Regional Entrepreneurial Assessment Project:

Final Briefing Report

Region 2: Roanoke-New River-Lynchburg

December 2018

TECONOMY PARTNERS LLC

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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 2 – Roanoke-New River- Lynchburg.

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 priority actions with local leaders to help strengthen the ecosystem.

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Setting the Context: Importance of Entrepreneurial Development for Regional Growth

- In 2017, there were 1,673 surviving traded sector startups formed since 2007 in Region 2
- 11,166 jobs in 2017 were found in these 1,673 surviving startups
- By comparison, over the 2007-2017 period, total traded sector industry employment declined by 9,187 in Region 2.
- So entrepreneurial growth has been a buffer in Region 2 offsetting the overall declines in the region's traded sector industry employment from the heights reached before the Great Recession of 2008-2009.

Project Work Plan

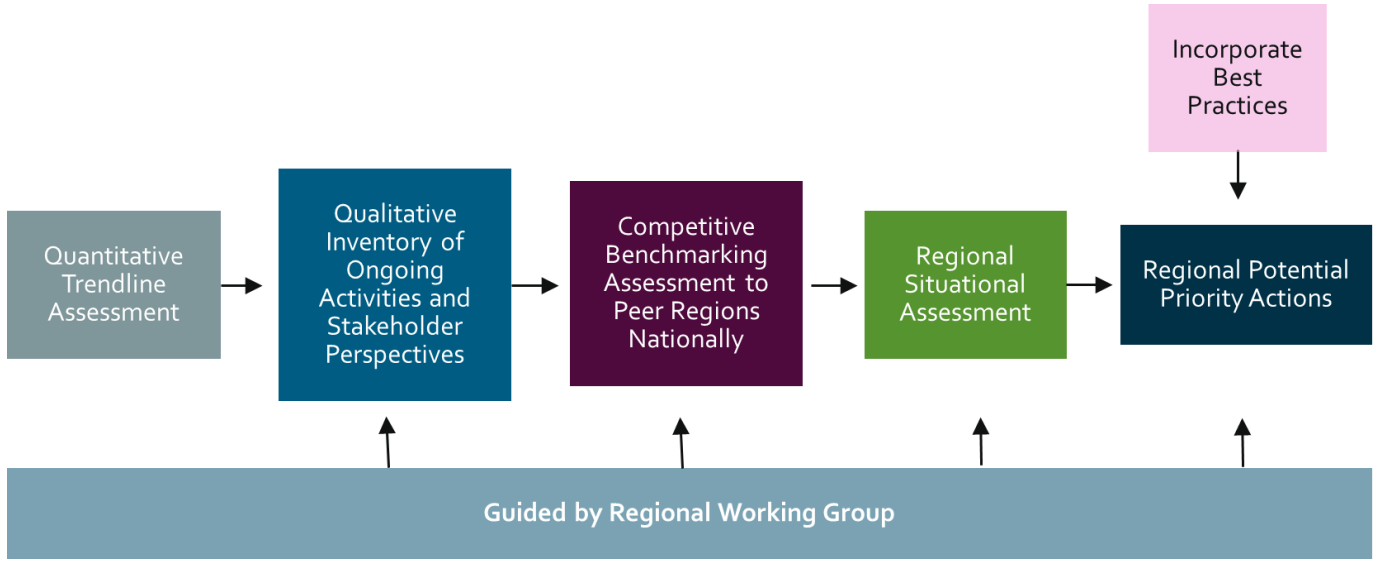
The work plan for preparing this Region 2 entrepreneurial development assessment involved examining:

- 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 2 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

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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.

	Ideation	Commercial Viability	Market Entry	Growth & Scalability
Activities at Each Stage	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 2

Overall Assessment:

Startups, patent innovation and talent attraction is lagging in the region despite a strong and growing university research base and increased activities to promote ideation in the region.

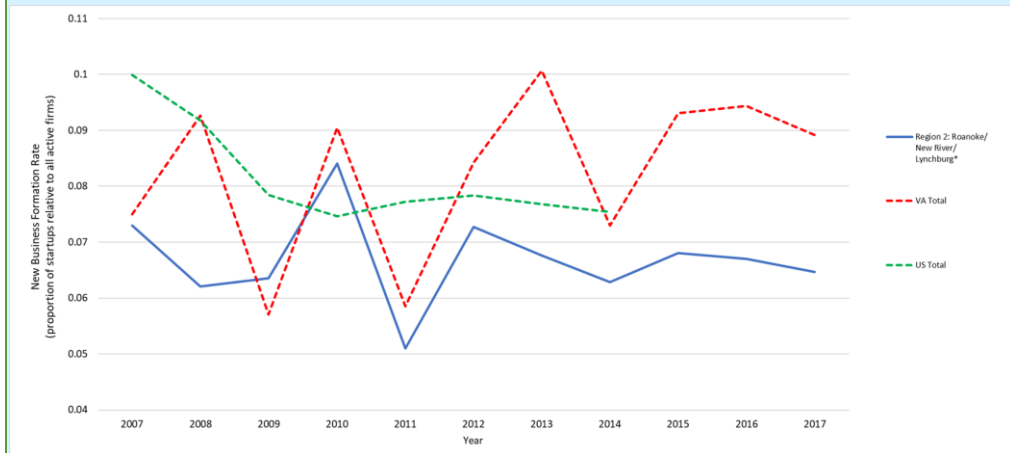
Strengths and Opportunities:

- **Traded sector startups found in three key hubs within region –** Roanoke area with 45% of the startups, Lynchburg with 30% and Blacksburg area with 18%.
- **Diversity in startup activities across traded sector industry clusters**, including with high relative concentration in life sciences, manufacturing and transportation/distribution/logistics
- **University research activity stands out --** university R&D per capita well above mid-sized benchmark regions and growing much faster
- **Major new academic drivers** with creation of VT-Carilion academic medical center, with a strong focus on neurosciences, and Liberty University expansion, including engineering program
- **Building blocks of activities to advance ideation found across the region** – including CoLabs in Roanoke, Co.Starters in Lynchburg and VT KnowledgeWorks in Blacksburg – but challenge of how to focus on traded sector activities
- **Opportunity to build upon the increased entrepreneurial programming at VT and LU to engage graduate students, post-docs and faculty**.

Gaps and Weaknesses:

- **Lower business formation than mid-sized benchmark regions –** 5% new business formation rate in Region 2 compared to 7% for mid-sized benchmark regions
- **Number of traded sector startups falling in 2016 (271) and 2017 (247)** – stood at more than 300 annually from 2012-2105
- **Patent activity lagging** -- slightly behind mid-sized benchmark regions and declined sharply in Region 2 from 2014-2017 while growing in the benchmark regions and nationally.
- **Significant net out-migration of highly educated to other states** – nearly 24,000 net outmigration from 2012-2017, while mid-sized benchmark regions gained in-migration, on average, of over 2,000.

Region 2 faces a significant challenge on business formation of traded sector startups



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

Assessment of Commercial Viability in Region 2

Overall Assessment:

Weakness in university research commercialization holds back region's potential despite base of small business innovation in the region

Strengths and Opportunities:

- **Significant SBIR/STTR activities –** well outpace mid-sized benchmark regions by approximately 10x, with 485 Phase I awards and 238 Phase 2 awards from 2010-2017
- **Creation of RAMP accelerator –** focus on high growth potential innovation-led startups, but needs more dedicated source of pre-seed funding
- **Efforts of VT Knowledgeworks** with limited pre-seed funding through a revolving loan fund
- **Presence of the Center for Advanced Research and Engineering –** focus on new product development with existing firms, including identifying technology solutions, proof-of-concept and prototyping

Gaps and Weaknesses:

- **Virginia Tech's technology transfer efforts lagging,** especially when compared to national averages, though mainly lagging on licensing efforts compared to mid-sized benchmark regions.
    - **Major "re-invention" of technology transfer underway at VT**, but the university needs to deal with minimal funding for patenting and proof-of-concept and past history of a lack of business friendliness in timeliness and approaches.

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

Region	Licenses/Options Executed	Licensing Income	Startups Formed
Virginia Tech	0.78	$50,711	0.09
U.S.	1.04	$413,677	0.13

Assessment of Market Entry in Region 2

Overall Assessment:

Young firm growth important driver of economic growth in recent years, but lack of venture capital investment holds region back.

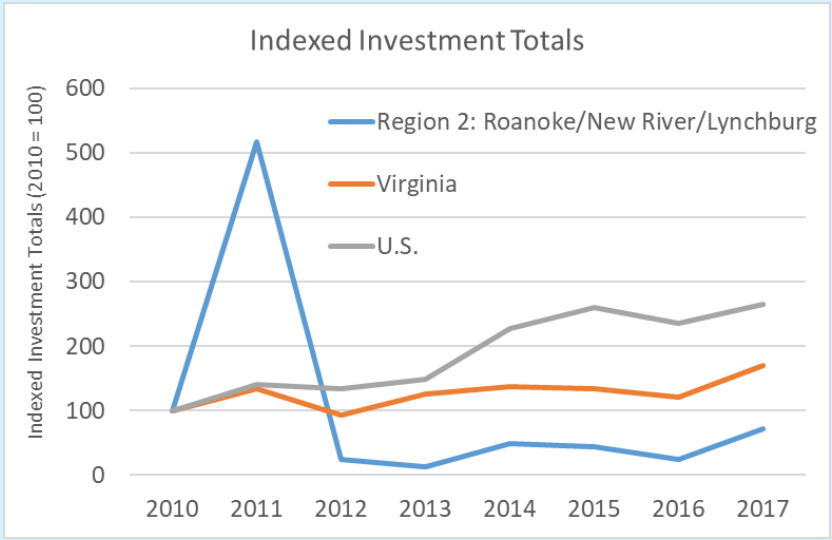
Strengths and Opportunities:

- **Significance of early stage company activity for growing the region –** 58% of Region 2's quarterly employment growth over past five years generated, on average, by firms under five years old compared to 34% for mid-sized benchmark regions
- **Presence of targeted angel and early stage funding in areas of SAAS and life sciences,** but not always in line with more engineering focus of region's technology strengths
- **Opportunity from new innovation space developments in the region**. New innovation spaces are advancing in the region. One is a planned expansion of the VT Corporate Research Center in Roanoke near the VT Carilion medical complex, with incubator and lab facilities of approximately 100,000 sq ft. Another significant development is the advancement of LUTECH at the 500-acre New London Business & Technology Center in Bedford County, VA, just a short drive from Liberty University's main campus. It will be a home for business and industry partners to Liberty University, with spaces from a single workstation to more than 10,000 sq. ft., innovation programming and access to shared use lab associated with the Center for Advanced Research and Engineering. Finally, the existing 44,000 sq. ft. of incubator space and loan funds managed by the Lynchburg Business Development Centre are under review to better utilize and enhance its offerings.

