targeted to emerging companies across the region.**
  - More informal network for accelerating companies, and not more systematic programming with quality and scale. For instance, no well-established accelerators across region, such as Lighthouse in Richmond
- **University of Virginia research commercialization efforts outside of life sciences are lagging**, including no proof-of-concept funding, mentor networks, access to entrepreneurs-in-residence to scout for technologies and pre-seed/seed funding.

## **University of Virginia's Efforts in Research Commercialization for Life Sciences Stand Out**

Nearly \$2 million annual spent across university commercialization/proof-of-concept programs, such as Coulter, Launchpad for Diabetes and IVY Foundation Biomedical Innovation Grant.

To date, 132 projects funded with approximately \$20 million in proof-of-concept funding have generated 18 startups, more than 55 technology licenses with companies and \$75 million in follow-on funding from investors, industry, foundations and federal sources.

Plus, a professionally managed UVA Seed Fund recently established with a \$10 million investment targeted to UVA-related startups that is a source for follow-on funding.

# Assessment of Market Entry in Region 9

## Overall Assessment:

*Key strength of region's entrepreneurial ecosystem, led by private-sector led venture investment.*

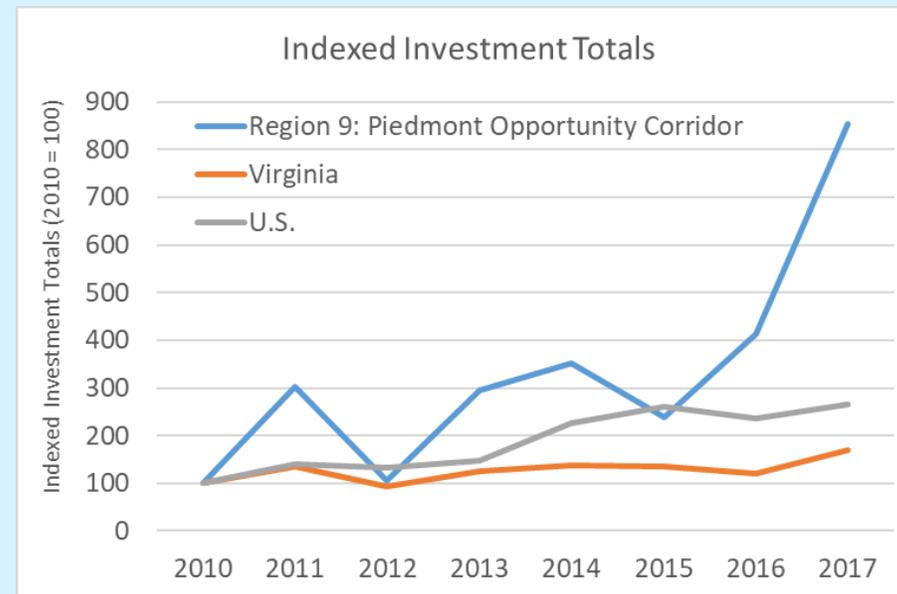
## Strengths and Opportunities:

- **High performing in share and growth of jobs in younger, traded sector firms.** Region 9 stands out compared to peer regions with 9% of its overall traded sector employment found in firms aged 0-5 years, and 60% of the growth in traded sector employment, on average over the past five years, found in firms aged 0-5 years.
- **Level and growth of venture capital significantly outpacing peers.** With \$222 million in venture capital funding from 2014-2017 and 131% growth from 2014-2017 compared to 2010-2013, the Region stands significantly above peers even from mid-sized regions (\$127 million and 86% growth).
- **Angel investments by high-net worth investors in the region, led by Charlottesville Angel Network, has been a crucial resource** for funding early stage companies at their formation and initial growth stages. Plus, growing activities to engage UVA alums.
- **Incubator and coworking spaces targeted to entrepreneurs found in both Charlottesville and Fauquier counties.**

## Gaps and Weaknesses:

- **Access to startup capital in Region 9 outside of Charlottesville.** No locally targeted angel investor or micro-loan funds for early stage startups found in northern counties of region.
- **Lack of lead early stage investors for high-potential startups needing formal venture capital investments beyond \$1-\$2 million from angel investor rounds.** When startups require larger Series A and B rounds, they are vulnerable to being relocated to be more proximate to investors since there is no lead investor at early stages of venture funding located in the region.
- **Despite strength of life sciences commercialization, there is no specialized wet lab facilities for startup and emerging life science companies.** Lack of incubator and multi-tenant wet lab space is a competitive disadvantage for the growing life sciences cluster in the region.

## Venture Capital Growth in Region 9 Stands Out Nationally



# Assessment of Growth & Scalability in Region 9

**Overall Assessment:**

*Uneven performance with significant opportunities to foster more retention and expansion of startups in the region.*

**Strengths and Opportunities:**

- **Right ingredients in region to grow startup companies.** Stakeholders see a strong confluence of talent, amenities and ecosystem – especially in the Charlottesville region – to support entrepreneurial development. Pockets of activity in other parts of the region also taking root.
- **Inc. 5000 fastest growing companies doubled in region and now stands at six.** Compared to rural regions, this number of Inc. 5000 is significantly higher, and it is growing much faster than the mid-sized benchmark regions, though roughly still half the average level.
- **Growth from startup companies important for many emerging industry clusters in the region,** including life sciences, engineering/R&D services and financial services. Plus, important in well-performing traditional industry of agriculture & food processing.

**Gaps and Weaknesses:**

- **Surprisingly, contribution of startups to growth of regional strength in Information and Communications Technology cluster is below 50% of total job gains – well below that of other regions.**
- **Declines in SBA 7(a) loans supporting growth-oriented small businesses in more traditional-based traded sector industries.** The decline of 27% from 2010-2017 stands out among benchmark peers.
- **Despite growth of highly educated workforce and positive in-migration from outside of Virginia, concerns voiced by stakeholders of talent shortages to scale-up startups, despite in-migration.**
- **Lack of networking for entrepreneurs and more formalized efforts to identify startup and emerging company needs outside of Charlottesville and increasingly Fauquier County.**
- **Outside of life sciences in Charlottesville with Cville BioHub, there is no focused targeted sector programs to support entrepreneurial development.**

**Contribution of Entrepreneurial Development to Traded Sector Industry Cluster Growth**

Industry Cluster	Economic Development Position in Region	Contribution of Entrepreneurship
Agriculture & Food Processing	Current Strength	Significant
Business Services	Sizable/Growing	Very Significant
Energy, Natural Resources, & Finished Products	Specialized/Declining	Very Significant
Engineering, R&D, Testing & Technical Services	Emerging Strength	Very Significant
Financial & Insurance Services	Emerging Strength	Very Significant
Information Technology & Communications Services	Current Strength	Modest
Life Sciences	Emerging Strength	Very Significant
Manufacturing	Declining	Very Significant
Ship Building, Aerospace, & Defense	Current Strength	Modest
Transportation, Distribution and Logistics	Declining	Very Significant

# Potential Priority Actions Identified for Entrepreneurial Development in Region 9

- Develop stronger ideation programming targeting traded sector startups.
- Support advancement of integrated accelerators-incubators-coworking entrepreneurial hubs across the region
- Catalyze wider range of risk capital in the region
- Strengthen networking of traded sector industry clusters
- Concept of a “Regional Entrepreneurial Quarterback”

# Potential Priority Action: Develop stronger ideation programming targeting traded sector opportunities

## Rationale:

- Take better advantage of region's strong base of talent and innovation activities to raise and sustain new business formation
- Limited ideation outreach currently in the region to broader base of non-university high-growth potential traded sector entrepreneurs
- Opportunity to raise entrepreneurial development in Information and Communication Technology cluster
- Opportunity to support small innovation businesses that receive or seek SBIR awards
- Address gap in UVA research commercialization efforts in non-life science areas, especially ICT or "tech" based businesses to raise contribution to growth of that sector

## Possible Activities:

- Create an ongoing regional capacity to offer an ideation program for potential entrepreneurs similar to SBDC's Innovation Commercialization Assistance Program
- Leverage expertise and resources of UVA through its iCorps site to have trainers and counselors from within the region
- Create a referral network tapping existing economic development organizations, coworking and incubator facilities, angel investors, local bankers and professional service providers
- Sponsor entrepreneurs-in-residence fellows in targeted sectors relevant to Region 9 to work with identified regional entrepreneurial startup teams that successfully complete initial phases of ideation program and demonstrate high-growth potential

## Illustrative Best Practice Examples:

- Chattanooga, TN: Co.Starters 9 week lean startup program followed by Co.Lab Accelerator mentoring program for high-growth potential startups
- Charlotte: Ventureprise at UNC, Charlotte leverages its NSF i-Corps site to bring a customer discovery/mentorship program to non-university related, early-stage, innovation-driven startups in the region. Successful teams then able to tap micro-grant (up to \$10k) or seed grant (up to \$50k) from statewide NC IDEA program.
- Raleigh-Durham: Blackstone Entrepreneurs Network North Carolina that provides expert venture coaching through a veteran group of EIRs

# Potential Priority Action: Support advancement of integrated accelerators-incubators-coworking entrepreneurial hubs across the region

## Rationale:

- While Charlottesville is the major hub of entrepreneurial activity in Region 9, there are significant pockets of entrepreneurial activity found across the region.
- Even Charlottesville lacks accelerator programs to support entrepreneurial teams to be mentored and provided initial pre-seed funding to advance their business concepts to the stage of company launch, including the identification of customers, new product development and business planning for startups
- Address gap in UVA research commercialization efforts in non-life science areas, especially ICT or “tech” based businesses to raise contribution to growth of that sector

## Possible Activities:

- **Leverage existing and encourage formation of new enterprise centers** offering incubation and coworking spaces involving support of local public/private partnerships across communities in Region 9
- **Create a collaboration across entrepreneurial hubs** to develop shared programs, mentor networks, outreach activities, pitch competitions, etc.
- **Offer acceleration services as a follow-on to proposed ideation services** for identified high-growth potential startups, especially targeting cohorts to specific industry clusters and market opportunities
- **Engage with existing angel networks and individual angel investors** to develop a strong pipeline of investment-ready new venture startups

## Illustrative Best Practice Examples:

- Birmingham, AL: Innovation Depot, a 140,000 incubator/coworking space, is home for a variety of entrepreneurial and talent initiatives in collaboration with community stakeholders and UAB, including a new technology accelerator, Velocity, that invests up to \$50k in seed funding for selected startup teams.
- Charlotte, NC: Within their entrepreneurial hub, known as Packard Place, offers a network of accelerator program services including in cleantech, fintech and more general tech-based businesses
- Greenville, AL: Led by the NEXT program of the Greenville Chamber, brings a strong focus on entrepreneurial and innovation-focused small businesses, with three different facilities, including one targeted for advanced manufacturing, mentoring programs, events and other ecosystem development efforts.
- Gainesville, Florida: Multiple types of entrepreneurial hubs including Sid Martin Biotech, Florida Innovation Hub, Innovation Square and smaller incubators located near smaller high education institutions.

# Potential Priority Action: Catalyze wider range of risk capital in the region

## Rationale:

Beyond the success of Charlottesville Angel Network, there are significant range of risk capital needs, including:

- Lack of lead early stage formal VC investors for high-potential startups needing formal venture capital investments beyond \$1-\$2 million from angel investor rounds.
- Need for access to startup capital outside of Charlottesville.

## Possible Activities:

- **Form a regional or multi-regional seed fund** able to bridge angel investors and more formal venture capital, with ability to lead syndication at seed stage and participate in follow-on early stage rounds
- **Create a region-wide micro-loan fund targeted to traded sector startups involved in more traditional traded sector activities**, such as agriculture and food processing, other manufacturing and business services. Learn from and perhaps build upon micro-loan efforts of Community Investment Collaborative in Charlottesville area to become region-wide and offer a targeted fund for traded-sector startups coming through ideation programs and identified as high-growth potential.
- **Organize angel investors across the region** to tap broader range of deal flow coming out of the network of entrepreneurial hubs in the region and their ideation/acceleration programs

## Illustrative Best Practice Examples:

- Susquehanna, PA: Rural Business Innovation organization provides business technical assistance for accessing financing, along with a micro-loan startup grants, as well as a network of incubators near local colleges and universities (including Bucknell).
- Chattanooga, TN: Two seed funds are active in the region, Chattanooga Renaissance Fund and Lamp Post Group.
- Ohio Third Frontier: 34 pre-seed or seed funds established across regions of Ohio, capitalized at approximately \$6-\$7 million on average.

# Potential Priority Action: Strengthen networking of traded sector industry clusters

## Rationale:

- Build upon the unique needs found across the diversity of startup activities found in traded sector industry clusters.
- Engage startups more actively across the region based on their specific industry domain requirements involving customers, new product development and technology adoption, talent and workforce needs and financing requirements.
- Outside of life sciences, there is not industry-specific organizations in the region.

## Possible Activities:

- **Facilitate bringing together entrepreneurs from around the region in specific industry clusters** to learn of their interest in coming together to form an industry innovation network.
- **Allow entrepreneurs to define initial activities of industry innovation network** to support their growth and access to specific domain-focused resources, such as mentor and professional service networks, accelerator services, infrastructure development, risk capital needs, talent and workforce programs, etc.
- **Host ongoing networking activities, workshops and investor forums.**
- **With effort of Cville Biohub, need for wet lab space is likely to be a major requirement.** Emulate Richmond's use of Virginia Biotechnology Research Authority to help finance wet lab space.

## Illustrative Best Practice Examples:

- Chattanooga, TN: Focused on targeted industry innovation networks through ongoing accelerator programming including ultra-high bandwidth business applications, consumer goods, outdoor recreation and food/beverage.
- Greenville, AL: Focused on regional opportunity with strong presence of foreign auto makers to establish International Center for Automotive Research that represents significant public/private partnership and involves a Center for Emerging Technologies. Plus, strong focus on entrepreneurial programs for advanced manufacturing through Chamber's entrepreneurial program efforts.
- Gainesville, FL: Sid Martin Biotech a 40,000 sf wet lab incubator with a strong track record of successful startups
- Raleigh-Durham: NCBioTech Center, a long-established resource supporting growth of life sciences with a historical focus on the Raleigh-Durham region. Has formed interest groups in specialized life sciences areas to pursue new opportunities and collaborative efforts, which has led to spin-off resources such as in forest biotechnology.

# Proposed GO Virginia Action: *Establish Regional Quarterbacks for Entrepreneurial Development in Each GO Virginia Region*

## Specific Activities:

- Identify opportunities and needs for regional entrepreneurial development within traded sector industries
- Ensure an implementation capacity on priority actions
- Provide a “front door” in each region for entrepreneurs to receive coordinated services among service providers

## Service Delivery Approach:

- Performance-based grants developed in consultation with each region to address priorities
- In each region, an advisory committee will be created to oversee the efforts of the regional quarterbacks
- Potential for multi-regional applications
- VRIC proposal articulates additional entrepreneurial activities that need to be coordinated with the regional GO Virginia efforts

## Budget Rationale:

- Award \$200k-\$300k per region to fund a full-time professional to serve as the regional quarterback. Funding could yet be made available in FY 2019.
- The regional quarterback would be tasked with advancing a regional strategic plan and prioritizing strategic investments, with the input from regional entrepreneurial ecosystem stakeholders, under the auspices of the GOVA Regional Boards.
- Once a regional prioritization investment plan is developed, further funding would be available in FY 2020 and thereafter to fill the gaps identified, including funding for efforts such as: EIRs, incubators, accelerators, mentor networks, etc.