Gaps and Weaknesses:

- **Overall levels and growth of risk capital lagging significantly --** $29 million in risk capital for Region 2 over 2014-2017 well behind $127 million median for mid-sized benchmark regions and Region 2 had a steep decline of 71% from period 2010-13 to period 2014-2017, while mid-sized benchmark regions rose 86%
- **A particular weakness is the low level of earliest forms of risk capital, including pre-seed (accelerator/incubator), angel investor and seed funding** – a total of only 32 deals took place from 2010-2017 according to Pitchbook in Region 2 in these earliest forms of risk capital
- **Missing base of serial entrepreneurs to mentor and grow companies,** especially those who have gone through formation to scale-up to exit in more deep technology areas

Venture Capital Falling Off for Region 2



Assessment of Growth & Scalability in Region 2

Overall Assessment:

Startup job generation important contributor in traded sector industry cluster transitions taking place in region, with opportunity to do more in emerging growth industries. Still region faces a significant workforce and talent challenge as startups seek to scale up.

Strengths and Opportunities:

- **Contribution of startup activity in Region 2 most pronounced in offsetting the decline of traded sector industry clusters.**
- **Among emerging growth industries mixed performance –** 84% of growth in ICT cluster from startups, but just 47% of growth in Engineering/R&D cluster
- **189 surviving high growth startups formed since 2007, measured by having greater than 25% growth over lifetime of business, generated sustained growth reaching 3,306 jobs in 2017**, with 10 or more high growth companies in nearly every industry cluster.

Gaps and Weaknesses:

- **Well behind in Inc. 5000 fastest growing companies –** Only 2 in region for 2018 compared to 13 on average for mid-sized benchmark region.
- **Lagging trends in workforce and top talent –** Working age population declining from 2012-2017, including decline in young working age (25-34) population and only small gains in highly educated working age (25-64) population, whereas solid growth realized by mid-sized benchmark regions
- **Lower levels of SBA 7(a) loans supporting growth-oriented small businesses in more traditional-based traded sector industries compared to mid-sized benchmark regions –** 1.7 loans per capita in Region 2 compared to 2.7 in mid-sized benchmark regions and $4 per loan value compared to $12 in mid-sized benchmark regions
- **General challenge of entrepreneurial culture in region,** including not many spinoff companies from existing industry base

Contribution of Entrepreneurial Development to Traded Sector Industry Cluster Growth

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

Potential Priority Actions Identified for Entrepreneurial Development in Region 2

- Generate increased ideation and greater activities in commercial viability for traded sector, high-growth oriented businesses, integrated with VT's and LU's technology commercialization efforts
- Advance innovation networks bringing together startups and existing companies focused on advancing commercialization and increasing talent connections
- Address need for more startup risk capital for market entry, including establishing an angel investor network and micro-loan fund
- Concept of a "Regional Entrepreneurial Quarterback"

Potential Priority Action: **Generate increased ideation for traded sector, high-growth businesses**

Rationale:

- Raising the level of business formation of high-growth potential traded sector businesses is critical for Region 2
- Need to take better advantage of Region 2's significant and growing university research base for advancing new innovation-led startups
- Address missing base of serial entrepreneurs to mentor and grow companies
- Opportunity with re-invention of technology transfer and commercialization at VT and enhanced VT-Carilion and LU research drivers coming to fruition to build a stronger community-wide approach for advancing university-related startups that taps the local entrepreneurial community and create stronger connections of university startups to the region
- Opportunity to build upon the increased entrepreneurial programming at VT and LU to engage graduate students, post-docs and faculty.
- Opportunity to advance commercialization planning for SBIR companies

Possible Activities:

- **Advance a regional industry-university collaborative for innovation and commercialization** to engage seasoned entrepreneurs and technology domain experts from industry to help vet university disclosures, inform needed proof-of-concept projects to validate commercial viability and form or mentor startup teams with university faculty and graduate students
- **Establish an ongoing regional capacity to offer an ideation program for potential entrepreneurs** similar to SBDC's Innovation Commercialization Assistance Program, building upon lean startup models, that leverages the expertise and resources of VT, LU, Western CC and other university & college business schools to create the trainers and counselors from within the region
- **Sponsor entrepreneurs-in-residence fellows in targeted sectors relevant to Region 2 to work with identified regional entrepreneurial startup teams**, both from university and broader community, that successfully complete initial phases of ideation program and demonstrate high-growth potential

Illustrative Best Practice Examples:

- Oklahoma: i2e Venture Assessment Program designed to help entrepreneurs investigate product/market fit of a new business concept through a five week program of workshops and individual feedback and direction with follow-on recommendations on next steps needed to advance business concept
- Raleigh-Durham: Blackstone Entrepreneurs Network North Carolina that provides expert venture coaching through a veteran group of EIRs
- Colorado: Innovation Center for the Rockies, initially established by Boulder County, over nearly a decade worked closely with the state's public research universities to bring expert teams of entrepreneurs and technology domain experts to assess and advance university technology transfer. From 2005-2015, beyond the ongoing review of disclosures, it worked with 80 university research teams to commercialize technologies and its experts were directly involved in the startup of 8 new companies, raising $75 m in private capital and creating over 400 jobs. Now integrated into Innosphere, a technology incubator with facilities across Colorado, including Fort Collins, Boulder, Denver, and South Denver/Castle Rock

Potential Priority Action: **Advance innovation networks to bring together startups and existing companies focused on advancing commercialization and increasing talent connections**

Rationale:

- Many traditional traded sector industry clusters declining and emerging clusters either under-performing national growth (ICT, life sciences) or not having strong contributions from startup activity (engineering/R&D)
- Build upon the unique needs found across the diversity of traded sector industry clusters in the region

  Possibly organize around statewide domain areas which have an existing or emerging presence in Region 2, such as:

  - Cybersecurity
  - Autonomous Systems
  - Life Sciences
- Need to address talent retention in the region not just for entrepreneurial talent, but for scaling up startup and existing businesses
- Strengthen regional capabilities in working with startup and existing businesses in commercial viability of new product development, tapping both university applied research capabilities and CAER

Possible Activities:

- Facilitate bringing together entrepreneurs and innovation-oriented existing businesses from around the region in specific industry clusters to form an industry innovation network.
- Among networking activities could be:
  - Technology and market intelligence workshops
  - Peer to peer networks across CEOs, CTOs
  - Investor forums/pitch competitions
- Matching entrepreneurial startups with domain area experts from existing companies and possibly holding accelerator cohorts
- Establish a talent outreach program that supports experiential learning projects and internships with students in relevant courses/degree programs through collaborations with faculty
- Offer innovation vouchers for identified high-growth potential startups completing ideation programs to address commercial viability, including through use of senior design projects with universities and tapping CAER and university applied research capabilities.

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.

Potential Priority Action: **Address need for more startup risk capital for early-stage market entry by traded sector startup companies**

Rationale:

- Overall levels and growth of risk capital lagging significantly in Region 2, including in the earliest forms of risk capital, including pre-seed (accelerator/incubator), angel investor and seed funding
- Existing ideation efforts lack follow-on funding to successfully launch companies in the region

Possible Activities:

- **Create a micro-loan fund for startups involved in more traditional traded sector activities**, such as manufacturing. An example found in Virginia is the Staunton Creative Community Fund that utilizes an SBA revolving loan fund to provide micro-loans to startup clients. VT Knowledgeworks has used a small revolving loan fund for pre-seed investments, and the Business Development Centre in Lynchburg manages several revolving loan funds able to be used for small business expansion in the City and nearby communities with a total loan pool of $1.875 million
- **Organize a formal angel investor network in the region.** Given lack of understanding of innovation-based businesses of high-net worth individuals consider creating an in-house capacity to conduct due diligence with support from GO Virginia
- **Seek to form a multi-regional seed fund with nearby regions** that is 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

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.

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 GO VA 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.

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 2 Task Force on Startups/Innovation/ Commercialization

- **Bob Bailey**, Center for Advanced Engineering and Research
- **Greg Feldmann**, Valleys Innovation Council
- **Victor Iannello**, Radiant Physics, co-chair VIC
- **Doug Juanarena**, serial entrepreneur and angel investor, co-chair VIC
- **Megan Lucas**, Lynchburg Regional Business Alliance
- **Georgeann Snead**, Electronic Design & Manufacturing, Inc.
- **Jonathan Whitt**, Liberty University

Appendix B: Quantitative Trendlines on Entrepreneurial Development

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

Key Measures:

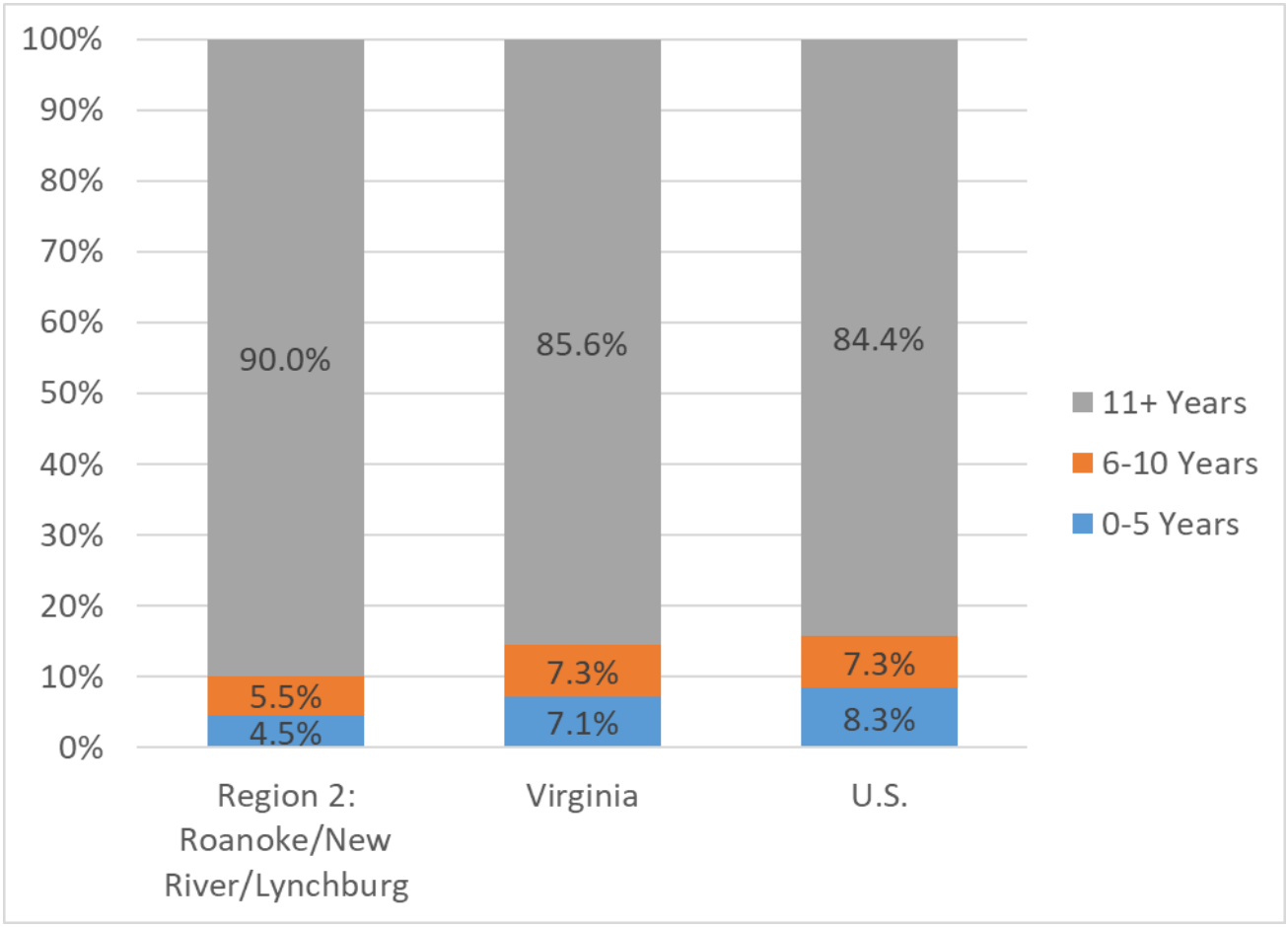
- Job distribution by age of firm
- Job creation by age of firm
- Business formation rates of start-ups
- Survival rates of startup companies
- Examining key elements of "net" employment growth
- The contribution of high-growth startups compared to all startups

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



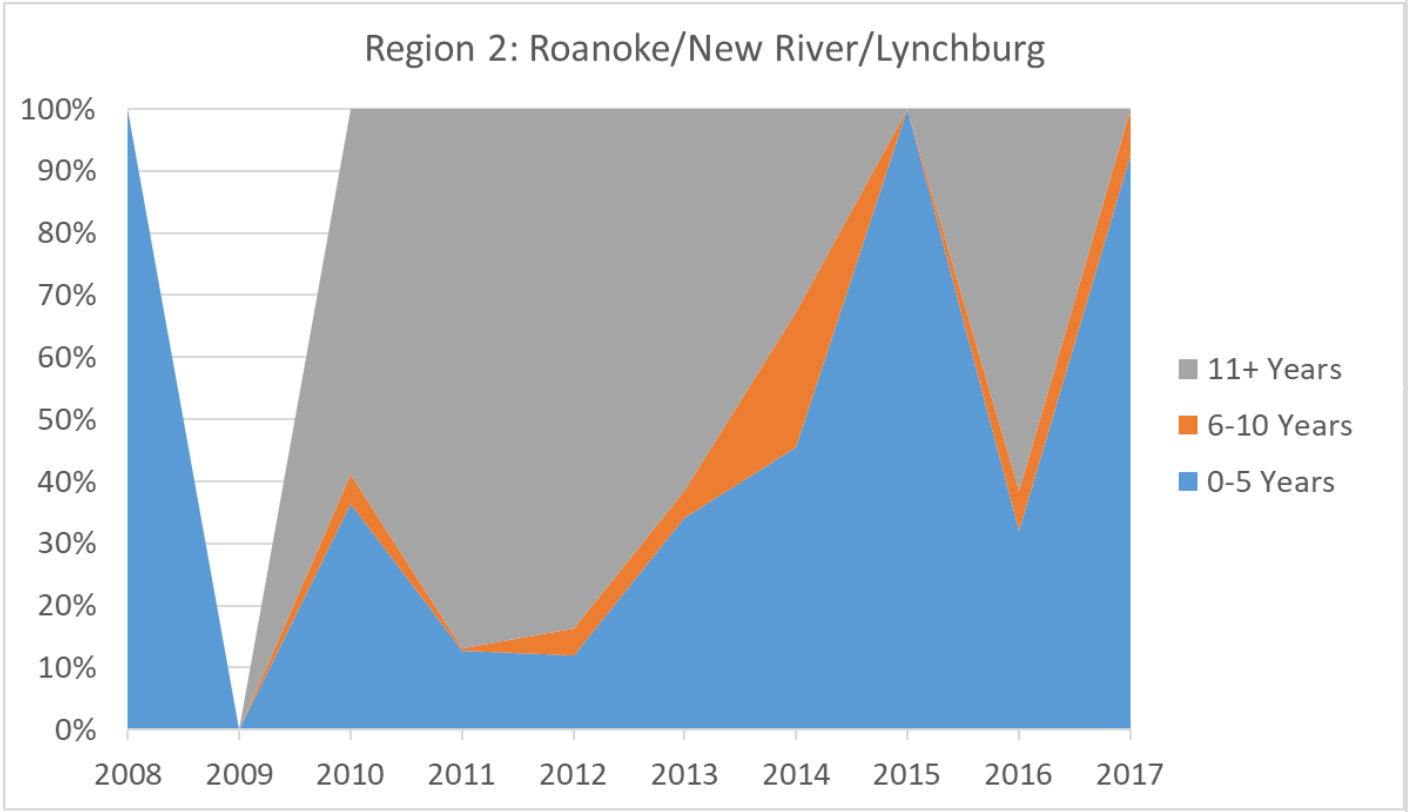
Traded Sector Employment Levels by Firm Age as a Percentage of Total Employment, Averaged 2008 Q1 through 2017 Q2

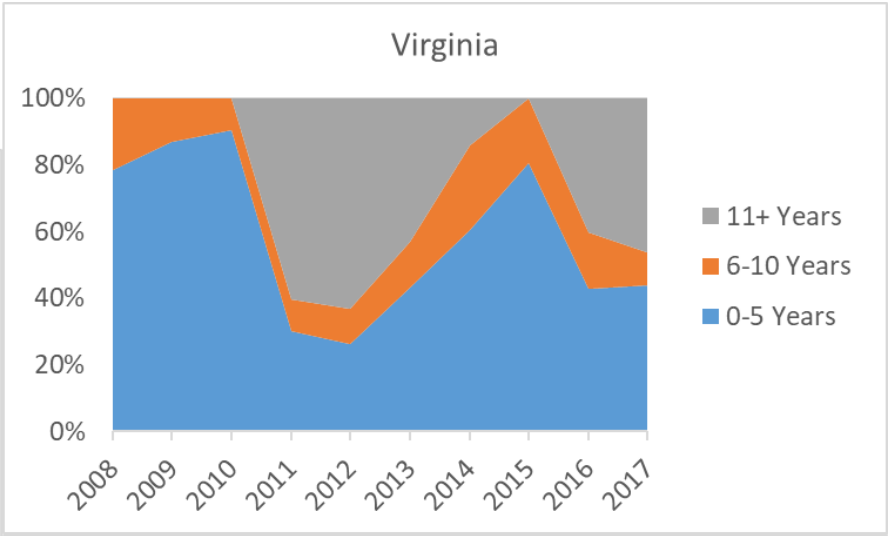
Source: U.S. Census Bureau Quarterly Workforce Indicators dataset.

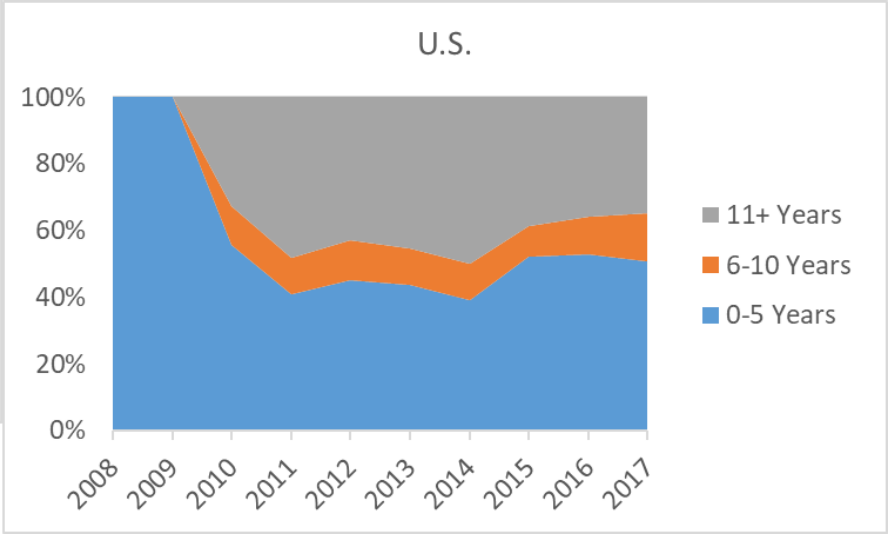
Trends in Job Growth Generation by Age of Firm for Traded Sector Industries

- Region 2 has a more balanced mix of net job growth coming from startups and older firms – interestingly startups larger share in recent years, though firms at stage of scale-up (6-10 years old), not contribution much to net job growth.