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## Comparable Best Practice Model: *Launch Tennessee*

- Supports a network of Entrepreneur Centers, located in six cities across the state that provide entrepreneurs access to a mix of support services, including: wayfinding for entrepreneurs, boot camps, mentorship, co-working space, and initial pre-seed grants.
- In 2016, Launch Tennessee made grants to its Entrepreneur Centers of \$200,000 to \$375,000 for each center. These centers serve a much smaller area than GO Virginia regions.

# Appendix A: Listing of Working Group Members

Working Group:  
Regional Council 9  
Task Force on  
Startups/Innovation/  
Commercialization

- **Jim Cheng**, CAV Angels and former Virginia Secretary of Commerce & Trade
- **Leigh Middleditch, Jr.**, Of Counsel, McGuireWoods, LLC
- **Elizabeth Smith**, Owner & General Manager, Afton Mountain Vineyards
- **Pace Lochte**, AVP for Strategic Initiatives, University of Virginia
- **Tom Click**, President & CEO, Patriot Aluminum
- **Miles Friedman**, Director of Economic Development, Fauquier County

# Appendix B: Quantitative Trendlines on Entrepreneurial Development

# Initial Analysis of Entrepreneurial Dynamics in Your Region's Traded Industry Sectors

## Key Measures:

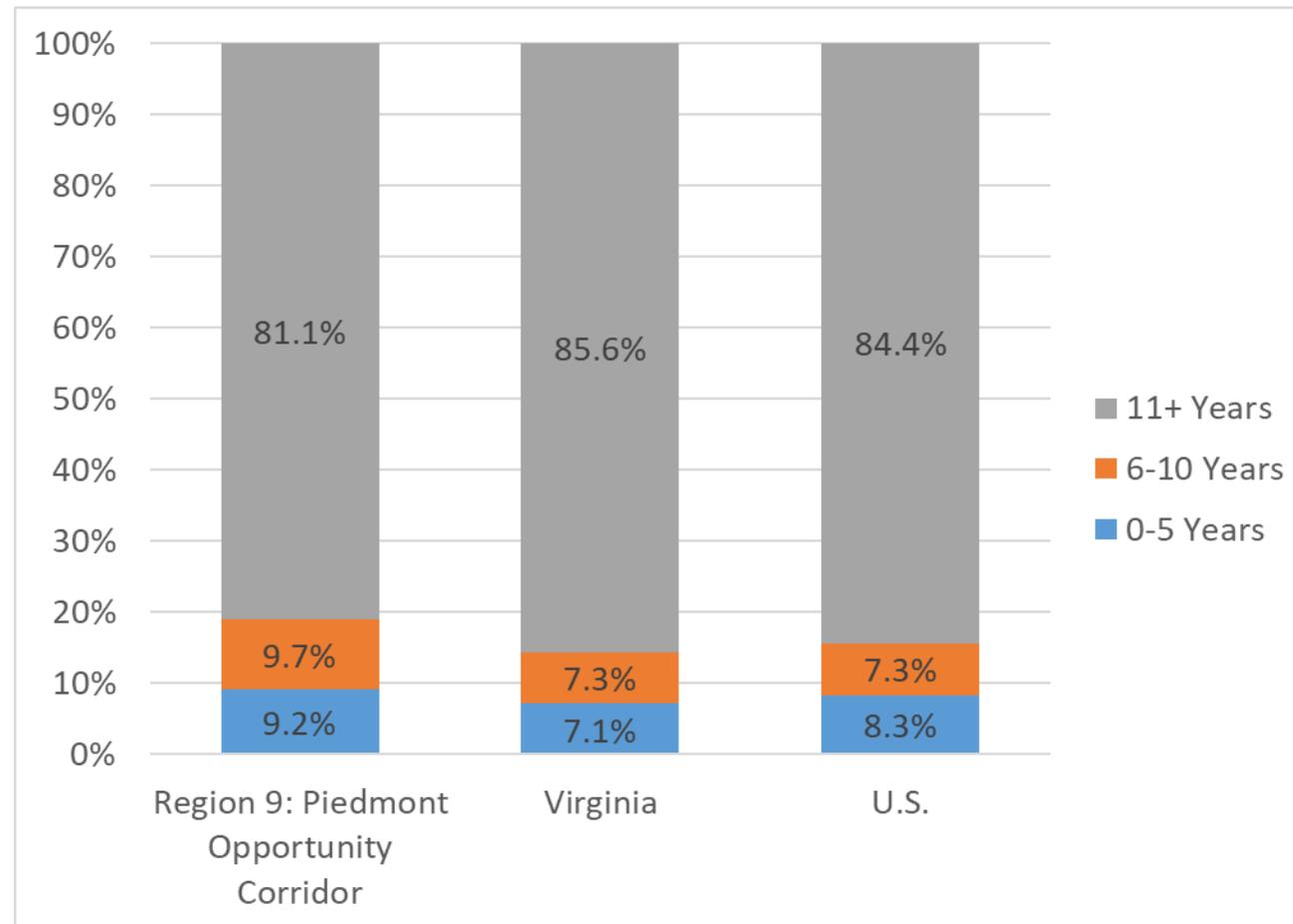
- Job distribution by age of firm
- Job creation by age of firm
- Business formation rates of start-ups
- Survival rates of startup companies
- Examining key elements of “net” employment growth
- The contribution of high-growth startups compared to all startups

## Note on Data Sources:

- Two data sources used to provide a full depiction of entrepreneurial dynamics:
- ***The Quarterly Workforce Indicators (QWI) from U.S. Census*** is a new longitudinal database with detailed data related to the job creation and other characteristics of firms, including by age groupings.
  - ***Most Detailed Level of Geographic Coverage:*** County
  - ***Coverage:*** Covers over 95% of U.S. private sector jobs (does not cover ag jobs, self-employment)
  - ***Grouping of Employment by Age of Firms:*** 0-1 Years; 2-3 Years; 4-5 Years; 6-10 Years; 11+ Years
  - ***Industry Coverage:*** 2-digit industry, which can define at a high-level traded sector industries
  - But QWI does not provide intelligence at the firm level
  - All data is on a quarterly basis
- **The Business Dynamics Research Consortium (BDRC) database** is a time-series dataset that catalogues individual establishments by location, employment, sales, and industry from 1997 to 2017. The BDRC It is maintained by the University of Wisconsin
  - Coverage: It compiles multiple data sets to track performance and growth for more than 144 million individual businesses across the United States.
  - Provides extensive firm level data
  - Able to identify firm by address
  - Detailed industry coverage

# Regional Employment Distribution by Age of Firm for Traded Sector Industries

- Majority of employment base is contained within older firms, mirroring wider state and national trends

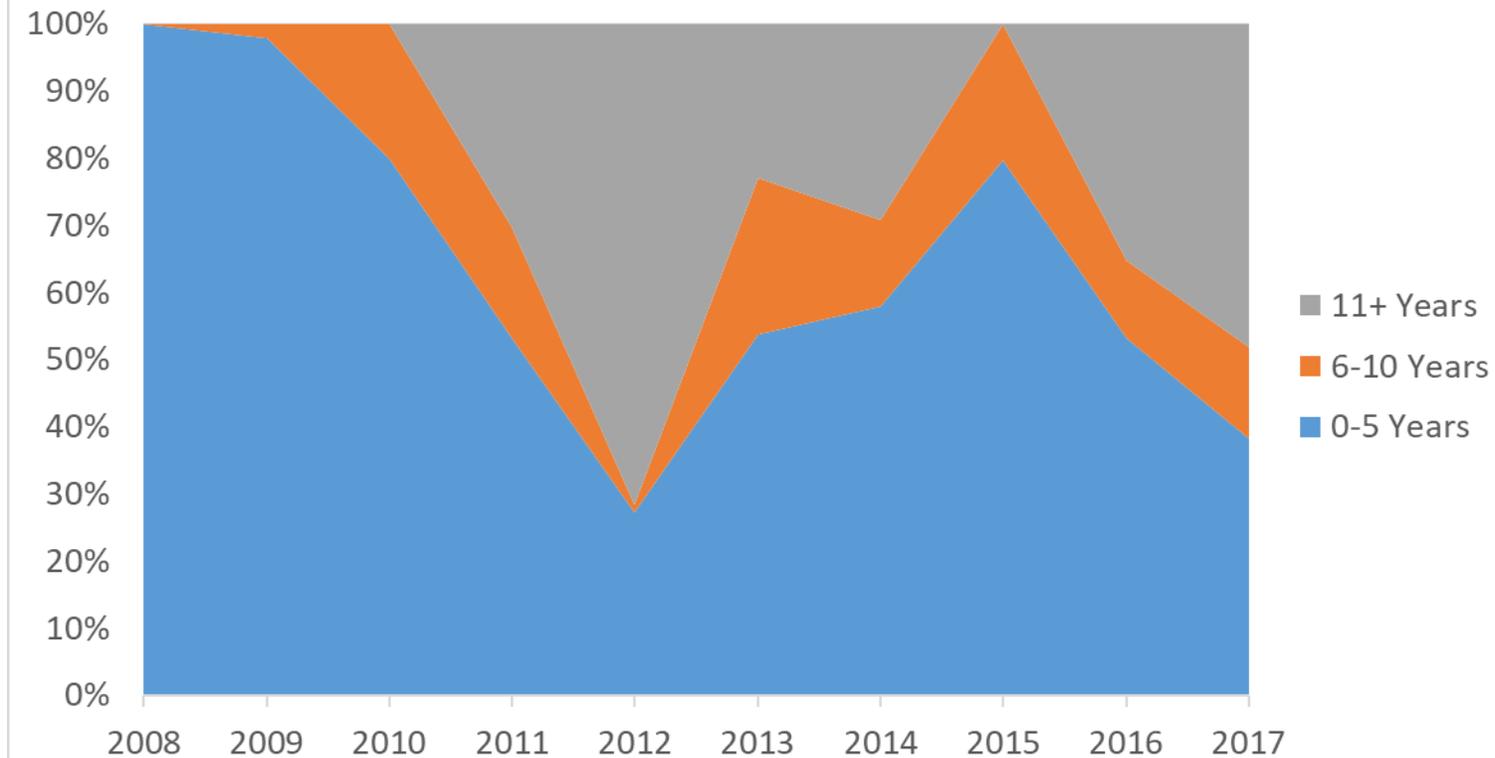


Traded Sector Employment Levels by Firm Age as a Percentage of Total Employment, Averaged 2008 Q1 through 2017 Q2

# Trends in Net Job Growth Generation by Age of Firm for Traded Sector Industries: Young start-ups drive net job change in any one quarter

Traded Sector Net Job Change by Firm Age, 2008 Q1 through 2017 Q2

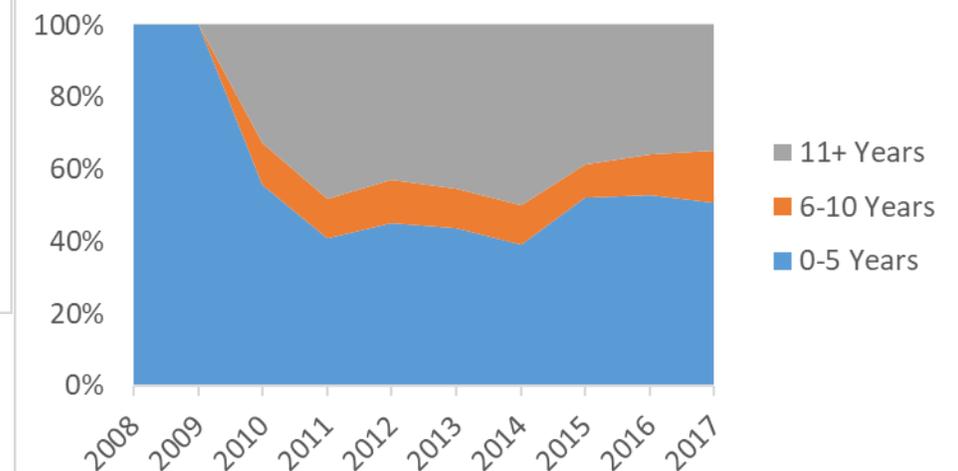
Region 9: Piedmont Opportunity Corridor



Virginia



U.S.



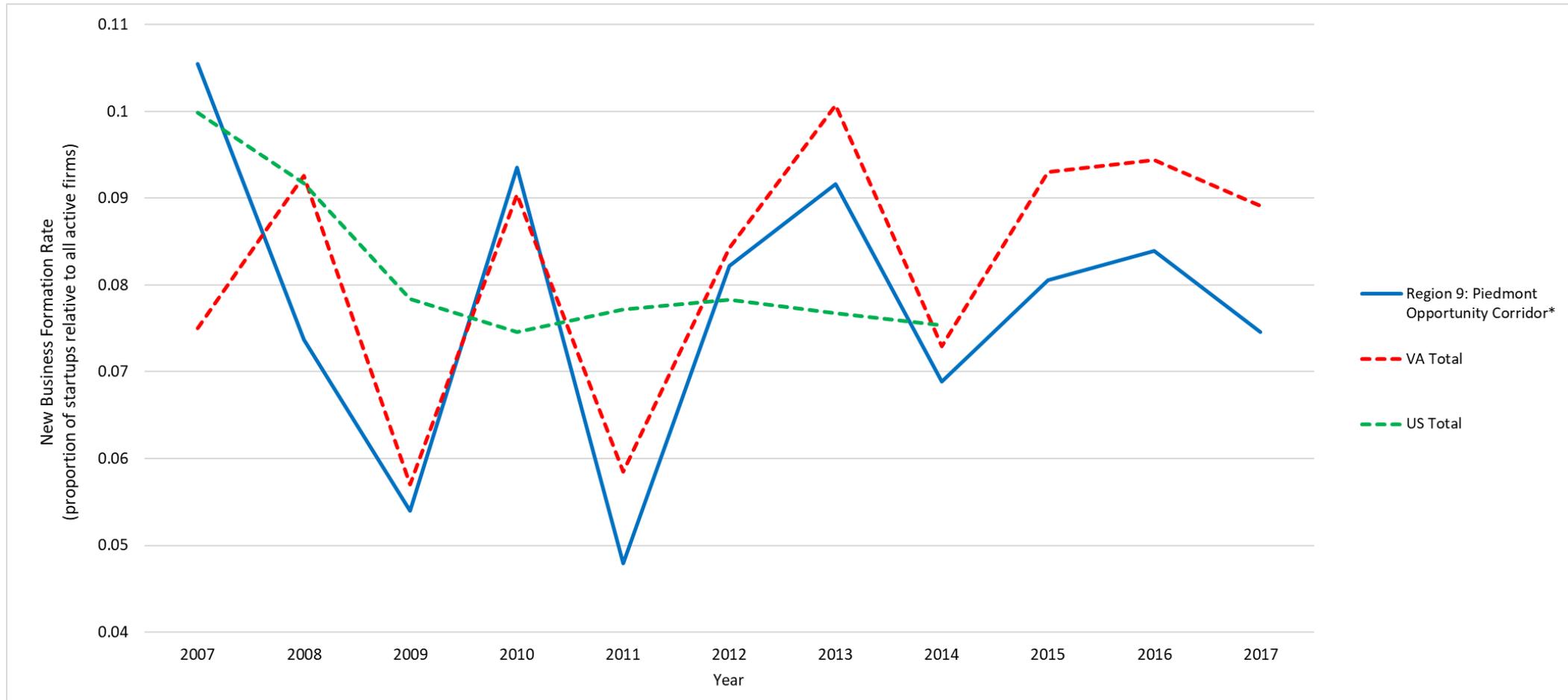
# BDRC Profile of Startup Activity Trends in Region