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



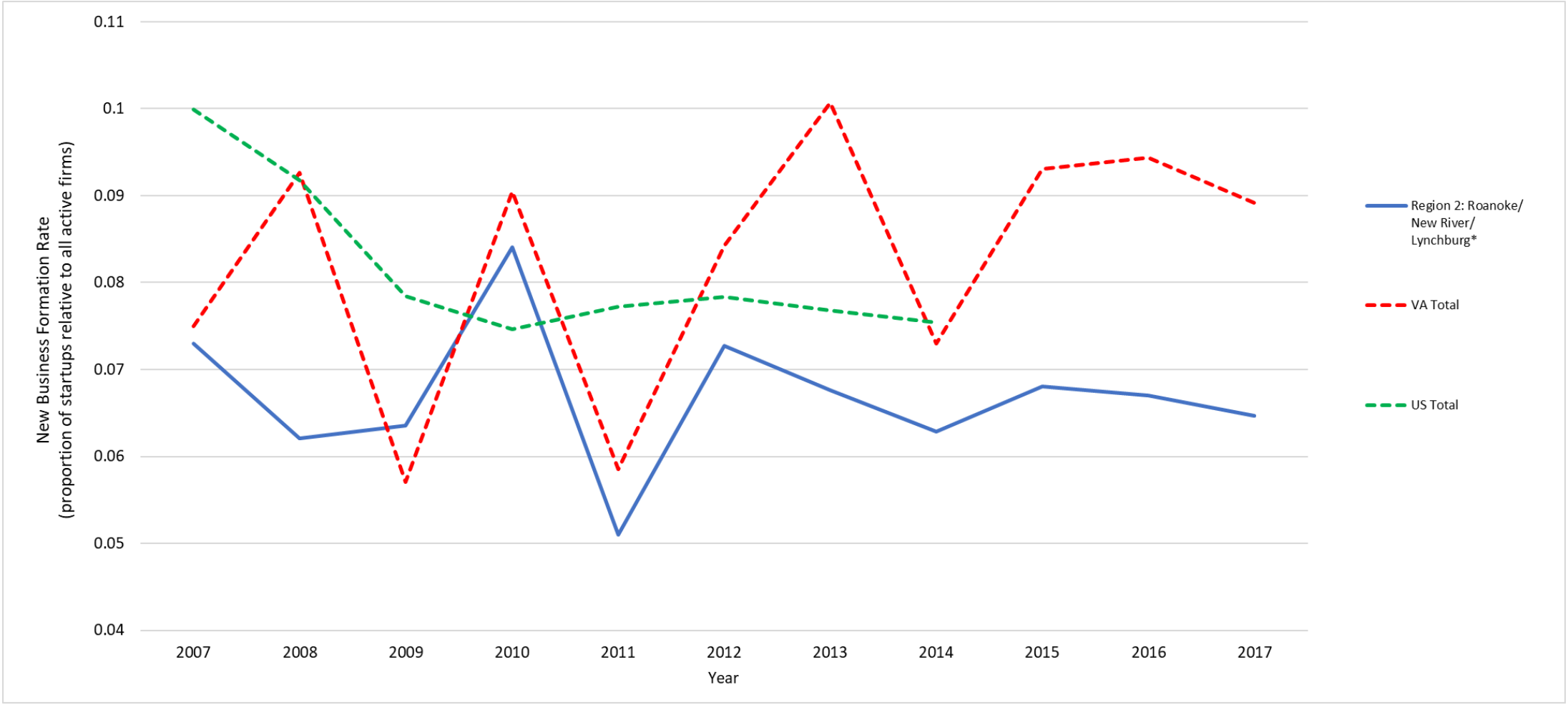




Source: U.S. Census Bureau Quarterly Workforce Indicators dataset.

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

- Trends in overall new business formation rates for region follow state until 2012, but then observe decline in activity



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

BDRC Profile of Startup Activity Trends in Region

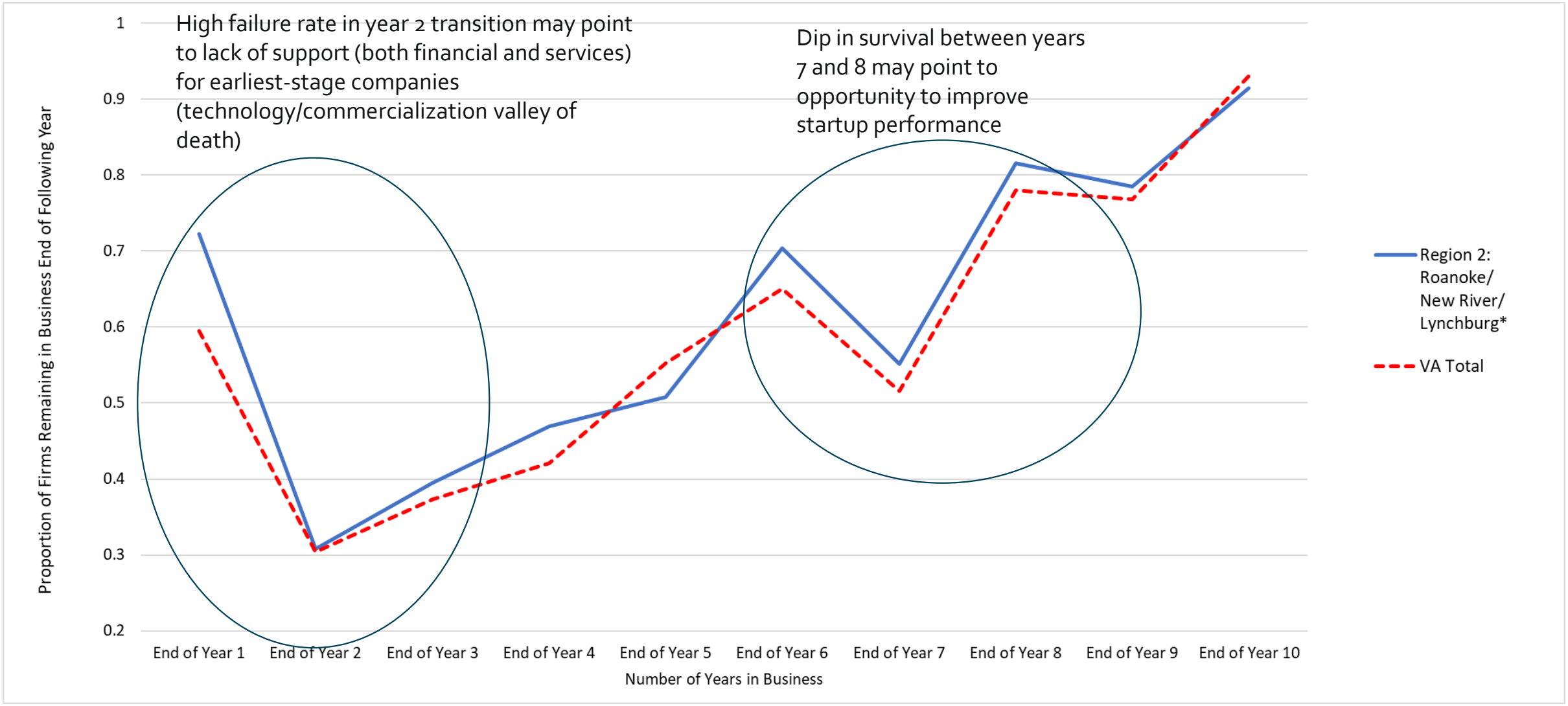
- 11,166 jobs found in Region 2 in 2017 associated with start-up activity in traded sector industries over the past decade

Founding Year of Startup Cohort*	Number of Startups in Traded Sector Industries	Number of Startups Surviving by 2017	Start-up Employment Levels 2017
2007	293	87	573
2008	257	108	864
2009	224	91	676
2010	402	155	1,337
2011	188	75	381
2012	309	151	913
2013	318	138	959
2014	306	192	1,509
2015	308	217	1,233
2016	271	212	1,333
2017	247	247	1,388

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

Year over Year Survival Rate Trends in Regional Traded Sector Startups

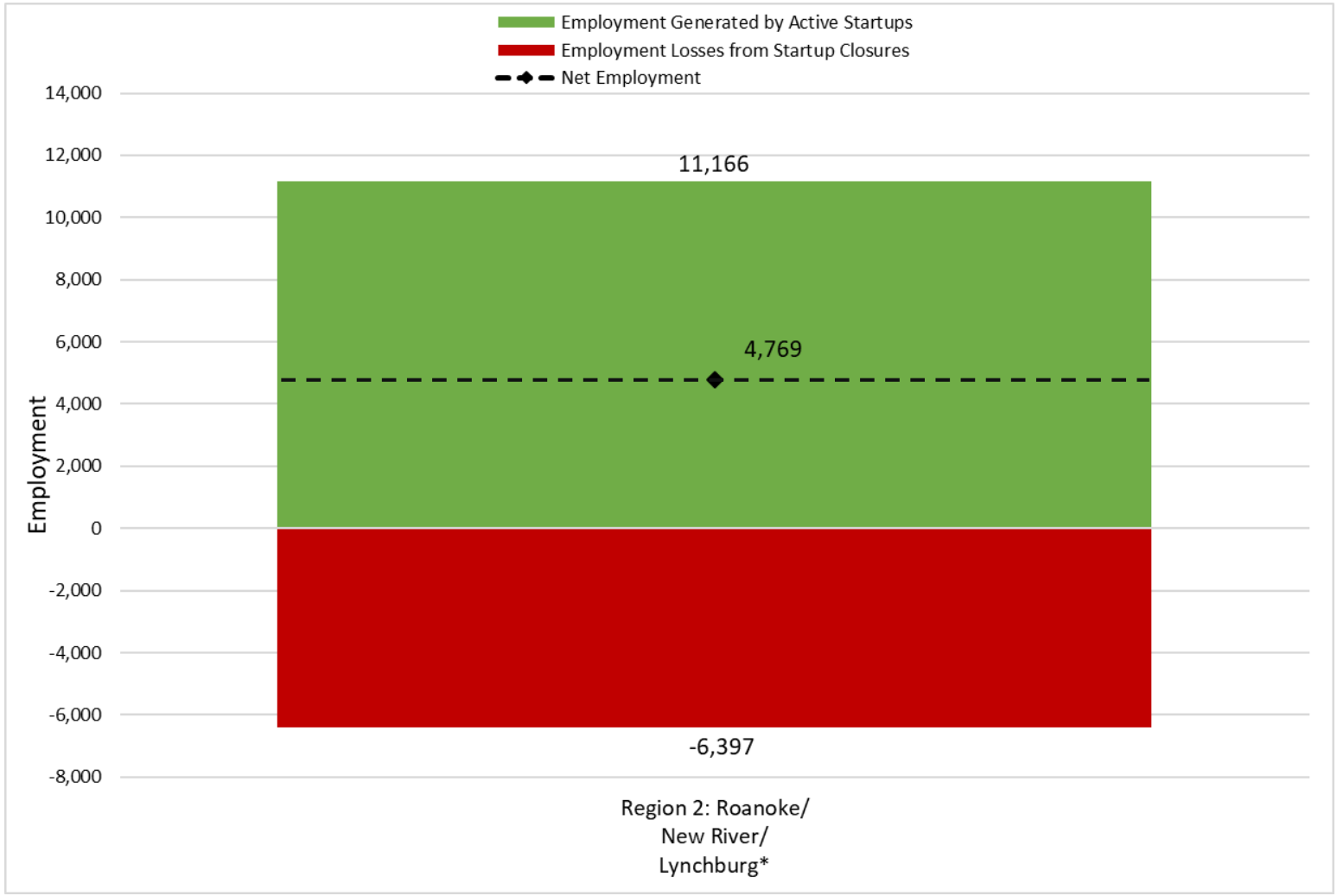
Cumulative 10-year startup cohort survival rates for region are 55.2% compared to a VA statewide rate 53.5%



*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



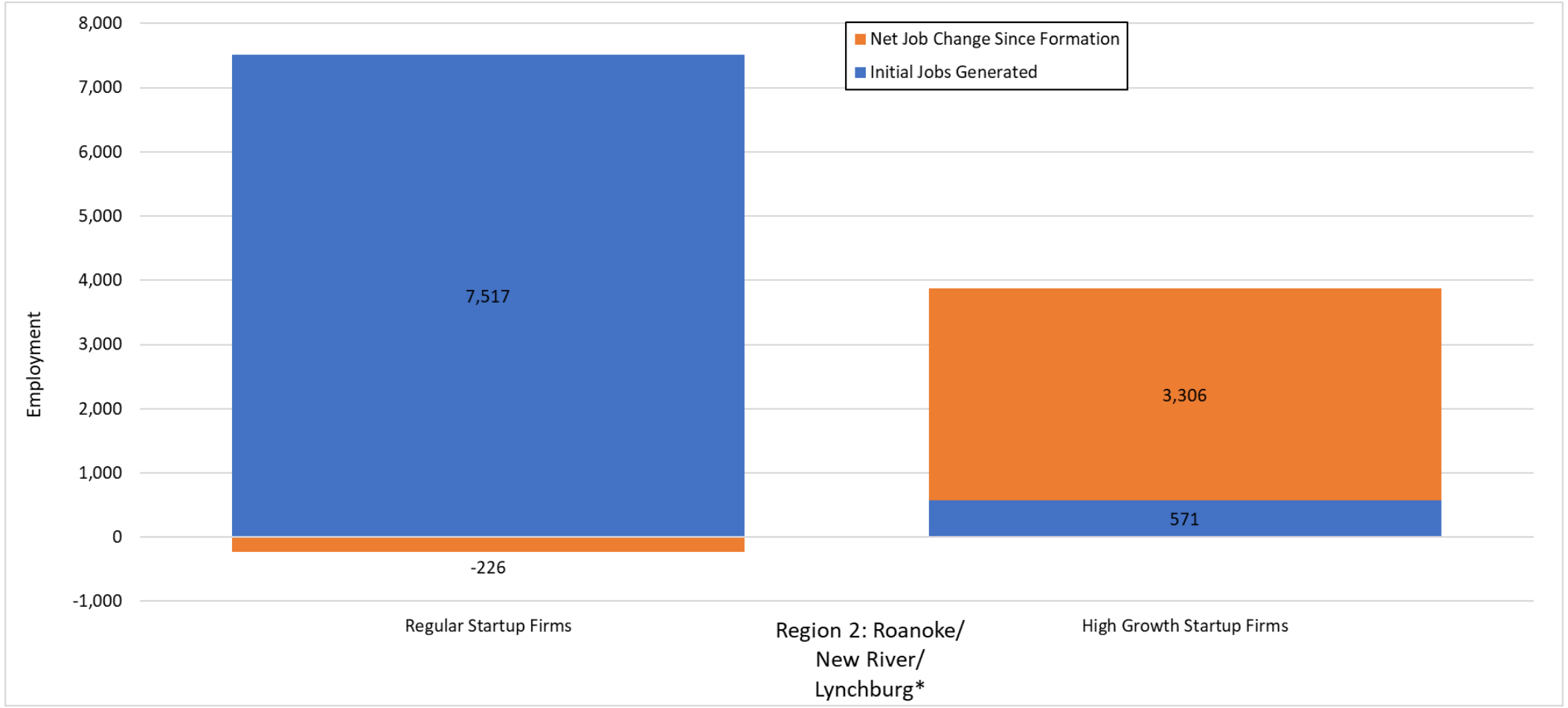
	Total Virginia Startups
Employment Generated by Active Startups	155,033
Employment Losses from Startup Closures	-98,732
Net Employment	56,301

*Indicates GO Virginia regions with research universities
**Startups defined as having firm age <10 years as of 2017

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



*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 Traded Sector High Growth Startup* Activity in Region

- Region 2 generation of high growth startups is in line with statewide averages:
  - High growth firm share of surviving startups, just slightly below state average:
    - Region 2: 11.3%
    - State Avg: 12.3%
  - Jobs per Surviving High Growth Firm slightly more in Region 2
    - Region 2: 20.5 jobs
    - State Avg: 17.3 jobs

Founding Year of Startup Cohort**	Total Number of Startups in Traded Sector Industries	Number of High Growth Start-ups Surviving by 2017	Employment Levels of High Growth Start-ups, 2017
2007	293	7	165
2008	257	8	434
2009	224	12	215
2010	402	15	683
2011	188	7	83
2012	309	21	340
2013	318	19	466
2014	306	52	932
2015	308	46	521
2016	271	2	38
2017	247		

* High growth startups defined as >25% annualized employment growth over lifetime of business
** Composed of all new non-branch firms with first recorded employment activity in a given year

Profile of Startup Activity Within Key Regional Industry Clusters

Region 2 Priority Clusters from 2017 Growth and Diversification Plan:

- **Manufacturing**
- **Life Sciences and Health Care**
- **Food and Beverage Processing**
- **Emerging Technologies and IT**

Major Industry Cluster	Number of Startups in Cluster	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*
Agriculture & Food Processing	248	137	12	666	1.06
Business Services	1,651	921	120	4,252	0.83
Energy, Natural Resources, & Finished Products	164	88	17	698	0.97
Engineering, R&D, Testing & Technical Services	185	107	19	570	0.51
Financial & Insurance Services	472	242	20	725	0.63
Health Care Services	84	41	18	710	0.60
Information Technology & Communications Services	173	104	33	991	0.61
Life Sciences	147	83	15	632	1.43
Manufacturing	225	112	23	1,019	1.24
Ship Building, Aerospace, & Defense	5	3	3	24	0.18
Transportation, Distribution and Logistics	677	355	72	3,196	1.27
Other Traded Sectors	408	210	33	1,497	0.74

*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

Contribution of Entrepreneurial Development to Leading Industry Clusters

Significant dynamics among industry clusters – move away from traditional industries, with current strength in health care and emerging strengths in ICT and Engineering/R&D

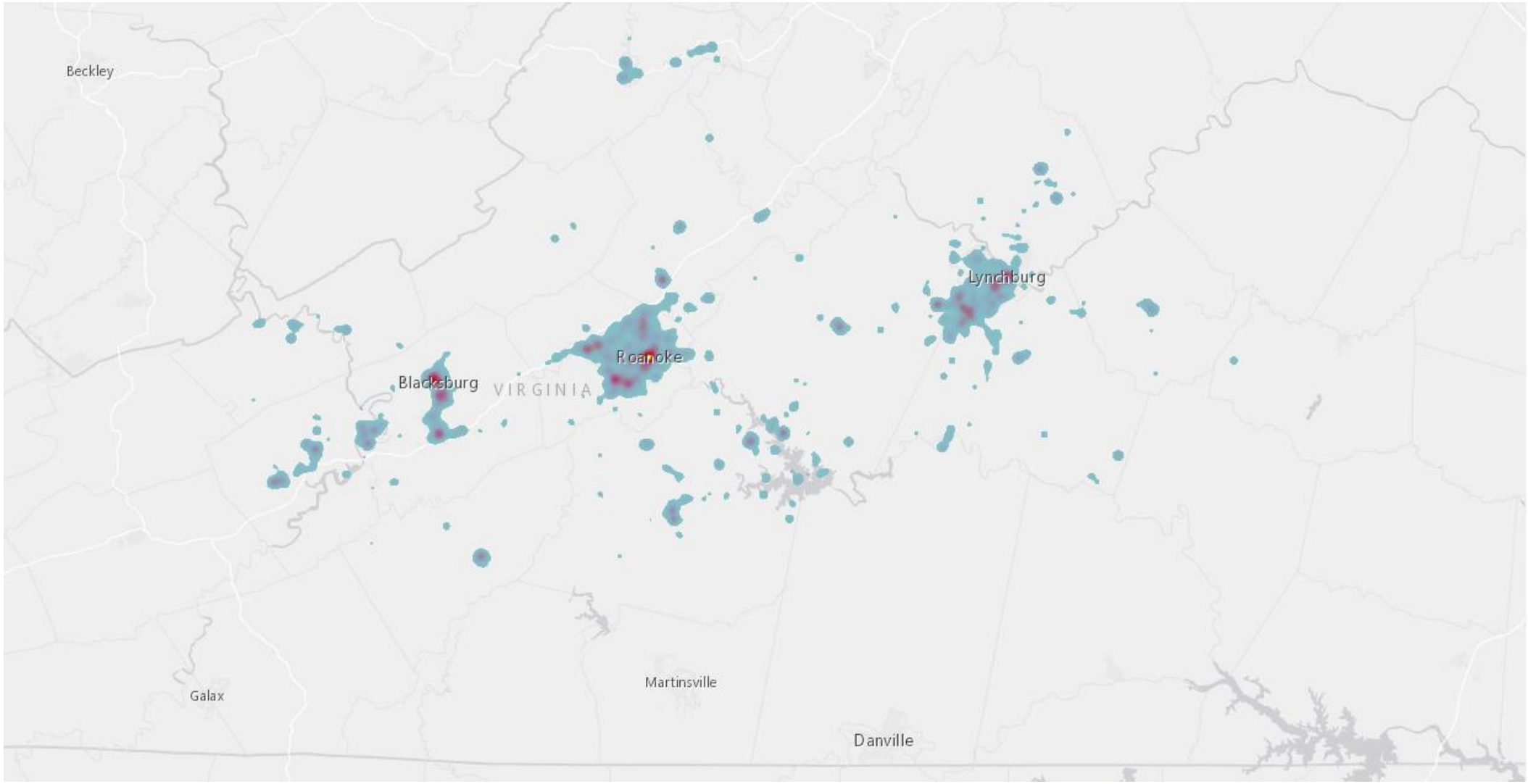
Role of entrepreneurial activity in emerging opportunities is significant in ICT, but only modest in Engineering/R&D – plus more generally helps offset declines in traditional industries

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	Declining	Very Significant	3,736	0.54	-8.5%	10.7%	-346	666	>100%
Business Services	Sizable/Declining	Very Significant	14,926	0.85	-5.0%	9.1%	-788	4252	>100%
Energy, Natural Resources, & Finished Products	Specialized/Declining	Very Significant	8,349	1.46	-22.5%	-13.3%	-2,422	698	>100%
Engineering, R&D, Testing & Technical Services	Emerging Strength	Modest	3,872	0.99	45.7%	6.5%	1,215	570	47%
Financial & Insurance Services	Declining	Very Significant	4,382	0.61	-33.7%	-4.1%	-2,225	725	>100%
Health Care Services	Current Strength	Modest	15,875	1.40	19.6%	12.5%	2,600	710	27%
Information Technology & Communications Services	Emerging Opportunity	Significant	4,255	0.65	38.2%	50.8%	1,175	991	84%
Life Sciences	Declining	Very Significant	1,634	0.48	-27.2%	9.7%	-611	632	>100%
Manufacturing	Specialized/Declining	Very Significant	32,232	1.84	-15.4%	-13.5%	-5,888	1019	>100%
Ship Building, Aerospace, & Defense	Declining	Very Significant	51	0.03	-53.9%	-7.7%	-59	24	>100%
Transportation, Distribution and Logistics	Sizable/Declining	Very Significant	13,281	0.86	-12.2%	8.7%	-1,838	3196	>100%

Geographic Distribution of Traded Sector Startup Activity in Region

High Regional Startup Activity Levels

Low Regional Startup Activity Levels



Closer Look at Subregional Entrepreneurial Activities

Three traded sector entrepreneurial hubs emerge in Region 2, comprising 93% of startup firms and related jobs since 2007 that are in existence in 2017.