Founding Year of Startup Cohort*	Number of Startups in Traded Sector Industries	Number of Startups Surviving by 2017	Start-up Employment Levels 2017
2007	370	115	1,082
2008	239	77	454
2009	140	53	355
2010	332	121	597
2011	110	54	243
2012	277	132	694
2013	301	140	878
2014	199	125	791
2015	224	168	965
2016	231	184	1,037
2017	148	148	760

\*Composed of all new non-branch firms with first recorded employment activity in a given year

# Overall New Business Formation Rates for Region Based on BDRC Firm Level Data

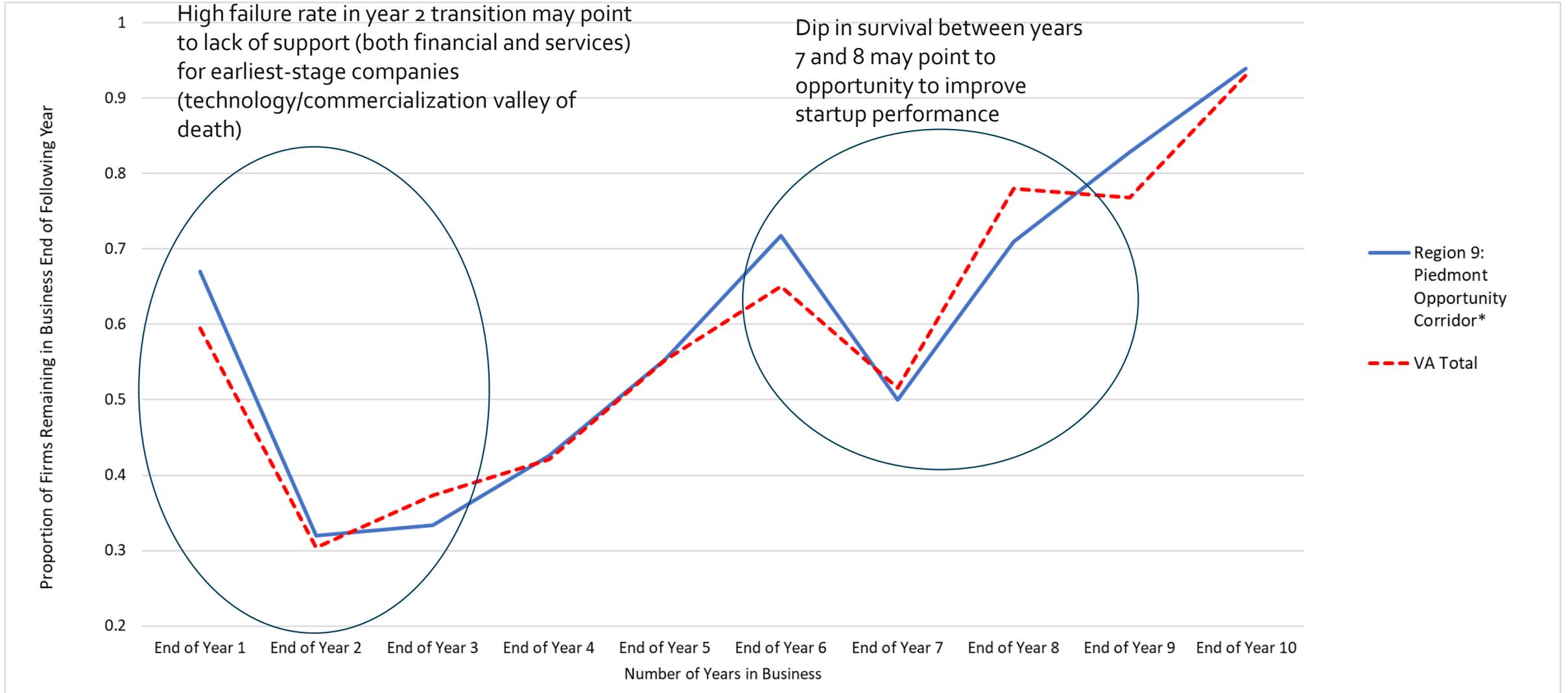
- Region 9 started higher than U.S. and State, but has had a sharper fall-off in recent years – with lots of volatility



\*US new business formation rates available to 2014 via US Longitudinal Business Database

# Year over Year Survival Rate Trends in Regional Traded Sector Startups

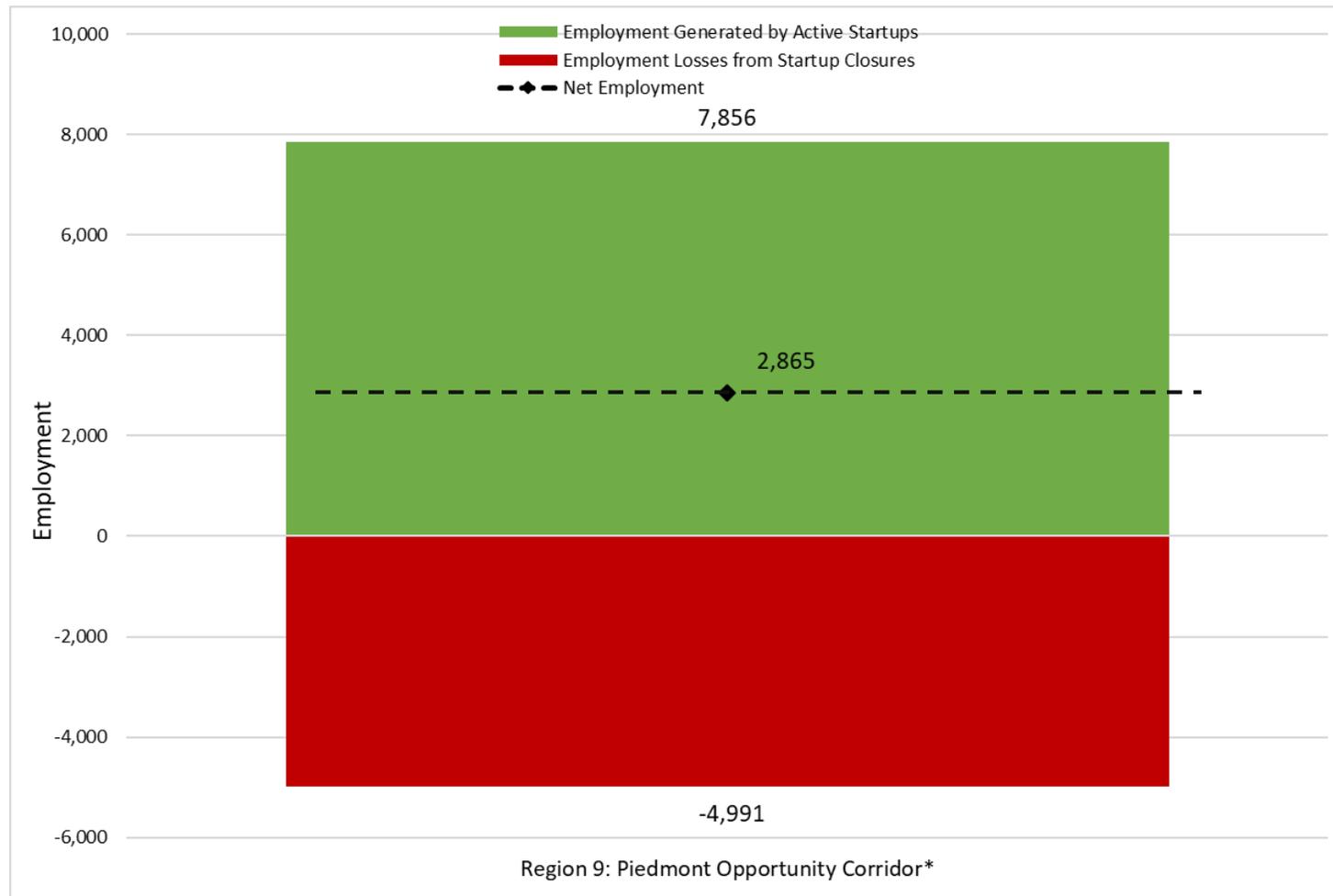
Cumulative 10-year startup cohort survival rates for region are 52.7% compared to a VA statewide rate 53.5%



\*Startups defined as having firm age <10 years as of 2017

# Net Employment Impacts Generated by Traded Sector Startup Firms in VA

- Significant churn within startups, though generally net employment gains from those surviving startup firms outpaces employment loss from failures across region



\*Indicates GO Virginia regions with research universities

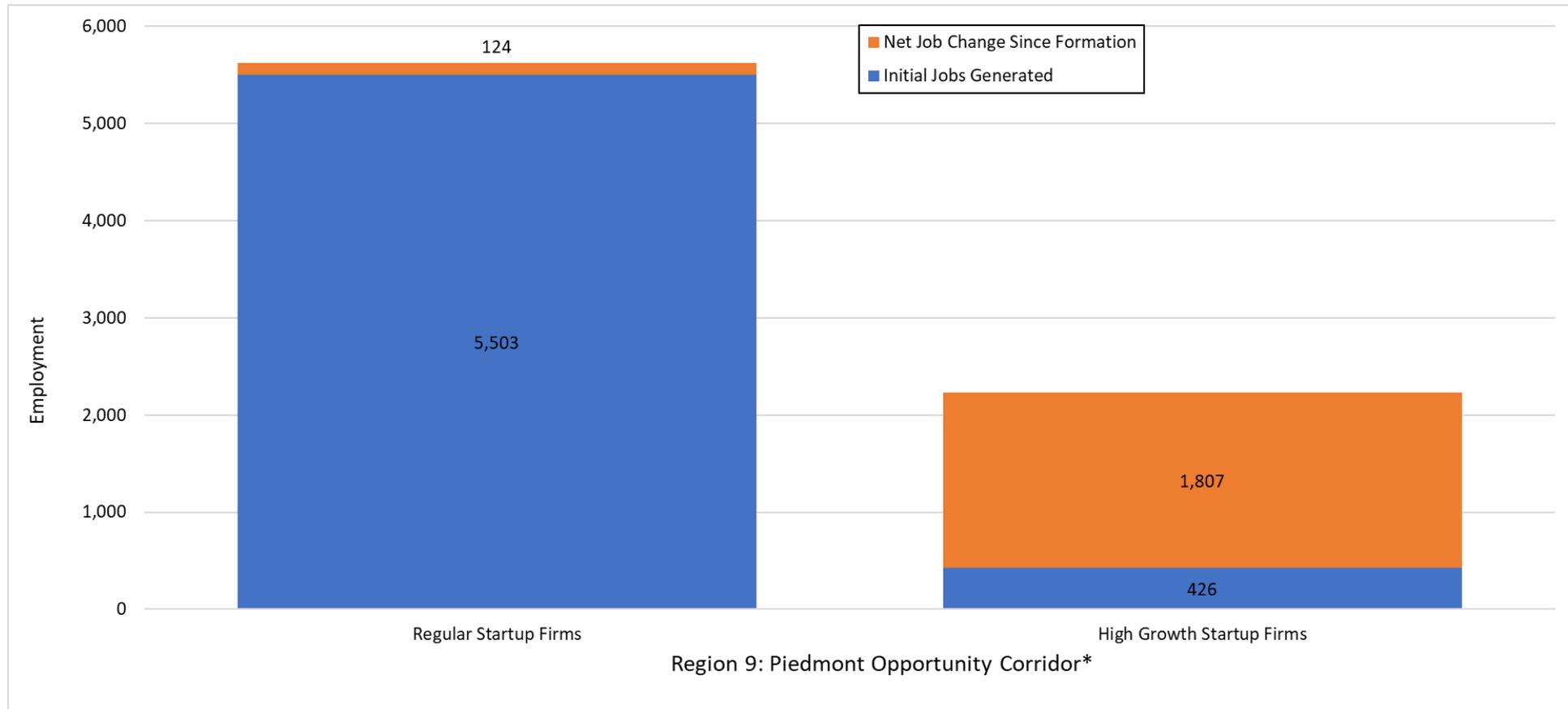
\*\*Startups defined as having firm age <10 years as of 2017

	Total Virginia Startups, 2008 (Q2)-2017(Q2)
Employment Generated by Active Startups	155,033
Employment Losses from Startup Closures	-98,732
Net Employment	56,301
Region 9 Share of Statewide Net Employment	5.1%

# Employment Growth Impacts Generated by Current Traded Sector Startup Firms in Region

- Key to long term success is high growth startups – disproportionate share of lasting gains in employment observed from cohort of startups exhibiting high annualized growth rates

	Total VA Regular Startup Firms	Total VA High Growth Startup Firms
Initial Jobs Generated	104,889	9,058
Net Job Growth Since Formation	506	40,781
Region 9 Share of Statewide Net Job Growth Since Formation		4.4%



\*Indicates GO Virginia regions with research universities

\*\*Startups defined as having firm age <10 years as of 2017, high growth startups defined as >25% annualized employment growth over lifetime of business

# Profile of Startup Activity Within Key Regional Industry Clusters

## Region 9 Priority Clusters from 2017 Growth and Diversification Plan:

- Light manufacturing
- Food and beverage manufacturing
- Information technology, communications
- Biomedical and biotechnology
- Financial & business services

Major Industry Cluster*** (those relating to regional priority clusters bold faced)	Number of Startups in Cluster, 2007-2017	Number of Start-ups Surviving by 2017	Number of High Growth Start-ups in Cluster**	Start-up Employment Levels, 2017	Start-ups Industry Cluster Employment Concentration Index*
<b>Agriculture &amp; Food Processing</b>	<b>318</b>	<b>195</b>	<b>27</b>	<b>1,056</b>	<b>2.57</b>
<b>Business Services</b>	<b>1,223</b>	<b>637</b>	<b>74</b>	<b>2,653</b>	<b>0.79</b>
Energy, Natural Resources, & Finished Products	111	63	11	406	0.86
Engineering, R&D, Testing & Technical Services	154	97	26	654	0.89
<b>Financial &amp; Insurance Services</b>	<b>348</b>	<b>170</b>	<b>13</b>	<b>613</b>	<b>0.82</b>
<b>Health Care Services</b>	<b>56</b>	<b>28</b>	<b>9</b>	<b>710</b>	<b>0.91</b>
<b>Information Technology &amp; Communications Services</b>	<b>126</b>	<b>74</b>	<b>15</b>	<b>577</b>	<b>0.54</b>
<b>Life Sciences</b>	<b>82</b>	<b>42</b>	<b>8</b>	<b>389</b>	<b>1.34</b>
<b>Manufacturing</b>	<b>103</b>	<b>58</b>	<b>12</b>	<b>608</b>	<b>1.13</b>
Ship Building, Aerospace, & Defense	6	4	3	78	0.88
Transportation, Distribution and Logistics	494	231	32	1,438	0.87