Subregions	Independent Cities and Counties Included	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 Three or More High Growth Companies of 10+ Employees
Roanoke-centric	Botetourt; Franklin; Roanoke City; Roanoke County; Salem City;	1418 (45%)	5316 (48%)	40	TDL; ICT; Business Services
Lynchburg-centric	Lynchburg City; Amherst; Bedford; Campbell	937 (30%)	3046 (27%)	32	Business Services; ICT; TDL
Blacksburg-centric	Montgomery; Pulaski; Radford City	552 (18%)	2073 (19%)	12	ICT; Business Services; TDL

Initial Analysis of Broader Innovation Ecosystem Activity Innovation Ecosystem Activities

Key Measures:

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

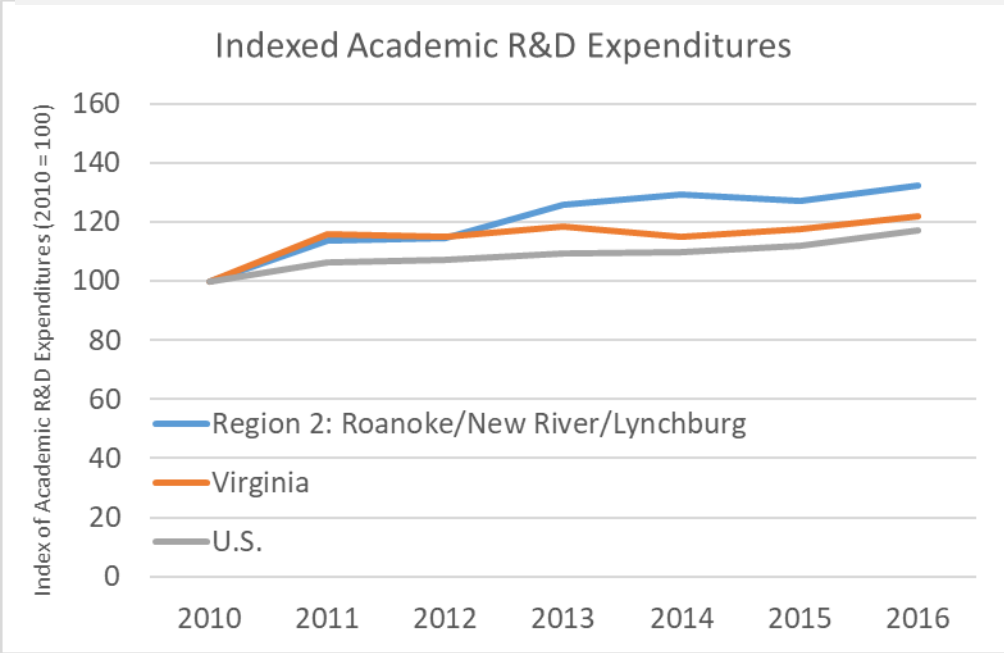
Growing University R&D, But Concerns on Tech Transfer

Academic R&D Expenditures (Millions)

Region 2: Roanoke/New River/Lynchburg	2010	2011	2012	2013	2014	2015	2016	Total
Virginia Tech	$398.2	$450.1	$454.4	$496.2	$513.1	$504.3	$521.8	$3,338.0
Other Institutions	$0.7	$3.8	$2.6	$5.0	$2.6	$2.2	$5.7	$22.6

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

Region	Licenses/Options Executed	Licensing Income	Startups Formed
Virginia Tech	0.78	$50,711	0.09
U.S.	1.04	$413,677	0.13



Academic R&D Expenditures, Top 5 Disciplines

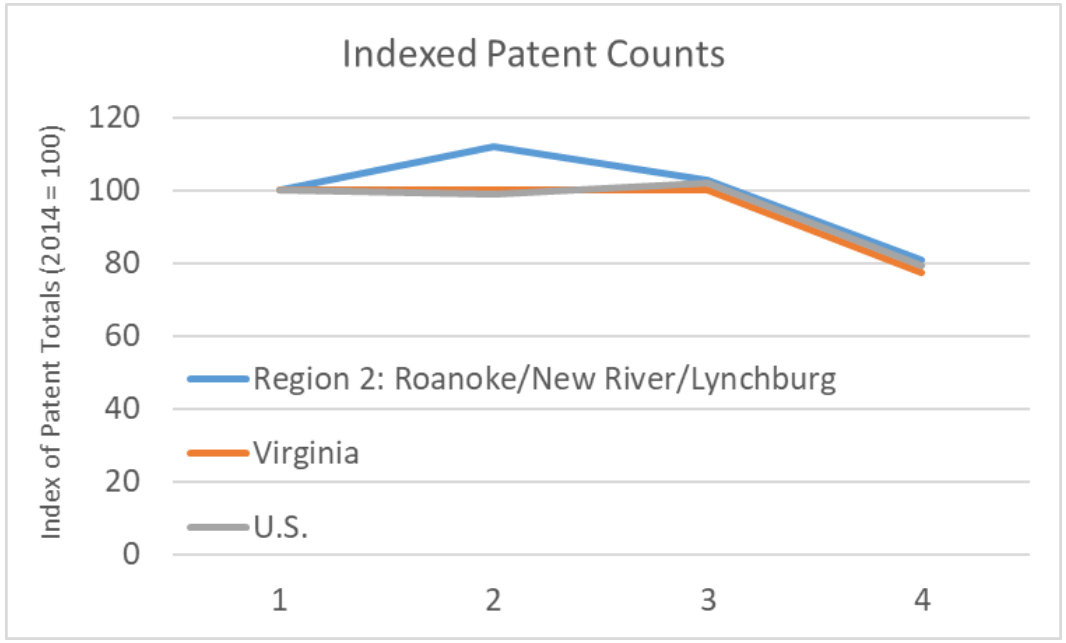
Field	R&D Expenditures, 2010-16 (Millions)	% of Total
Agricultural Sciences	$675.62	20.1%
Biological and Biomedical Sciences	$440.08	16.4%
Civil Engineering	$378.61	16.9%
Electrical/ Electronic/ Communications Engineering	$299.79	16.1%
Mechanical Engineering	$262.78	16.8%

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

Patent Activity: Significant Base, Very Diverse Areas of Technology

Total Patents, 2014-17

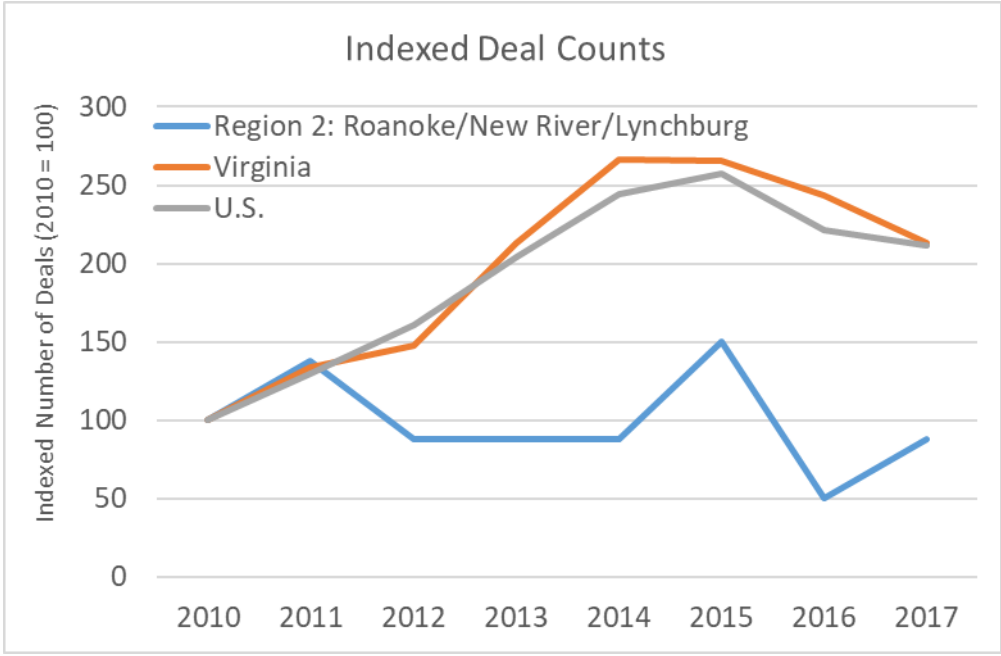
Region 2: Roanoke/New River/Lynchburg	2014	2015	2016	2017	Total
Patent Counts	526	588	540	426	2,080

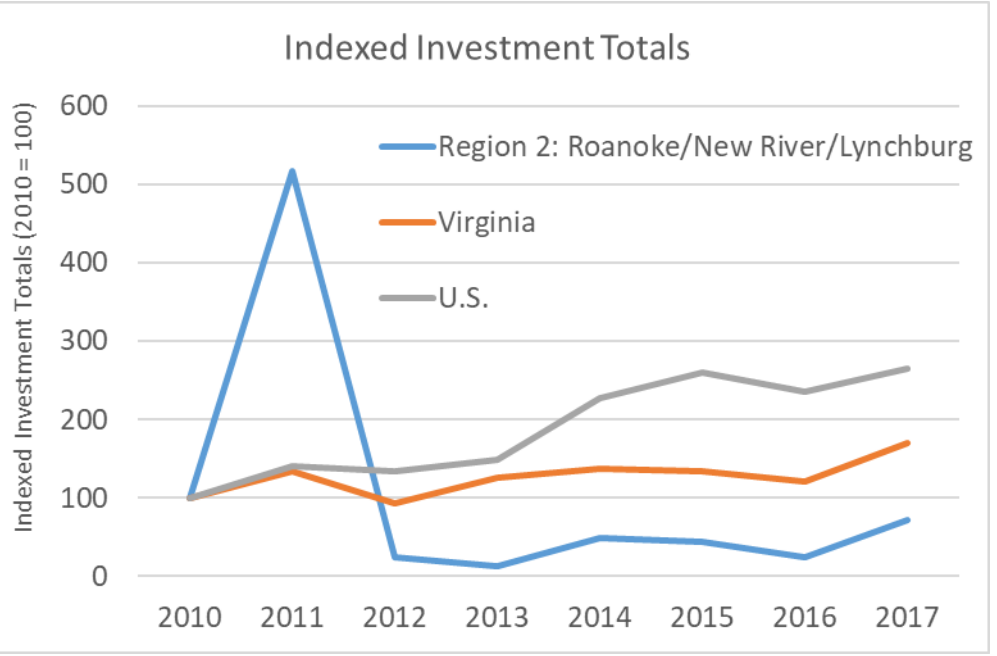


Technology Class Area	# of Patents, by Inventor, 2010-2017
Lenses and optical parts	64
Biopharmaceuticals	32
Digital computing or data processing equipment or methods, specially adapted for specific functions	31
AC/DC power converters	24
User interface and data input devices	21
Program control and monitoring systems	21
Materials analysis methods and technologies	21
Light guides; Structural details of arrangements comprising light guides and other optical elements, e.g. couplings	20
Control of nuclear reaction	19
Optical accessories	19
Radio transmission systems	19
Tobacco smoke filters, e.g. filter-tips, filtering inserts; Mouthpieces for cigars or cigarettes	19

Sources: Association of University Technology Managers (AUTM) Licensing Activity Survey, U.S. Patent & Trademark Office data from Thomson Reuters Thomson Innovation patent analysis database.

Fall-Off in Venture Capital





Region 2: Roanoke/New River/ Lynchburg	2010	2011	2012	2013	2014	2015	2016	2017	Total
Deal Counts	8	11	7	7	7	12	4	7	63
Investment Totals (Millions)	$15.4	$79.8	$3.7	$1.9	$7.5	$6.9	$3.6	$11.2	$130

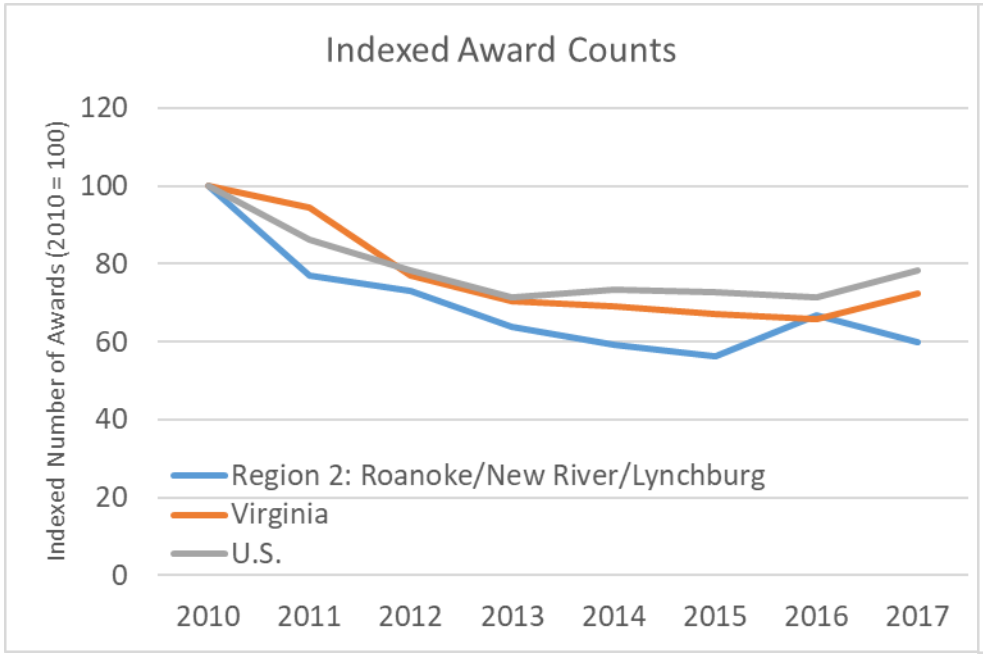
Region 2: Roanoke/New River/ Lynchburg	Pre-Seed	Angel	Seed	Early Stage	Later Stage	Total
Deal Counts	8	24	4	15	12	63
Investment Totals (Millions)	$0.1	$9.7	$1.2	$46.2	$72.7	$130.0

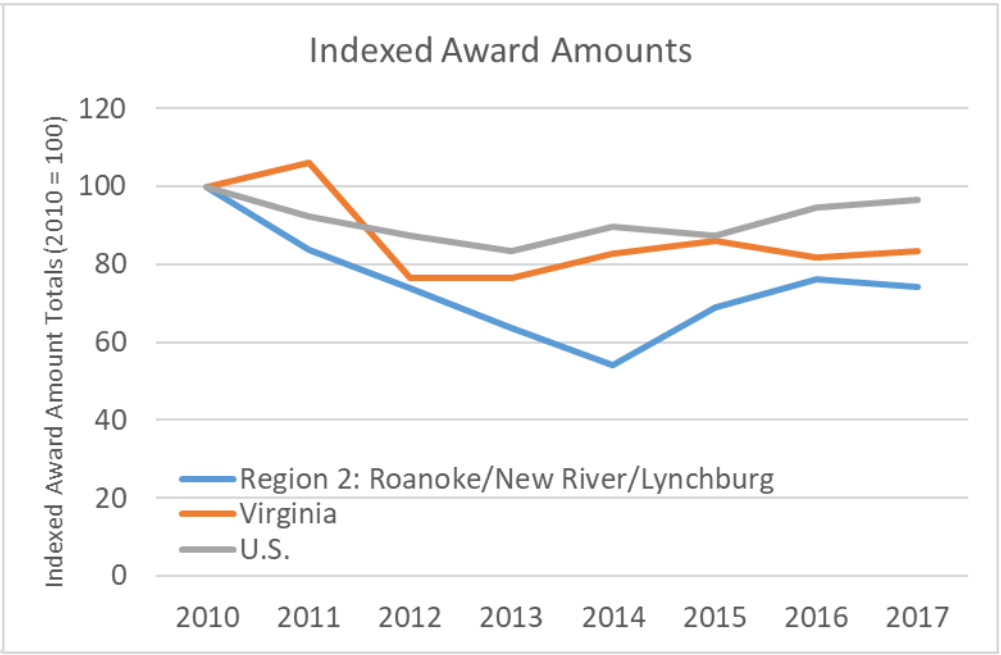
Source: PitchBook Data, Inc.

SBIR/STTR Awards

- Significant activity in SBIR awards, slightly below recent U.S. trends

Region 2: Roanoke/New River/ Lynchburg	2010	2011	2012	2013	2014	2015	2016	2017	Total
Award Counts	130	100	95	83	77	73	87	78	723
Award Amounts (Millions)	$42.67	$35.78	$31.54	$27.13	$23.13	$29.47	$32.46	$31.69	$253.87





Source: www.SBIR.gov

SBIR/STTR Awards

- A few companies dominate in SBIR activity

Top 10 Companies Receiving Phase II Awards, 2015-17

Company	Phase II Award Counts	Phase II Award Amounts (Millions)
Luna Innovations Incorporated	37	$31.75
Nanosonic Inc.	17	$14.49
Nuvotronics, LLC	10	$9.39
Harmonia Holdings Group, LLC	6	$4.60
Prime Photonics, LC	4	$2.57
Graf Research Corporation	2	$1.75
International Scientific Technologies, Inc.	2	$1.74
Innovative Wireless Technologies, Inc.	1	$1.44
Ceramic Tubular Products	1	$1.01
Innovative Technologies International, Inc.	1	$1.01

Source: www.SBIR.gov

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 2: SBA 7(a) Loans and Loan Amounts, Cumulative Totals 2010-18*

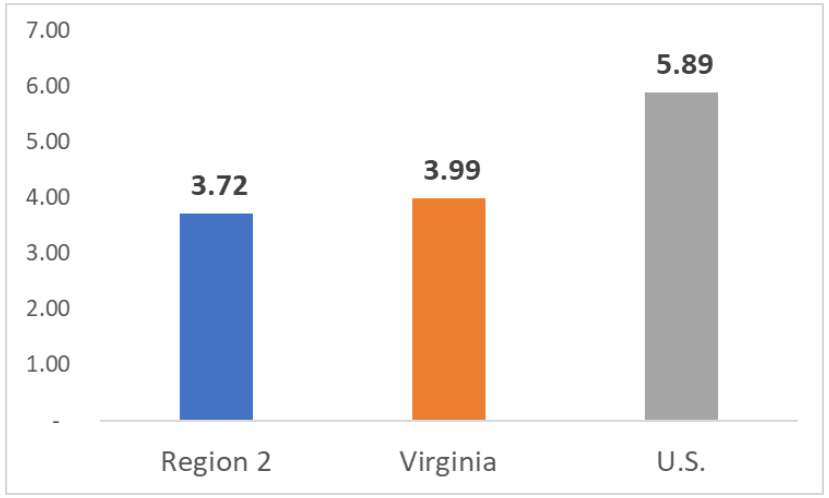
Industry Clusters	Co's Receiving Loans	Total No. of Loans	Total Loan Amounts ($)	% of Total Loan Amounts
Total, All Traded Sector Industries	**97**	**118**	**$40,578,100**	**100%**
Agriculture & Food Processing	10	13	$1,938,000	5%
Business Services	26	31	$6,448,300	16%
Energy, Natural Resources, & Finished Products	11	11	$3,535,500	9%
Engineering, R&D, Testing & Technical Services	4	5	$3,356,000	8%
Financial & Insurance Services	2	2	$1,087,000	3%
Health Care Services	2	2	$155,000	0%
Information Technology & Communications Services	4	5	$320,300	1%
Life Sciences	1	1	$40,000	0%
Manufacturing	24	33	$19,931,500	49%
Transportation, Distribution and Logistics	13	15	$3,766,500	9%

Source: TEConomy analysis of SBA loan data reports.
*Data for 2018 are through Q2.