\*Represents a measure of specialization in startup activity in certain industry clusters given overall state trends, >1.2 indicates highly specialized concentration of startup generation in industry area

\*\*Defined as >25% annualized employment growth over lifetime of business

\*\*\*Note: some industry cluster definitions include a mix of traded and untraded industry sectors

# Contribution of Entrepreneurial Development to Leading Industry Clusters

Significant dynamics among industry clusters – move away from traditional industries, though ag/food specialized and growing, while many emerging strengths

Role of entrepreneurial activity varies across leading industry clusters:

- Interestingly, among industry clusters that are “current strengths” not very significant contributor to job growth – including for ICT and Defense-related industries
- Very important in emerging industries within region, including life sciences, engineering/R&D services, and financial services

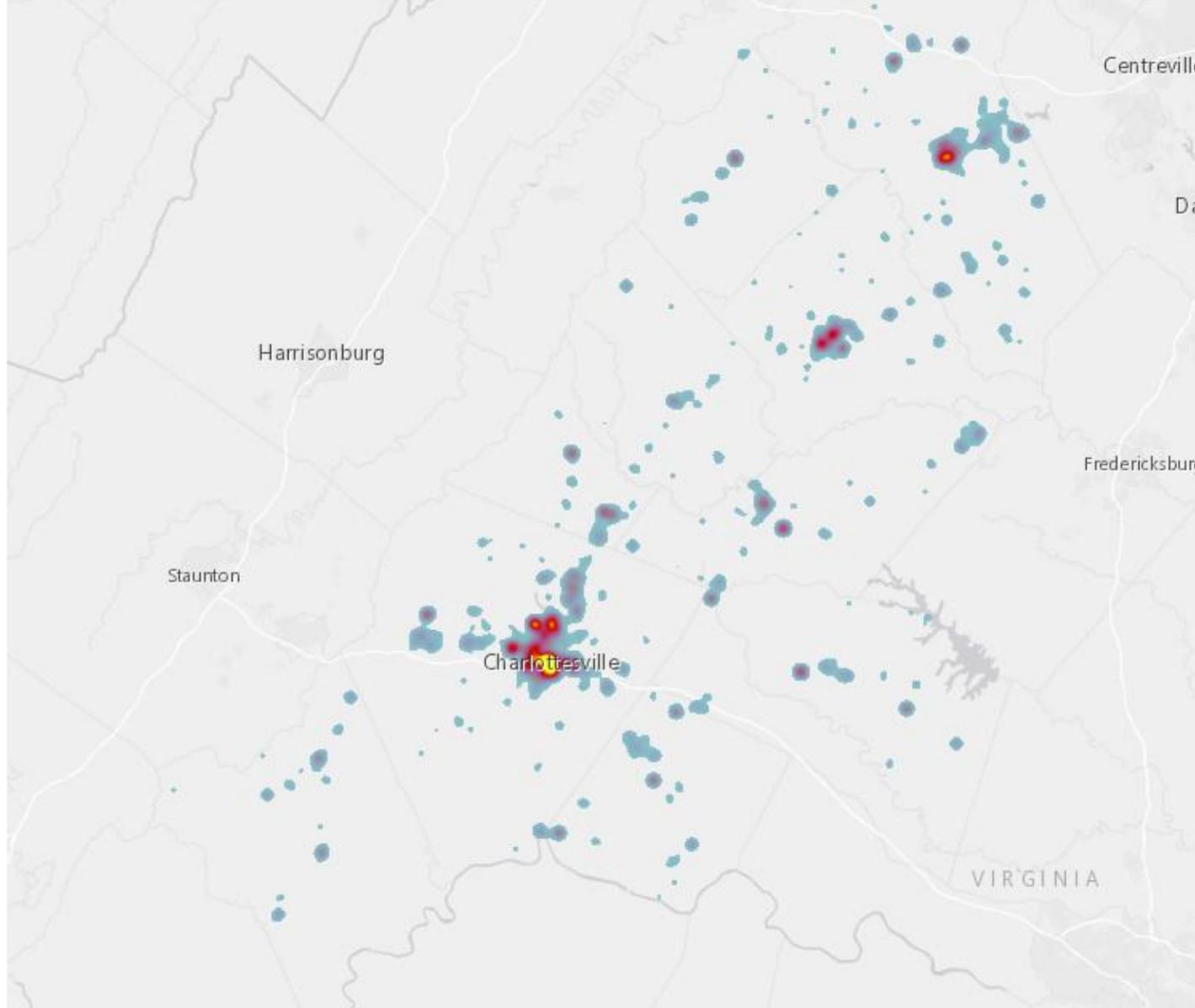
Industry Cluster	Economic Development Position in Region	Contribution of Entrepreneurship	Data Analysis						
			2017 Employment	2017 Location Quotient	Regional 2007-2017 Percentage Job Growth	U.S. 2007-2017 Percentage Job Growth	Net Job Growth, All Companies, 2007-2017	Net Job Growth, Startups, 2007-2017	Share Start-ups of All Net Job Growth, 2007-2017
Agriculture & Food Processing	Current Strength	Significant	3,827	1.19	47.2%	10.7%	1,227	1056	86%
Business Services	Sizable/Growing	Very Significant	6,796	0.84	4.8%	9.1%	313	2653	847%
Energy, Natural Resources, & Finished Products	Specialized/Declining	Very Significant	3,615	1.38	-18.7%	-13.3%	-829	406	>100%
Engineering, R&D, Testing & Technical Services	Emerging Strength	Very Significant	1,940	1.08	9.6%	6.5%	170	654	385%
Financial & Insurance Services	Emerging Strength	Very Significant	1,902	0.58	38.6%	-4.1%	530	613	116%
Information Technology & Communications Services	Current Strength	Modest	3,432	1.14	66.3%	50.8%	1,369	577	42%
Life Sciences	Emerging Strength	Very Significant	847	0.55	23.3%	9.7%	160	389	243%
Manufacturing	Declining	Very Significant	3,958	0.49	-32.3%	-13.5%	-1,891	608	>100%
Ship Building, Aerospace, & Defense	Current Strength	Modest	942	1.24	37.1%	-7.7%	255	78	31%
Transportation, Distribution and Logistics	Declining	Very Significant	3,985	0.56	-9.8%	8.7%	-435	1438	>100%

# Geographic Distribution of Traded Sector Startup Activity in Region 9

High Regional  
Startup Activity  
Levels



Low Regional  
Startup Activity  
Levels



# Closer Look at Subregional Entrepreneurial Activities

The Charlottesville MSA dominates in number, jobs and high growth startups in the region ... but significant startup activity in Fauquier and Culpeper counties.

Subregions	2017 Number of Startups since 2007 in existence	2017 Employment from Startups since 2007	Number of High Growth Startups Since 2007 with 10+ Employees	Industry Clusters with Multiple High Growth Companies of 10+ Employees
Charlottesville Metro Area (Charlottesville; Albemarle; Fluvanna; Greene; Nelson)	1470 (57%)	4656 (59%)	35	Diversified across engineering/R&D; business services; TDL; ICT; life sciences
Culpeper	261	885	3	
Fauquier	435	1285	9	ICT; TDL
Louisa	118	293	2	
Madison	55	142	1	
Orange	166	423	4	ICT
Rappahannock	66	172	0	

## Key Measures:

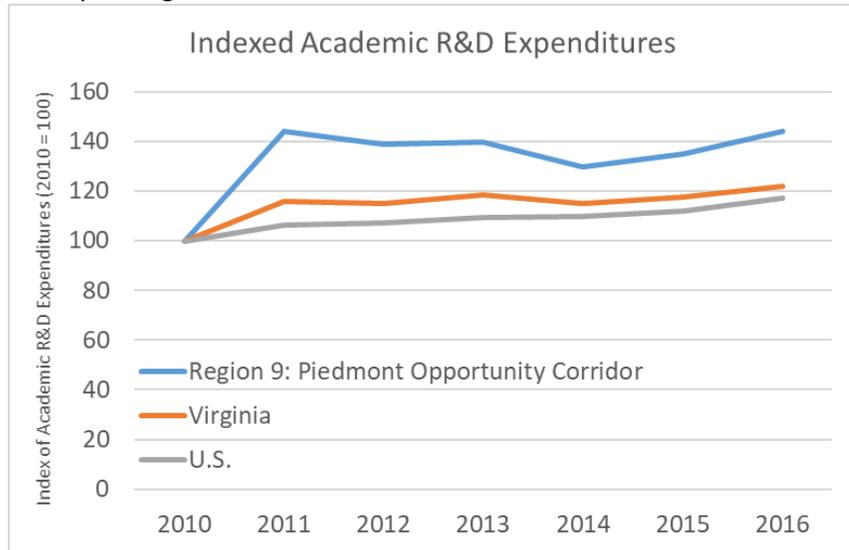
- R&D and Commercialization
- Patent Activity of Inventors Residing in Region
- Venture Capital
- Federal Small Business Innovation Research Awards

# R&D Expenditures and Commercialization

- Gains in university R&D – but relatively flat since 2011
- 72% of University of Virginia R&D found in life sciences over 2010-2017 period
- Active technology transfer and commercialization effort
- Also presence of federal lab R&D

## Academic R&D Expenditures (Millions)

Region 9: Piedmont Opportunity Corridor	2010	2011	2012	2013	2014	2015	2016
University of Virginia, Charlottesville	\$276.3	\$398.1	\$383.4	\$385.8	\$358.6	\$373.2	\$397.5



Sources: National Science Foundation (NSF) Higher Education Research and Development (HERD) Survey

## University Technology Transfer Metrics Per \$10M in Research Expenditures, Avg. 2010-16

Metric	University of Virginia	U.S. Average, All Research Universities
Disclosures	4.68	3.72
Licenses/Options Executed	1.64	1.04
Startups Formed	0.17	0.13

Sources: Association of University Technology Managers (AUTM) Licensing Activity Survey

## R&D Expenditures at Federally Funded R&D Centers (Millions)

R&D Center	2010	2011	2012	2013	2014	2015
National Radio Astronomy Observatory	\$65.0	\$47.9	\$46.6	\$40.7	\$85.3	\$89.7

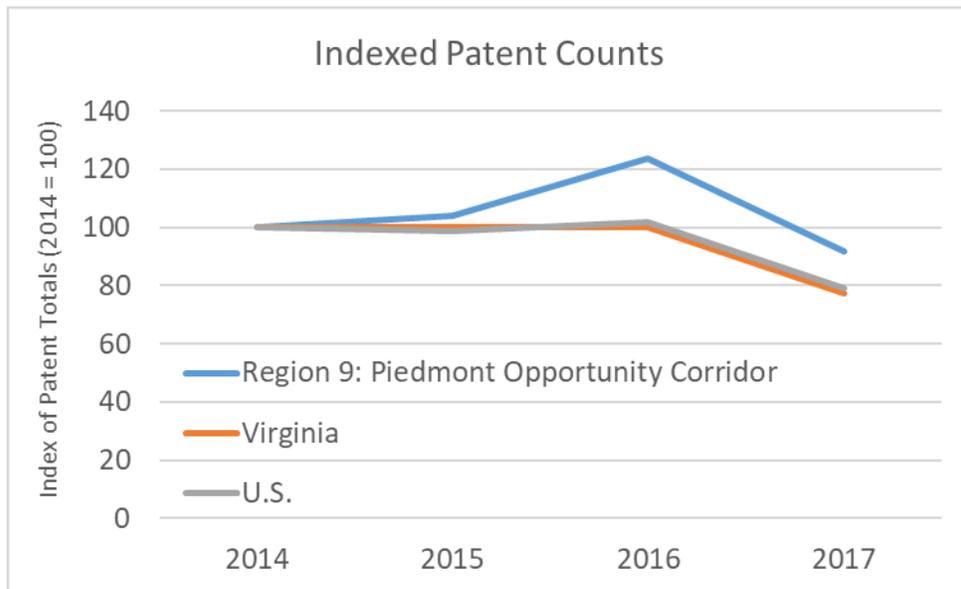
Sources: National Science Foundation (NSF) FFRDC Research and Development Survey.

# Patent Activity Across Industry and Research Institutions

- Significant level of patent activity each year
- Most inventors are not associated with university technology transfer – university generates patent issuances of around 30+ per year
- Interestingly, IT among top areas .... But lots of life sciences as well

## Total Patents, 2014-17

Region 9: Piedmont Opportunity Corridor	2014	2015	2016	2017
Patent Counts	459	477	567	421



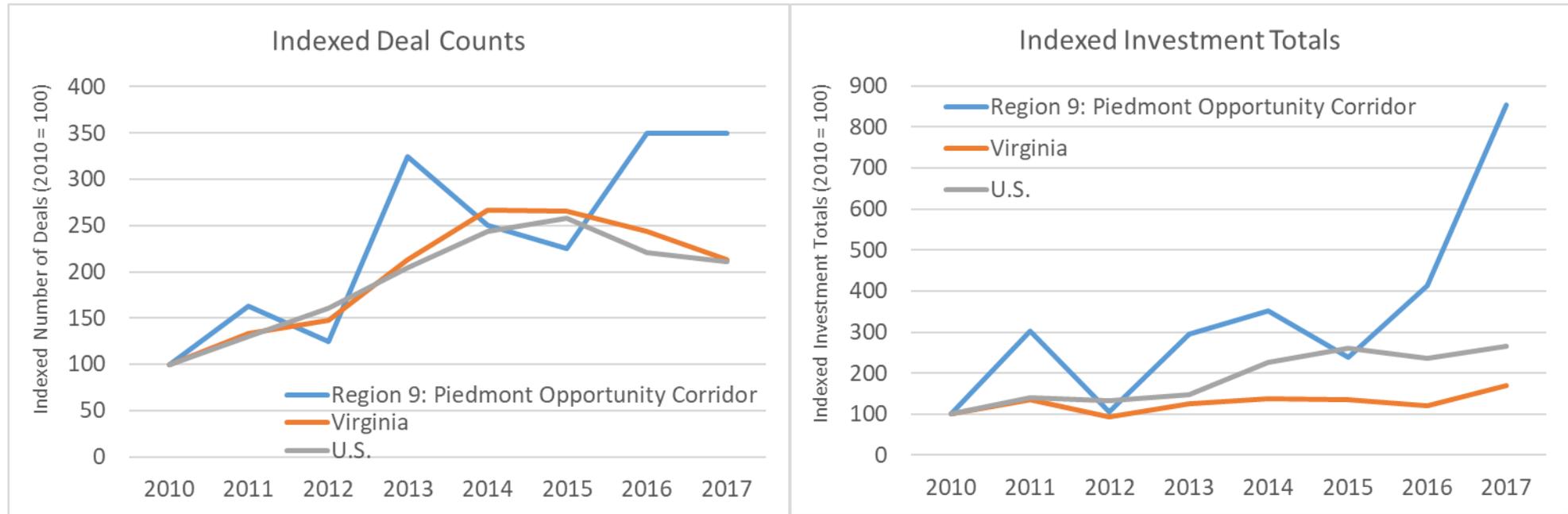
## Leading Areas of Patent Activity, 2010-17

Technology Class Area	# of Patents, by Inventor, 2010-2017
Digital computing or data processing equipment or methods, specially adapted for specific functions	85
Network architectures or network communication protocols for network security	54
Diagnostic medical devices	50
Electronic shopping or e-commerce	45
Digital user interfaces and input/output systems	42
Biopharmaceuticals	41
Video games	38
Database administration and management	33
Surgical devices	32
Devices for bringing media into the body in a subcutaneous, intra-vascular or intramuscular way	32
Medical prosthetics, filters, and other implantable devices	31
Computer processing and task management systems	30
Network-specific arrangements or communication protocols supporting networked applications	30
Security arrangements for protecting computers, components thereof, programs or data against unauthorized activity	27
Arrangements for software engineering	27

Source: U.S. Patent & Trademark Office data from Thomson Reuters Thomson Innovation patent analysis database.

# Venture Capital

- Growth of venture capital stands out in Region 9 in both deals and investment since 2010
- Includes funding from accelerators/incubators to angel investors to institutional funding

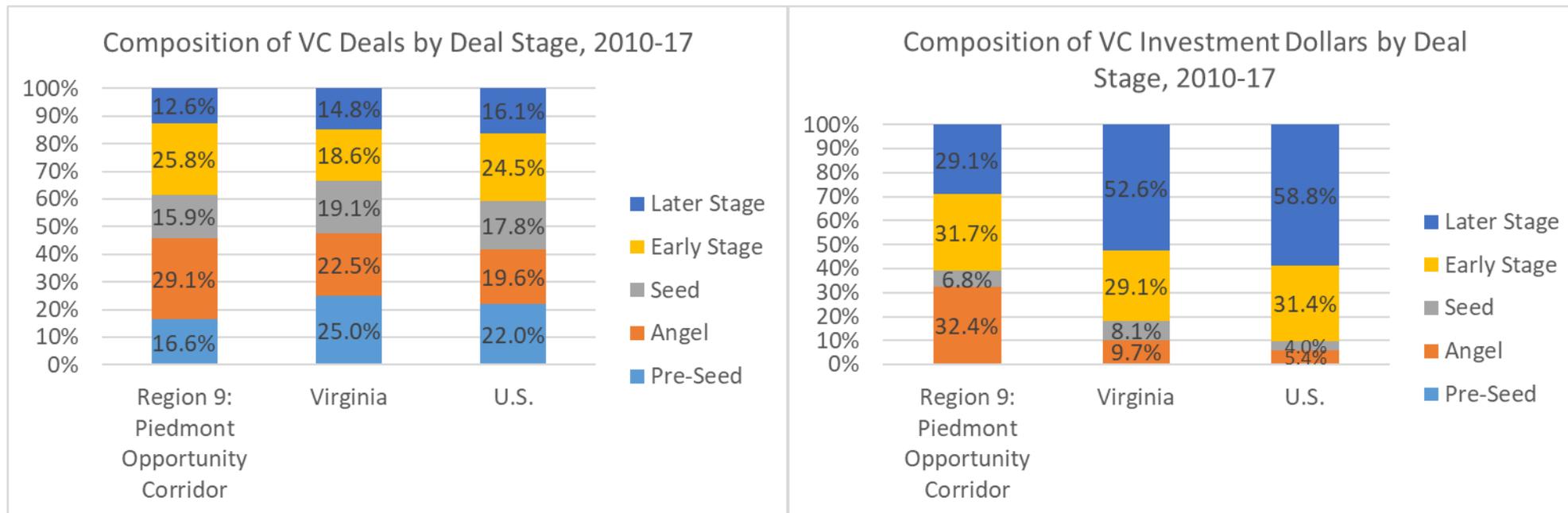


Region 9: Piedmont Opportunity Corridor									
Corridor	2010	2011	2012	2013	2014	2015	2016	2017	Total
Deal Counts	8	13	10	26	20	18	28	28	151
Investment Totals (Millions)	\$12.0	\$36.3	\$12.6	\$35.3	\$42.2	\$28.5	\$49.3	\$102.1	\$318.1

# Venture Capital by Stage of Funding

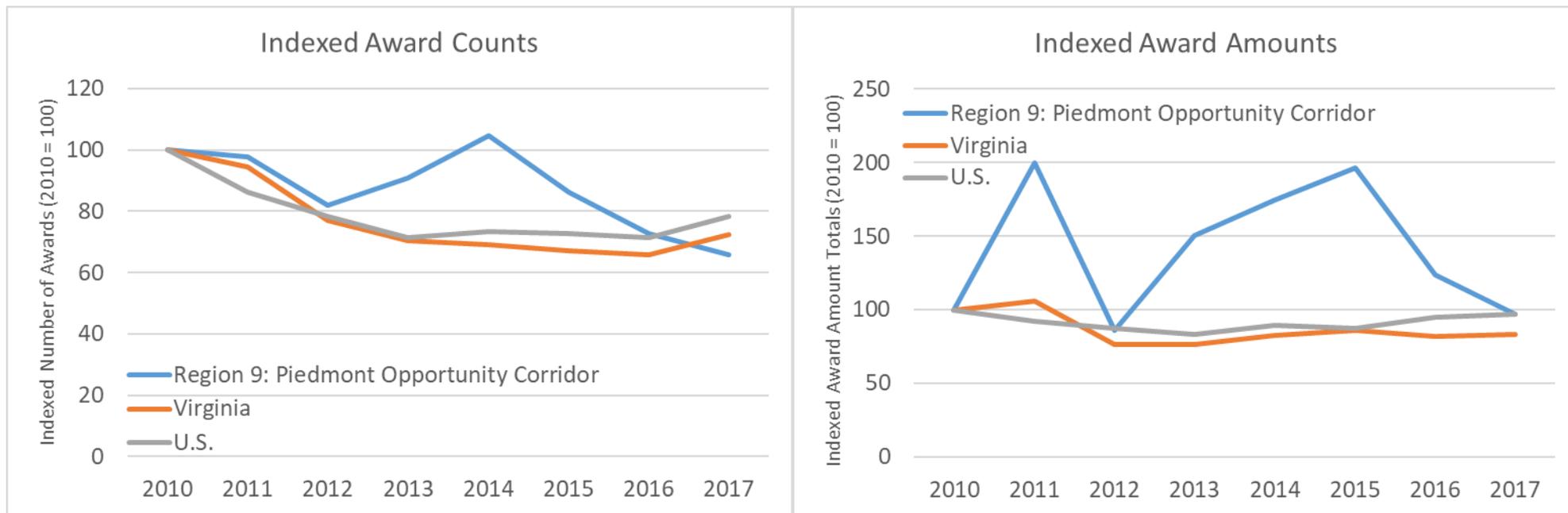
- Angel investment stands out in region
- Little pre-seed funding (accelerators and incubators)
- Companies in region accessing all stages of funding

Region 9: Piedmont Opportunity Corridor, 2010-2017	Pre-Seed	Angel	Seed	Early Stage	Later Stage	Total
Deal Counts	25	44	24	39	19	151
Investment Totals (Millions)	\$0.2	\$103.0	\$21.5	\$100.9	\$92.4	\$318.1



# SBIR/STTR Awards

- SBIR awards another important source of funding for emerging technology companies
- Region is falling off in SBIR activity in recent years



Region 9: Piedmont Opportunity Corridor	2010	2011	2012	2013	2014	2015	2016	2017	Total
Award Counts	44	43	36	40	46	38	32	29	308
Award Amounts (Millions)	\$12.75	\$25.51	\$10.94	\$19.20	\$22.21	\$25.03	\$15.77	\$12.39	\$143.80

# Regional Use of SBA Loans

- **SBA 7(a) loans are the agency’s primary program for financial assistance to small businesses**

- Amounts: up to \$5M
- SBA guarantees: 75% to 85%
- Qualification: for-profit business, SBA size standards, demonstrate good credit/mgmt./ability to repay
- Use of Proceeds: Startup costs, buying land/buildings/equipment, new construction, working capital, seasonal lines of credit.
- Benefits: Flexible, longer terms, lower down payments, no prepayment penalties

### Region 9: SBA 7(a) Loans and Loan Amounts, Cumulative Totals 2010-18\*

Industry Clusters	Co's Receiving Loans	Total No. of Loans	Total Loan Amounts (\$)	% of Total Loan Amounts
<b>Total, All Traded Sector Industries</b>	<b>80</b>	<b>89</b>	<b>\$24,025,875</b>	<b>100%</b>
Agriculture & Food Processing	15	18	\$4,318,600	18%
Business Services	20	24	\$4,341,800	18%
Energy, Natural Resources, & Finished Products	3	3	\$302,400	1%
Engineering, R&D, Testing & Technical Services	2	2	\$40,000	0%
Financial & Insurance Services	2	2	\$1,361,000	6%
Information Technology & Communications Services	6	6	\$1,125,700	5%
Life Sciences	2	3	\$340,000	1%
Manufacturing	19	20	\$7,870,900	33%
Transportation, Distribution and Logistics	11	11	\$4,325,475	18%

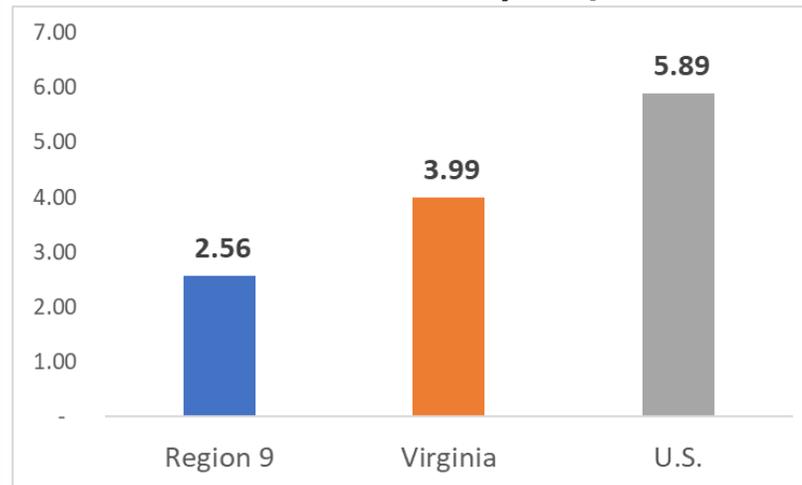
Source: TEconomy analysis of SBA loan data reports.

\*Data for 2018 are through Q2.

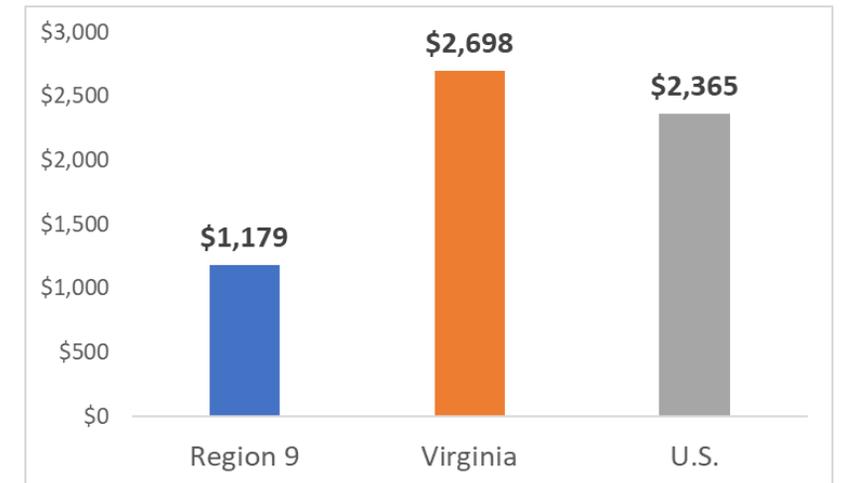
# Regional Utilization of SBA Loans vs. State & U.S. Totals

- In 2017, regional companies approved for loan funding at a lower level relative to overall establishments compared with VA and US

**SBA 7(a) Loan Counts, Traded Sector Companies Per 1,000 Establishments, 2017**



**SBA 7(a) Loan Amounts (\$), Traded Sector Companies Per Establishment, 2017**



# Appendix C: Inventory and Stakeholder Discussions

# Informing the “Situational Assessment”

## Stakeholder Discussions

- Paul Beyer, TomTom Foundation
- Sean Carr and David Touve, Batten Institute
- Martin Chapman, Cville BioHub
- Jim Cheng, CAV Angels
- Miles Friedman, Fauquier County Economic Development
- Phil Geer, Orange County Economic Development
- Jennifer Goldman, Fauquier County Enterprise Centers
- Alex Goodman, Cville Machine
- Tracey Greene, CBIC and Charlottesville Angels
- Pace Lochte, UVA Economic Development
- John Macfarlane, Angel Investor and UVA Bd of Visitors/LVG Board
- Brendan Richardson, Serial Entrepreneur
- Michael Straightiff, UVA Licensing & Venture Group
- Renee Younes, Mason Enterprise Center

\* See handout for inventory profiles

# Entrepreneurial Activities Across Stages of Entrepreneurial Development

Entrepreneurial Activity	Ideation	Commercial Viability	Market Entry	Growth & Scalability
Catalyst Accelerator Program		✓		
Cavalier Angel Network			✓	
Charlottesville Angel Network			✓	
Charlottesville Business Innovation Council				✓ (networking)
Charlottesville Technology Incubator			✓	
Community Investment Collaborative	✓ (mostly local businesses)		✓	
Coulter/Launchpad for Diabetes/IVY Foundation Biomedical Innovation	✓ (university life sciences)	✓		
Cville Biohub				✓
Cville Machine	✓	✓		
Fauquier Enterprise Centers			✓	✓
Hackville	✓ (university)			
iLab@UVA	✓ (university)	✓		
Mason Enterprise Center			✓	✓
SBDC Centers – Central VA & Lord Fairfax SBDCs	✓ (ICAP)		✓	✓
TomTom Festival				✓ (mkting/branding)
UVA Entrepreneurship Cup	✓	✓	✓	
UVA Health System Venture Fund			✓	
UVA Seed Fund (life sciences focused)			✓	
UVA Technology Entrepreneurship	✓	✓		

# Appendix D: Competitive Benchmarking

# Benchmarking: *Regions Selected and Comparative Measures*

- **Regions Selected:** TEconomy solicited and received input across the 9 GO Virginia regions on regions they benchmark themselves against, consider useful comparisons

- **Large Technology Hubs**

- Raleigh/Durham, NC
- Austin, TX
- Charlotte, NC

- **Medium-sized regions with urban core and multiple mid-tier research institutions**

- Birmingham, AL (UAB)
- Chattanooga, TN – medium-sized, minimal university presence
- Dayton, OH (Univ. of Dayton; Wright State Univ.)
- Durham, NC (Duke)
- Greenville, SC (Clemson Univ.)
- Nashville, TN – medium-sized, major research university
- Raleigh, NC (NC State)

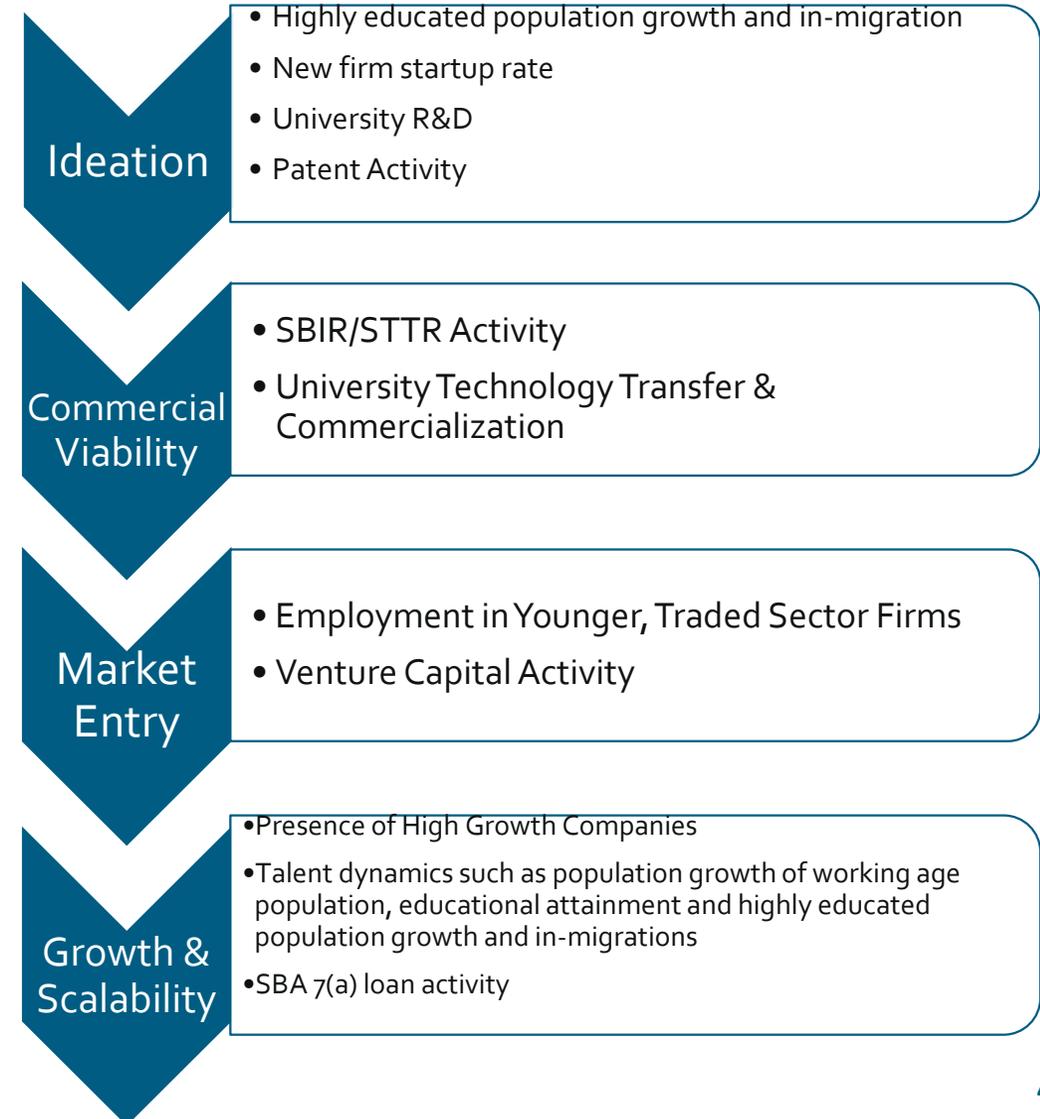
- **Rural regions with major research institutions**

- West Lafayette, IN (Purdue University)
- Gainesville, FL (Univ. of Florida)

- **Rural region without major research institutions (near Interstate and mfg.-oriented)**

- Greater Susquehanna, PA (MSA/Micro blend)
- Cookeville, TN (Micro) – rural, minimal university presence
- Jackson, TN (Micro) – rural, minimal university presence

- **Comparative Measures:** Organized across stages of entrepreneurial development



\*Regional geographies are Metropolitan Statistical Areas (MSAs) if not otherwise specified above.

# Ideation

Ecosystem Element	Measure	GO VA Region 9	VA	U.S.	Benchmarking Groups: Median Value			
					Large Tech Hubs	Mid-sized Regions	Rural with Major Research Anchor	Rural with No Major Research Anchor
New Firm Startup Rate	Rate of New Firm Formation as a Percent of All Firms, 2014	7%	7%	8%	9%	7%	7%	5%
	Percentage Pt. Change, 2010-14	0.8	0.3	0.2	0.0	-0.1	0.4	-1.0
University R&D	University R&D Expenditures per Capita, 2016	\$936	\$174	\$222	\$863	\$370	\$2,800	\$62
	Percent Change in Total R&D Expenditures, 2010-16	44%	22%	17%	16%	15%	13%	-25%
Patenting (Incls. Industry & University)	Invented Patents per 1,000 Population, 2017	0.5	0.3	0.5	2.1	0.4	1.4	0.2
	Percent Change in Total Invented Patents, 2014-17	-27%	-33%	7%	16%	9%	20%	6%

Note:

- Large Tech Hubs: Raleigh/Durham, NC; Austin, TX; Charlotte, NC
- Mid-Sized Regions: Birmingham, AL; Chattanooga, TN; Dayton, OH; Durham, NC; Greenville, SC; Nashville, TN; Raleigh, NC
- Rural region with Major Research Anchor: West Lafayette, IN; Gainesville, FL
- Rural region without Major Research Anchor: Greater Susquehanna, PA; Cookeville, TN; Jackson, TN

# Commercial Viability

Ecosystem Element	Measure	GO VA Region 9	VA	U.S.	Benchmarking Groups: Median Value			
					Large Tech Hubs	Mid-sized Regions	Rural with Major Research Anchor	Rural with No Major Research Anchor
SBIR/STTR Awards	SBIR, STTR Award Funding per Capita, Avg. 2014-17	\$45	\$15	\$8	\$17	\$5	\$30	\$0.30
	SBIR, STTR % Pt. Change in Share of Award Funding, Avg. 2010-13 to 2014-17	0.05	-0.56	-	0.09	0.03	-0.04	0.00
	Number of Phase 1 Awards, 2010-2017	190	1,796	17,802	486	44	119	2
	Number of Phase 2 Awards, 2010-2017	118	935	10,002	235	33	49	0
University Technology Transfer & Commercialization	Avg. Annual Univ. Start-ups, 2014-16	7	17	911	28	5	21	-
	Avg. Startups Formed per \$10M Univ. Research, 2014-16	0.19	0.15	0.16	0.13	0.10	0.36	-
	Avg. Licenses/Options Executed per \$10M Univ. Research, 2014-16	1.81	1.12	1.14	1.54	1.03	2.87	-

# Market Entry

Ecosystem Element	Measure	GO VA Region 9	VA	U.S.	Benchmarking Groups: Median Value			
					Large Tech Hubs	Mid-sized Regions	Rural with Major Research Anchor	Rural with No Major Research Anchor
Employment in Younger, Traded Sector Firms	Share of Employment in Traded Sector Firms Ages 0-5, 2017 Q2	9%	7%	8%	8%	6%	7%	3%
	Avg. Share of Employment Growth in Firms Ages 0-5, 2013-2017 Q2	60%	52%	46%	36%	34%	42%	30%
Venture Capital Investments	VC Investments, 2014-17	\$222 M	\$2.6 B	\$308 B	\$2.3 B	\$127 M	\$66 M	\$0.2 M
	VC Investments per Capita, 2014-17	\$525	\$315	\$954	\$1,221	\$164	\$255	\$1
	Change in VC Investment, 2010-13 to 2014-17	131%	24%	89%	42%	86%	-13%	2000%
	VC Deals, 2014-17	94	1,068	54,030	565	81	74	3
	VC Deals per 100,000 population, 2014-17	22	13	17	31	13	30	2
	Change in VC Deals, 2010-13/2014-17	65%	67%	58%	67%	49%	135%	125%
	Share of VC Investments in Angel + Seed + Early Stages, 2014-17	70%	51%	41%	36%	79%	65%	100%
Share of VC Deals in Angel, Seed + Early Stages, 2014-17	90%	81%	88%	85%	84%	91%	100%	

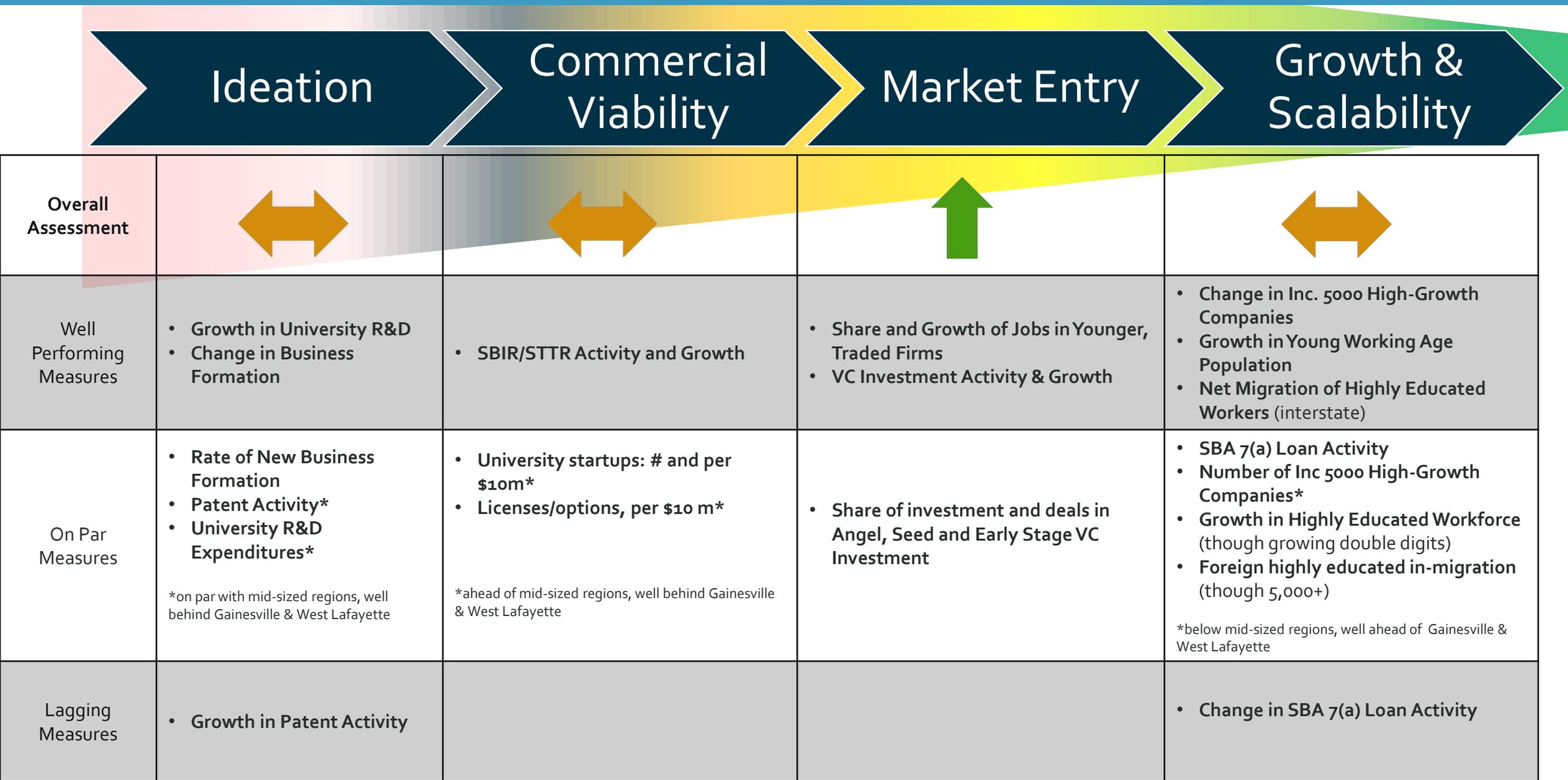
# Growth & Scalability

Ecosystem Element	Measure	GO VA Region 9	VA	U.S.	Benchmarking Groups: Median Value			
					Large Tech Hubs	Mid-sized Regions	Rural with Major Research Anchor	Rural with No Major Research Anchor
SBA 7(a) Loans	Avg. SBA 7(a) Loans, per 100,000 population, 2010-2017	<b>2.5</b>	2.9	4.7	3.6	2.7	2.0	3.2
	Change in SBA 7(a) Loans, 2010-2017	<b>-27%</b>	11%	22%	55%	80%	-17%	-20%
	Avg. SBA 7(a) Loan Value, per Capita, 2010-2017	<b>\$6</b>	\$9	\$17	\$18	\$12	\$10	\$20
	Change in SBA 7(a) Loan Value, 2010-2017	<b>208%</b>	214%	82%	149%	120%	693%	48%
Presence of High-Growth Companies	Number of Companies on the Inc. 5000 List of Fastest Growing US Companies, 2018	<b>6</b>	297	-	57	13	3	1
	Change in Companies in Inc. 5000, 2010-18	<b>100%</b>	2%	-	15%	13%	83%	-50%

# Cross-Cutting Ecosystem Element: Talent Dynamics

Ecosystem Element	Measure	GO VA Region 9	VA	U.S.	Benchmarking Groups: Median Value			
					Large Tech Hubs	Mid-sized Regions	Rural with Major Research Anchor	Rural with No Major Research Anchor
Growth in Working Age Population	Growth in Total Working Age Population, 25-64—2012-2017	3%	1%	3%	9%	5%	2%	-2%
	Growth in Young Working Age Population, 25-34—2012-2017	12%	3%	7%	11%	7%	6%	4%
Educational Attainment	Share of Population Ages 25-64 with a Bachelor's Degree or Higher, 2017	28%	28%	23%	31%	23%	21%	15%
	Growth in Highly Educated Workforce (BA+), (25-64, working age) — 2012-2017	14%	10%	12%	26%	17%	16%	6%
Highly Educated Migration	Net Migration of Highly Educated Workers (BA+), 2012-17	7,520	-14,000	154,411	45,424	2,279	-9,684	-1,402
	Foreign In-Migration (BA+), 2010-17	5,201	151,627	3,933,494	38,243	8,782	8,423	587

# Competitive Benchmarking Assessment



# Appendix E: Benchmark Case Study Profiles

# Benchmark Case Studies: Wide Number of Tools for Entrepreneurial Development

Ideation

Commercial  
Viability

Market Entry

Growth &  
Scalability

## Typical Entrepreneurial Assistance Service Tools

Tool-Kit Components	<ul style="list-style-type: none"> <li>Lean startup bootcamps/pre-accelerator preparation</li> <li>Mentoring by an EIR/venture advisor</li> <li>Pitch/Business competitions</li> <li>University entrepreneurship centers</li> <li>University technology commercialization scouting</li> </ul>	<ul style="list-style-type: none"> <li>Accelerators/venture development organizations/incubators</li> <li>NSF iCorps</li> <li>Mentoring by EIRs with understanding of specific markets and technologies</li> <li>Incubator, co-working, maker-spaces</li> </ul>	<ul style="list-style-type: none"> <li>Mentoring by EIR with serial startup experience</li> <li>Second stage incubators, research parks, multi-tenant specialized lab facilities</li> </ul>	<ul style="list-style-type: none"> <li>Growth services involving talent recruitment and development, networking in domain areas and business functions, export assistance</li> <li>Mentoring by seasoned business executive who grew companies 20x</li> </ul>
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## Typical Risk Capital Catalysts Tools

Tool-Kit Components	<ul style="list-style-type: none"> <li>Commercialization/Technology Transfer Funds</li> <li>Pitch competition micro-investments</li> </ul>	<ul style="list-style-type: none"> <li>Proof-of-Concept Funds</li> <li>SBIR/STTR Matching Grants</li> <li>Accelerator and Pre-Seed Funding</li> <li>Refundable R&amp;D and Technology Investment Tax Credits</li> </ul>	<ul style="list-style-type: none"> <li>Angel Matching/Due Diligence Funds</li> <li>Angel Investment Tax Credits</li> <li>Seed Matching Funds</li> </ul>	<ul style="list-style-type: none"> <li>Fund of Fund Investments (multiple ways to generate funding)</li> </ul>
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# Innovation and Entrepreneurial Development Ecosystem Components



Benchmark Communities			
Austin, TX	← IC <sup>2</sup> Institute – mentorship, networking, Austin Technology Incubator → UT Kelleher Entrepreneurial Center UT School of Engineering Innovation Center		← South by Southwest Conference & Festivals →
Birmingham, AL	← Alabama Drug Discovery Alliance → Velocity Accelerator	Innovation Depot	Focus on IT training: Covalence IT coding boot camp; Innovate Birmingham efforts in IT training for under-employed and unemployed young adults
Charlotte, NC	UNCC 49er Student Foundry ← Network of accelerators (fintech, cleantech, NC Idea → Charlotte Venture Challenge	UNCC NSF i-Corps Site Packard Place	Innovate Charlotte regional assessments on needs
Chattanooga, TN	← CO.LAB – mentorship, networking, accelerators, connection to capital → ← CO.Starters → ← CO.LAB’s Gig Tank, Consumer Goods Accelerators, etc. →		Crowd-sourced financing platforms, such as Kiva; Chattanooga Renaissance Fund (seed fund); and Lamp Post Group (early-stage VC)
Dayton, OH	Wright Brothers Institute (commercialization intermediary)	The Entrepreneurial Center accelerator program	The Entrepreneurial Center mentoring services Accelerant Seed Fund
Gainesville, FL	UF Entrepreneurship & Innovation Center	← Sid Martin Biotech Incubator & Innovation Hub Incubator → Florida Angel Nexus	← Innovation Square → Florida Opportunity Fund StartupGNV networking events

# Innovation and Entrepreneurial Development Ecosystem Components



Benchmark Communities	
Greenville, SC	← NEXT program of Greenville Chamber – accelerator, mentoring, incubator and makerspace → CU-International Center for Automotive Research
Nashville, TN	Vanderbilt Wondry ← Bunker Labs – Launch Lab, Veterans-in-Residence program, CEOs Circle → ← Nashville Entrepreneurial Center – mentoring, Pre-Flight, In-Flight, Music & Healthcare Accelerators →
Raleigh-Durham, NC	NC State NSF i-Corps Site ← Active student bootcamps/pitch competitions/incubation → ← Research Triangle Park, Centennial Campus, HQ coworking, American Underground & Biolabs → ← Active university alumni angel networks at Duke, NC State & UNC → NC State EIR to Scout for Technologies PoC Funds at NC State, UNC & Duke ← Duke collaboration with privately managed accelerator and incubators → ← NC Biotech Center → UNC Carolina Research Ventures \$10 m “Seed” Fund
Susquehanna, PA	← Rural Business Innovation network of incubators → Micro-startup grants from Rural Business Innovation ← Keysone Innovation Zone Transferable Tax Credits for Young Firm Revenue Growth → College student internship funding
West Lafayette, IN	← Purdue Research Park & Purdue Discovery Park District: Incubators, Multi-tenant facilities, Mixed-Use placemaking → ← Purdue Foundry with EIR mentors → Trask Fund for applied research and PoC Elevate Purdue Foundry “pre-seed” Fund Ag-Celerator “pre-seed” Fund \$12 m Foundry Investment “seed” Fund

# Benchmark Case Study: Austin, TX

<b>Regional Context:</b>	<ul style="list-style-type: none"><li>• A major technology hub with one research anchor that until recently was not aggressive on tech transfer/startups and had no medical school</li><li>• Chamber of Commerce drove progress where government was passive or lagged</li><li>• Success at attracting semiconductor consortia in 1980s led to increasing ties to Silicon Valley and its investors</li><li>• Unexpected success of Dell Computer in 1980s/1990s created local wealth and management talent, all used in startup formation</li></ul>
<b>Key Tools:</b>	<ul style="list-style-type: none"><li>• <b>IC2.</b> Institute started creating entrepreneurial momentum even in a period when university itself lagged</li><li>• <b>Austin Technology Incubator.</b> Probably the most important outcome of IC2. Industry verticals aligned with Chamber targets.</li><li>• <b>Dell Medical School.</b> Chamber succeeded in lobbying state for new med school at UT Austin, and Travis County matched with local tax levy</li><li>• <b>Innovation District.</b> Next logical step after medical school is an integrated medical district, now under way</li><li>• <b>SXSW.</b> Once a music festival, it deliberately broadened to add film and software/interactive, creating additional ties to coastal media &amp; investors</li><li>• <b>Kelleher Center at UT McCombs School.</b> Finally active in entrepreneurship, UT Austin now has a campus hub in the business school</li><li>• <b>Cockrell School of Engineering Innovation Center</b> offers advice and training to faculty and staff, provides small startup grants, and hosts competitions, among other activities.</li></ul>
<b>Successes:</b>	<ul style="list-style-type: none"><li>• Chamber has adopted Innovate Austin initiative, and names annual 'A-list' of emerging, growth, and accelerator-stage ventures</li><li>• Regional Council of Governments CEDS has unusually sophisticated section on entrepreneurship and growth acceleration, recognizing importance of both launch and expansion</li><li>• ATI itself claims to have helped clients raise \$890 million in capital, cumulatively, \$200 million in 2016 alone to 19 companies</li><li>• Across entire region, Chamber claims \$869 million in capital to 123 deals in 2016</li></ul>
<b>Challenges:</b>	<ul style="list-style-type: none"><li>• Growing a full, research-oriented biomedical capacity has only just begun and remains a major challenge</li><li>• Withering of semiconductor initiatives leaves status of J.J. Pickle Research Campus uncertain, isolated by expressway from main campus</li></ul>
<b>Best Practice Lessons:</b>	<ul style="list-style-type: none"><li>• Austin is the pre-eminent example of successfully mixing arts and technology into a single message on creative economy</li><li>• SXSW has been as impactful as any high-tech initiative, and made Austin a platform for startups nationally, as well as exposing local startups to the national audience</li><li>• There are few other mid-sized metros with such close ties to the centers of music and film (LA) and tech (NY and San Francisco)</li></ul>

# Benchmark Case Study: Birmingham, AL

## Regional Context:

- Mid-sized region with research anchors, including University of Alabama Birmingham (\$500+ m annually) and Southern Research Institute (~\$70 m annually in contract research funding).
- Research anchor focus is strongly on life sciences.
- Challenge of having to reinvent itself from being a steel-oriented economy (the “Pittsburgh of the South”) to an innovation and knowledge hub.

## Key Tools:

- **Applied and translational research focus:** Alabama Drug Discovery Alliance, a collaboration of SR and UAB, leverages significant drug discovery and development research and shared use facilities and moves new therapeutic leads through a structured process of assay development, high-throughput drug screening, lead identification and development, pre-clinical testing and early clinical trials.
- **Innovation Depot**, a 140,000 sq. ft. incubator and co-location space, making it one of the largest in the nation. It offers range of space options, including wet lab. The Innovation Depot is far more than a technology incubator, but a home for a variety of entrepreneurial and talent initiatives in collaboration with community stakeholders.
- **Velocity**, a relatively new accelerator housed at Innovation Depot, with ability to invest \$50,000 in seed funding for each selected startup company.
- **IT workforce development** – Multiple efforts in place at different levels for IT coding/software development bootcamps targeting undergraduates and under-employed/unemployed young adults.
- **Networking activities:** Tech Birmingham programs include a monthly TechTuesday speaker series, member only networking socials, broader information sharing events, and Keep It Local to create opportunities for local companies to do more business together in IT products and services, among other efforts.

## Successes:

- Innovation Depot reports 112 companies assisted with 1,064 jobs and \$155 million in sales revenue. Largely tech-oriented companies, but some life sciences.
- Establishing networks and connections with other communities to generate investor interest and entrepreneurial teams, including New York and Israel
- Many of its graduates are now serving as tenants for a larger innovation district development in Birmingham
- Alabama Drug Discovery Alliance in early 2018 had 19 drugs in the development pipeline, leveraging major drug discovery programs in emerging infectious diseases, cystic fibrosis and cancer, engaging major biopharmaceutical companies.

## Challenges:

- Advancing broader access to capital across stages of investment
- Generating life sciences startups from research anchors

## Best Practice Lessons:

- Role of entrepreneurial anchor in creating focus and branding on innovation and entrepreneurship
- Advancing a single umbrella for delivery of technology transfer, commercialization and entrepreneurial services
- Embedding talent and workforce initiatives with innovation and entrepreneurial anchor activities

# Benchmark Case Study: Charlotte, NC

<b>Regional Context:</b>	<ul style="list-style-type: none"><li>• Fast growing technology hub with smaller research anchors</li><li>• Leveraging position in banking center to generate a rising entrepreneurial community.</li></ul>
<b>Key Tools:</b>	<ul style="list-style-type: none"><li>• <b>Innovate Charlotte (formerly Charlotte Regional Fund for Entrepreneurship):</b> Established through the 2012 regional plan for “Prosperity for Greater Charlotte,” and funded through the region’s \$2.5 billion community foundation. It was envisioned as a grant funding mechanism to support local non-profits to advance entrepreneurial culture, ecosystem connections, risk capital availability and technical skills. Over the years has taken a more pro-active approach in providing entrepreneurial assessments of the region, holding ideation workshops and recommending specific activities.</li><li>• <b>Packard Place:</b> A redeveloped large auto showroom/building that has been transformed into an entrepreneurial hub housing multiple accelerators (see below) as well as offering fellowships to new startup founders and co-working space.</li><li>• <b>Network of accelerators:</b> Includes one in clean energy (Joules Accelerator), fintech (QC FinTech), and tech (RevTech Labs and NC IDEA)</li><li>• <b>Ventureprise:</b> UNC Charlotte’s long-time affiliated incubator founded back in 1986. Long history of engaging entrepreneurial community, though in 2017 reconstituted with a stronger focus on student and faculty startups, with programs such as Ventureprise Launch NSF iCorps for university tech commercialization and 49er Foundry a student incubator. Also manages the NC IDEA offering a lean-startup program similar to its Ventureprise Launch for innovation-driven startups in the community.</li></ul>
<b>Successes:</b>	<ul style="list-style-type: none"><li>• Packard Place reports results for its aggregate community of accelerators, coworking spaces, fellows, etc. as generating from 2010-2017, 500 new jobs and \$1 billion in venture capital raised.</li><li>• Ventureprise reports over the 2008-2017 period supporting 46 new clients, with some notable successes such as CSi/Photograds, Verian Technologies, SecureEdge Networks and Saprex, which had successful exits or have moved into their own commercial facilities to accommodate substantial growth.</li></ul>
<b>Challenges:</b>	<ul style="list-style-type: none"><li>• Long time period to grow university research anchors to match fast growth of overall entrepreneurial activities and offer a deeper driver of innovation.</li><li>• Not doing well in growing new research park anchors to complement emergence of technology hub, including slow growth of campuses with Charlotte Research Institute and David H. Murdock Research Institute.</li></ul>
<b>Best Practice Lessons:</b>	<ul style="list-style-type: none"><li>• Role of community foundation and community leaders in spurring entrepreneurial development.</li></ul>

# Benchmark Case Study: Chattanooga, TN

<b>Regional Context:</b>	<ul style="list-style-type: none"><li>• Mid-sized region with limited research anchor. [RYAN, CAN YOU ADD BENCHMARKING INDICATORS?]</li></ul>
<b>Key Tools:</b>	<ul style="list-style-type: none"><li>• Company Lab (or CO.LAB) is a non-profit accelerator and one-stop shop for local entrepreneurs founded in 2008. CO.LAB has developed a range of programs and services for both local growth and high-growth companies at different stages of development, including: Way Finding to screen and guide entrepreneurs to services, CO.STARTERS a 9-week program that teaches lean startup methods for business startup; CO.LAB Accelerator, a mentor-driven program for high-growth potential startups; GIG Tank, an accelerator focused on ultra-high bandwidth business applications; Consumer Goods Accelerator, an accelerator focused on outdoor recreation and food/beverage sector.</li><li>• CO.LAB connects companies to capital, like the Chattanooga Renaissance Fund, and Lamp Post Group focused on seed investments. CO.LAB has also joined the Kiva, crowd-sourced financing platform.</li><li>• In 2015 a new intermediary organization formed, the Enterprise Center, to more broadly leverage the City's high broadband infrastructure to create a place that develops and tests many applications for urban needs.</li><li>• Chattanooga foundations and business leaders have historically invested in downtown revitalization efforts, including the riverfront development. CO.LAB spun out of downtown revitalization and visioning exercise supported by local family foundations. Other investments and assets include Chattanooga's gigabit network (10 gbps metro-wide fiber optic network), UTC, the regional university in close proximity to downtown, and the rebranded Innovation District involved mixed use developments.</li></ul>
<b>Successes:</b>	<ul style="list-style-type: none"><li>• Significant scale of activities by CO.LAB since its formation back in 2008, including 20+ cohorts and 700+ participants in CO.Starters, 83 companies graduated and \$7M+ capital raised from CO.LAB Accelerator, 58 companies graduated and \$29M+ capital raised for GIG Tank and 200 consultations a year from Way Finding.</li></ul>
<b>Challenges:</b>	<ul style="list-style-type: none"><li>• Lack of capital is viewed as a key constraint to high-growth companies</li></ul>
<b>Best Practice Lessons:</b>	<ul style="list-style-type: none"><li>• Demonstration of how to revitalize a community and its downtown through talent retention, placemaking, startup activity, and ecosystem building that supports both "local growth" and high-growth companies</li><li>• Critical role of local foundations in catalyzing activities and combining placemaking, unique tech infrastructure development and entrepreneurial programming.</li></ul>

# Benchmark Case Study: Dayton, OH

<b>Regional Context:</b>	<ul style="list-style-type: none"><li>• Mid-sized region anchored by major federal research lab, Air Force Research Labs at Wright Patterson Air Force Base, and University of Dayton with its research institute generating more than \$100m in research activities highly aligned with ARL needs, plus Wright State University, with some research programs and an important talent driver for the region.</li><li>• Challenge of moving beyond federal contract activity to drive new traded sector company growth.</li></ul>
<b>Key Tools:</b>	<ul style="list-style-type: none"><li>• <b>Wright Brothers Institute (WBI):</b> A partnership intermediary to facilitate technology transfer from ARL, identify unmet technology needs, further commercialization through collaborative team efforts and engage small technology-based businesses to tap opportunities and partnerships.</li><li>• <b>The Entrepreneur Center (TEC):</b> Serves as the delivery arm of entrepreneurial services supported by the Ohio Third Frontier and operates a traditional incubator with two sites in the region, which is now expanding into offering coworking space and an accelerator program. Also houses a site for WBI.</li></ul>
<b>Successes:</b>	<ul style="list-style-type: none"><li>• Wright Brothers Institute reports supporting over 100 innovation-based projects annually, with typically \$3 million of commercialization activities and engaging over 1,000 small technology-oriented businesses.</li><li>• While not among the top performing seed funds in Ohio, the Accelerant seed fund over 2007-2014 invested \$17 million, creating 2,995 jobs and retaining 1,274 jobs. This performance though ranks last of the six privately-managed regional seed funds supported with matching funding from Ohio Third Frontier – and since 2013 has received no additional state matching funds.</li></ul>
<b>Challenges:</b>	<ul style="list-style-type: none"><li>• Creating more commercially focused technology-based companies.</li></ul>
<b>Best Practice Lessons:</b>	<ul style="list-style-type: none"><li>• While advancing industry partnerships with federal labs can be effective, it does not always translate into new commercially-focused technology businesses.</li></ul>

# Benchmark Case Study: Gainesville, FL

## Regional Context:

- Compact metro in North Central Florida surrounded by rural counties, distant from major population centers, dominated by U Florida, the land grant which also includes a medical school
- Master planning is emphasizing infill between historic downtown and the university campus
- Innovation & economic development one of six “pillars” of regional CEDS

## Key Tools:

- **Sid Martin Biotech.** 40,000 s.f. Incubator created in 1990 with long and well recognized track record, off campus in Progress Corporate Park
- **Florida Innovation Hub.** 100,000 s.f. dry incubator at downtown campus, anchoring:
- **Innovation Square.** Major live/work innovation district project planned for blocks between campus and downtown Gainesville, 1 major multitenant building already open, both wet and dry space
- **Entrepreneurship and Innovation Center.** On-campus hub for student entrepreneurship, including consultancy with real startups and ‘hatchery’ for student ventures
- **Florida Opportunity Fund.** Venture fund established with state’s allocation from Treasury SSBCI fund
- **Florida Virtual Entrepreneur Center.** State-supported through Florida High Tech Corridor collaboration of the three major research universities.
- **StartupGNV (formerly GAIN).** Not-for-profit organization encouraging local startups.
- Additional lower-tech incubators including two at smaller institutions like Santa Fe College strongly supported by the Chamber and highlighted in regional strategies
- Multiple commercial coworks, makerspaces, etc.
- **Florida Angel NEXUS.** Statewide collaborative of regional angel groups and funds
- Every county in the region (all 12 counties surrounding Alachua) qualify for planning support from the state Rural Economic Development Initiative

## Successes:

- Sid Martin claims its companies have attracted cumulatively \$500 million in capital (\$1.7 billion in funding including revenue and acquisitions), with 80% still in operation 5 years after graduation, and 16 of all biotech companies in-state started there
- UF licensing office claims to have started more than 160 companies (about half biomedical, but also technology)

## Challenges:

- Relative isolation from state’s major business/corporate centers – 70 miles to Jacksonville, 110 to Orlando, 130 to Tampa
- Chamber recognizes need to take strategy to a higher level, including better connecting startup creation to targeted industry clusters, and reducing outward brain drain

## Best Practice Lessons:

- Through patient nearly 30-year investment in Sid Martin Biotech, UF has moved beyond “Gatorade” to genuine standing in biotech world

# Benchmark Case Study: Greenville, AL

<b>Regional Context:</b>	<ul style="list-style-type: none"><li>• Mid-sized region anchored by presence of university research anchors in the region and a growing academic hospital creating a new medical school in collaboration with local universities.</li></ul>
<b>Key Tools:</b>	<ul style="list-style-type: none"><li>• <b>New innovation center campuses outside of the main Clemson University campus with focus on specific technologies, including:</b><ul style="list-style-type: none"><li>• <b>Clemson University International Center for Automotive Research (CU-ICAR), Greenville:</b> Significant public-private partnership between growing automotive industry, Clemson University and the state to create a new R&amp;D center of excellence in automotive technologies close to the industry cluster and about 45 minutes from the Clemson campus . Includes creation of a new graduate program in automotive technologies at the site that involves multi-disciplinary approach involving electronics, computing and advanced materials, supported by recruitment of eminent scholars. Home to company research centers, including BMW IT Research Center and Koyo Bearing R&amp;D Center, plus offers a 60,000 sq ft Center for Emerging Technologies.</li><li>• <b>Clemson University Biomedical Engineering Innovation Campus, Greenville:</b> A 30,000 sq. ft. lab located within a facility at the Greenville Health System campus, which is a spearhead to advance collaborations with a new academic medical center development taking place.</li><li>• <b>Clemson University Innovation Campus and Technology Park, Anderson, SC:</b> Eight miles from the main Clemson campus. Home to university's Advanced Materials Research Lab, environmental labs and computing center; Duke Energy Innovation Center; and industry funded National Brick Research Center</li></ul></li><li>• <b>Rise of mix of accelerator, incubator and maker-spaces in Greenville region:</b> Led by the NEXT program of the Greenville Chamber, brings a strong focus on entrepreneurial and innovation-focused small businesses, with three different facilities, including one targeted for advanced manufacturing, mentoring programs, events and other ecosystem development efforts.</li></ul>
<b>Successes:</b>	<ul style="list-style-type: none"><li>• \$250 million public-private partnerships in CU-ICAR has generated 770 jobs and another 720 jobs announced, plus major surrounding projects including 1,100-acre mixed use development with an expected population of 10,000, location of Hubbell Lighting Corporation headquarters, among other industry and health system investments.</li><li>• NEXT Innovation Center reports assisting 102 companies, attracting \$23 million in new capital in 2017 and 261 new jobs paying on average \$69,443.</li></ul>
<b>Challenges:</b>	<ul style="list-style-type: none"><li>• Linking major public-private innovation center developments with entrepreneurial activity.</li></ul>
<b>Best Practice Lessons:</b>	<ul style="list-style-type: none"><li>• Creating new anchor research and innovation centers around industry clusters through university, industry and state partnerships</li></ul>

# Benchmark Case Study: Nashville, TN

<b>Regional Context:</b>	<ul style="list-style-type: none"><li>• Mid-sized region anchored by a major research university, strong music scene and leading healthcare companies</li></ul>
<b>Key Tools:</b>	<ul style="list-style-type: none"><li>• The Nashville Entrepreneur Center a non-profit offering a range of fee-based services and memberships spanning coworking, networking, incubation and intensive mentoring/acceleration services:<ul style="list-style-type: none"><li>• Co-Working space and Community access</li><li>• Pre-Flight program for entrepreneurs to advance business ideas</li><li>• In-Flight program for early-stage startups with up to three employees and \$150,000 in revenue</li><li>• Accelerators focused on music industry and healthcare industry verticals that accept startups nationwide</li></ul></li><li>• Vanderbilt is an NSF i-Corps site and has graduated 17 teams; Vanderbilt's Wond'ry, the university innovation center, is aimed at developing an institutional innovation culture for faculty and students, and includes programs like Innovation Garage (industry-university collaboration on disruptive solutions), entrepreneurship courses, a makerspace, pitch events, and EIRs</li><li>• Bunker Labs</li></ul>
<b>Successes:</b>	<ul style="list-style-type: none"><li>• Branding from major LaunchTN entrepreneurial event, 36/86, is helping to create buzz for Nashville's entrepreneurial community, which is not strong in VC funding, overall net employment from young companies nor university tech transfer, but is attracting significant net in-migration and is generating significant numbers of high growth companies.</li></ul>
<b>Challenges:</b>	<ul style="list-style-type: none"><li>• Very diffuse entrepreneurial community, with need to create stronger presence of innovation in the region, including more placemaking</li></ul>
<b>Best Practice Lessons:</b>	<ul style="list-style-type: none"><li>• Importance of having a one-stop entity for entrepreneurship</li></ul>

# Benchmark Case Study: Raleigh-Durham, NC

## Regional Context:

- Mid-sized region anchored by major research universities with strong focus on innovation programs and place-making.

## Key Tools:

- **NCBiotech Center:** Long-standing, dedicated program to growing life sciences in the region and across the state, including advancing research excellence, investing directly in emerging companies, ensuring trained workforce and advancing networking and peer groups in life sciences.
- **Major placemaking for technology with Research Triangle Park (RTP) and Centennial Campus at NC State.** RTP is one of the oldest and largest research parks in the U.S., but has been largely home to larger corporations, including a strong emphasis on biopharmaceutical. It is now reinventing itself with a new town center to offer more amenities and opportunities for emerging companies, plus single use facilities are being converted into multitenant facilities for start-ups and emerging companies, such as Alexandria Real Estate's new Agtech facility that used to be a Syngenta R&D facility.. Centennial Campus at NC State has been a leader on establishing innovation districts, leveraging the university as an anchor and creating close relationships between faculty, students and company tenants, while offering mixed use developments including housing.
- **Role of universities in commercialization.**
  - NC State is a national leader, with over 20 startups annually, dedicated funding through its Chancellor's Innovation Fund for proof-of-concept, a full-time site for NSF i-Corps, an Executive in Residence program to scout for technologies at university research labs, bootcamps and business plan competitions, strong entrepreneurial programs within its colleges and strong alumni networking of its start-ups (Wolfpack Investor Network).
  - UNC in 2010 launched a stronger focus on commercialization and entrepreneurship, including commercialization training launched through an EDA i6 grant, on-campus incubators, a downtown coworking space, proof-of-concept funding (Kickstart Venture Services), alumni investor network (Carolina Angel Network) and a \$10 million seed-stage investment fund created by the university's endowment known as Carolina Research Ventures Fund.
  - Duke University has also embraced entrepreneurship with fellowship program, startup challenge, an incubation fund and a prototyping facility for students, and in its technology transfer efforts participation in the Coulter program, active alumni angel network and partnerships with private sector incubators and accelerators (MedBlue incubator, Biomarker Factory and Center for Advanced Hindsight).
- Non-university physical developments, including coworking and incubator spaces, such as HQ coworking with three facilities in Raleigh and American Underground and BioLabs in Durham

## Successes:

- Raleigh Durham is a top region for venture investment in high-potential innovation-driven companies, with over \$1 billion in venture funding to 173 companies, able to attract VC investment from East and West coasts, as well as having a strong base of SBIR backed companies.

## Challenges:

- Linking major public-private innovation center developments with entrepreneurial activity.

## Best Practice Lessons:

- University engagement in commercialization and innovation is key driver for the region. Builds on brand of being a major complex for university research and talent.

# Benchmark Case Study: Susquehanna, PA

<b>Regional Context:</b>	<ul style="list-style-type: none"><li>• Rural region with no university research anchors, but presence of non-research oriented colleges and universities.</li></ul>
<b>Key Tools:</b>	<ul style="list-style-type: none"><li>• Presence of a Keystone Innovation Zone designation, one of 29 in the state, offering transferable tax-credits of up to \$100,000 based on growth in revenues to young companies under 8 years old, operating in innovation-led sectors and located in designated areas near colleges and universities.</li><li>• Rural Business Innovation serves as hub for entrepreneurship including:<ul style="list-style-type: none"><li>• Network of incubators located near local colleges and universities</li><li>• Business technical assistance for accessing financing</li><li>• Micro-startup grants of up to \$5,000</li><li>• Student internships of up to \$2,000 per semester</li><li>• Coordinator of local KIZ involving outreach and engagement with local businesses</li></ul></li></ul>
<b>Successes:</b>	<ul style="list-style-type: none"><li>• Diversified range of approximately 30 companies served across manufacturing, IT, and bio-health through incubators, internships, micro-loans and KIZ tax benefits</li><li>• Eleven companies received KIZ benefits in 2017 generating nearly \$1 million in new sales and receiving \$444,000 in transferable tax credits.</li></ul>
<b>Challenges:</b>	<ul style="list-style-type: none"><li>• Sustaining a rural economy by having new and small businesses generate job opportunities</li></ul>
<b>Best Practice Lessons:</b>	<ul style="list-style-type: none"><li>• Demonstrates role that an entrepreneurial focused entity can have across a rural region partnering with local institutions</li><li>• Shows that a targeted tax credit oriented towards young growing businesses in traded industry sectors can be effective in rural communities.</li></ul>

# Benchmark Case Study: West Lafayette, IN

<b>Regional Context:</b>	<ul style="list-style-type: none"><li>• Rural region with major research anchor</li></ul>
<b>Key Tools:</b>	<ul style="list-style-type: none"><li>• Purdue's university driven research park developments. The Purdue Research Park, a 725-acre site on formerly university ag-related lands approximately 8.5 miles from main campus. Now home to 160 tenants. Home to a 105,000 sq. ft. university incubator and coworking space, which was developed with private contributions and bond funding from a state tax-increment financing program to create business incubators that offers \$5 million in bonding per incubator. Discovery Park District, a 400-acre mixed-use development immediately west of the main campus. It is the location for many of the university's commercialization and entrepreneurial development initiatives housed in the Burton Morgan Center for Entrepreneurship.</li><li>• Purdue's Foundry is an accelerator-type program to help Purdue-affiliated entrepreneurs create startups offering access to EIR mentors as well as an umbrella for a range of entrepreneurial and commercialization initiatives including: Trask Fund for applied research and proof-of-concept funding of university inventions; an NSF iCorp site; a range of venture financing assistance, including a \$12 m Foundry Investment Fund, a pre-seed Elevate Purdue Foundry fund receiving state support, Purdue Startup Fund, Purdue Angels and pre-seed Ag-Celerator funding.</li></ul>
<b>Successes:</b>	Since the founding of the Purdue Foundry in 2013, there have been 165 startups created that generated more than \$270 million in funding and 200-plus new jobs.
<b>Challenges:</b>	<ul style="list-style-type: none"><li>• Growing a broader and sustainable innovation ecosystem for the region that sees local startups stay rooted in the region as well as attract other growth-oriented companies.</li></ul>
<b>Best Practice Lessons:</b>	<ul style="list-style-type: none"><li>• A major research anchor can both attract existing industry operations to locate nearby as well as create the tools to generate new startups from research inventions, and faculty and student ideas.</li></ul>



## **Innovating Tomorrow's Economic Landscape**

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