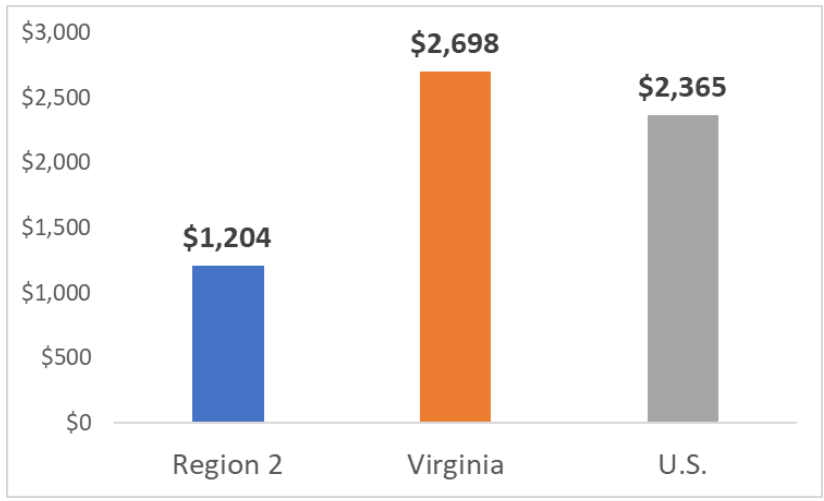
Regional Utilization of SBA Loans vs. State & U.S. Totals

- In 2017, regional companies approved for loan funding at a lower level relative to 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



Source: TEConomy analysis of SBA loan data reports.

Appendix C: Inventory and Stakeholder Discussions

Informing the "Situational Assessment"

Stakeholder Discussions and Inventory *

- Bob Bailey, CAER
- Alex Barker, LU Center for Entrepreneurship
- Anna Bentson, Opportunity Lynchburg
- James Creekmore, Creekmore Law Firm and owner/operator of TechPad, a co-working space in Blacksburg
- Russ Ellis, Common Wealth Growth Fund
- Sam English, serial entrepreneur, formerly with Carilion Institute and active consultant
- Greg Feldmann, Valleys Innovation Council
- Meredith Huntley, VIC
- Victor Iannello, Radiant Physics, co-chair VIC
- Doug Juanarena, serial entrepreneur and angel investor, co-chair VIC
- Stephanie Keener, SBDC – Lynchburg Region
- Megan Lucas, Lynchburg Regional Business Alliance
- Derick Maggard, VT Apex
- Robert McAden, Roanoke Blacksburg Technology Council
- Joe Meredith, VT Corporate Research Center
- James Ramey, VTC Innovation Fund/Middleland Capital
- Georgeann Snead, Electronic Design & Manufacturing, Inc.
- Brad Stephens, CoLab Roanoke
- Plus, Ross Baird feedback from his own meetings with entrepreneurs

* See handout for inventory profiles

Entrepreneurial Activities Across Stages of Entrepreneurial Development

Entrepreneurial Activity	Ideation	Commercial Viability	Market Entry	Growth & Scalability
Business Development Centre			✓	
Center for Advanced Engineering and Research	✓	✓		✓
CoLab			✓	
Commonwealth Growth Fund			✓	
Liberty University Center for Entrepreneurship	✓			
Lynchburg Regional Business Alliance				✓
Opportunity Lynchburg Co.Starters	✓			
RAMP Regional Accelerator		✓		
Small Business Development Centers – Roanoke and Lynchburg	✓ (ICAP)		✓	✓
Tech Pad			✓	
Valleys Innovation Council				✓
Virginia Western Community College Entrepreneurship Plus Program	✓			
VT Apex System Center for Innovation and Entrepreneurship	✓			
VT Carilion Innovation Fund			✓	
VT Corporate Research Center & KnowledgeWorks		✓	✓	✓

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* See Excel handout for inventory profiles

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

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

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

Ideation
- Highly educated population growth and in-migration
- New firm startup rate
- University R&D
- Patent Activity

Commercial Viability
- SBIR/STTR Activity
- University Technology Transfer & Commercialization

Market Entry
- Employment in Younger, Traded Sector Firms
- Venture Capital Activity

Growth & Scalability
- Presence of High Growth Companies
- Talent dynamics such as population growth of working age population, educational attainment and highly educated population growth and in-migrations
- SBA 7(a) loan activity

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Ideation

Ecosystem Element	Measure	GO VA Region 2	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	**5%**	7%	8%	9%	7%	7%	5%
	Percentage Pt. Change, 2010-14	**0.3**	0.3	0.2	0.0	-0.1	0.4	-1.0
University R&D	University R&D Expenditures per Capita, 2016	**$672**	$174	$222	$863	$370	$2,800	$62
	Percent Change in Total R&D Expenditures, 2010-16	**31%**	22%	17%	16%	15%	13%	-25%
Patenting (Incls. Industry & University)	Invented Patents per 1,000 Population, 2017	**0.3**	0.3	0.5	2.1	0.4	1.4	0.2
	Percent Change in Total Invented Patents, 2014-17	**-38%**	-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

Sources: TEConomy analysis of National Science Foundation, Higher Education R&D Survey and US Patent and Trademark Office data and U.S. Census Bureau, Business Dynamics Statistics

Commercial Viability

Ecosystem Element	Measure	GO VA Region 2	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	**$38**	$15	$8	$17	$5	$30	$0.30
	SBIR, STTR % Pt. Change in Share of Award Funding, Avg. 2010-13 to 2014-17	**-0.25**	-0.56	-	0.09	0.03	-0.04	0.00
	Number of Phase 1 Awards, 2010-2017	**485**	1,796	17,802	486	44	119	2
	Number of Phase 2 Awards, 2010-2017	**238**	935	10,002	235	33	49	0
University Technology Transfer & Commerciali-zation	Avg. Annual Univ. Start-ups, 2014-16	**5**	17	911	28	5	21	-
	Avg. Startups Formed per $10M Univ. Research, 2014-16	**0.10**	0.15	0.16	0.13	0.10	0.36	-
	Avg. Licenses/Options Executed per $10M Univ. Research, 2014-16	**0.77**	1.12	1.14	1.54	1.03	2.87	-

Sources: TEConomy analysis of SBIR.gov data and Association of University Technology Managers, Licensing Activity Survey

Market Entry

Ecosystem Element	Measure	GO VA Region 2	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	**4%**	7%	8%	8%	6%	7%	3%
	Avg. Share of Employment Growth in Firms Ages 0-5, 2013-2017 Q2	**58%**	52%	46%	36%	34%	42%	30%
Venture Capital Investments	VC Investments, 2014-17	**$29 M**	$2.6 B	$308 B	$2.3 B	$127 M	$66 M	$0.2 M
	VC Investments per Capita, 2014-17	**$38**	$315	$954	$1,221	$164	$255	$1
	Change in VC Investment, 2010-13 to 2014-17	**-71%**	24%	89%	42%	86%	-13%	2000%
	VC Deals, 2014-17	**30**	1,068	54,030	565	81	74	3
	VC Deals per 100,000 pop'l, 2014-17	**4**	13	17	31	13	30	2
	Change in VC Deals, 2010-13/ 2014-17	**-9%**	67%	58%	67%	49%	135%	125%
	Share of VC Investments in Angel + Seed + Early Stages, 2014-17	**78%**	51%	41%	36%	79%	65%	100%
	Share of VC Deals in Angel, Seed + Early Stages, 2014-17	**80%**	81%	88%	85%	84%	91%	100%

Sources: TEConomy analysis of U.S. Census Bureau, Quarterly Workforce Indicators data and PitchBook data

Growth & Scalability

Ecosystem Element	Measure	GO VA Region 2	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	**1.7**	2.9	4.7	3.6	2.7	2.0	3.2
	Change in SBA 7(a) Loans, 2010-2017	**13%**	11%	22%	55%	80%	-17%	-20%
	Avg. SBA 7(a) Loan Value, per Capita, 2010-2017	**$4**	$9	$17	$18	$12	$10	$20
	Change in SBA 7(a) Loan Value, 2010-2017	**-40%**	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	**2**	297	-	57	13	3	1
	Change in Companies in Inc. 5000, 2010-18	**-50%**	2%	-	15%	13%	83%	-50%

Sources: TEConomy analysis of SBA.gov and Inc 5000 data

Cross-Cutting Ecosystem Element: Talent Dynamics

Ecosystem Element	Measure	GO VA Region 2	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	**-1%**	3%	7%	11%	7%	6%	4%
Educational Attainment	Share of Population Ages 25-64 with a Bachelor's Degree or Higher, 2017	**20%**	28%	23%	31%	23%	21%	15%
	Growth in Highly Educated Workforce (BA+), (25-64, working age) — 2012-2017	**3%**	10%	12%	26%	17%	16%	6%
Highly Educated Migration	Net Migration of Highly Educated Workers (BA+), 2012-17	**-23,974**	-14,000	154,411	45,424	2,279	-9,684	-1,402
	Foreign In-Migration (BA+), 2010-17	**7,231**	151,627	3,933,494	38,243	8,782	8,423	587

Sources: TEConomy analysis of U.S. Census Bureau, American Communities Survey

Competitive Benchmarking Assessment

	Ideation	Commercial Viability	Market Entry	Growth & Scalability
Overall Assessment	↔	↔	↔	↓
Well Performing Measures	• University R&D Level and Growth • Rise in New Firm Startup Rate	• SBIR/STTR Levels	• Share of net job creation by new firms (0-5 years old)	
On Par Measures		• University startup levels	• Share of VC activity in angel, seed and early stages	• Foreign in-migration
Lagging Measures	• New Firm Startup Level • Patent Levels and Growth • Growth in working age, young adult workers and highly educated workers – plus net outmigration of highly educated workers	• University licensing activity • Growth in SBIR/STTR activity	• Venture capital levels and growth	• Growth in working age, young adult workers and highly educated workers – plus net outmigration of highly educated workers • SBA loan activity and growth • Presence of Inc 5000 High Growth Companies

Note: Compared Region 2 with median scores for mid-sized regional benchmarks.

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	• Lean startup bootcamps/pre-accelerator preparation • Mentoring by an EIR/venture advisor • Pitch/Business competitions • University entrepreneurship centers • University technology commercialization scouting	• Accelerators/venture development organizations/incubators • NSF iCorps • Mentoring by EIRs with understanding of specific markets and technologies • Incubator, co-working, maker-spaces	• Mentoring by EIR with serial startup experience • Second stage incubators, research parks, multi-tenant specialized lab facilities	• Growth services involving talent recruitment and development, networking in domain areas and business functions, export assistance • Mentoring by seasoned business executive who grew companies 20x
Typical Risk Capital Catalysts Tools				
Tool-Kit Components	• Commercialization/Technology Transfer Funds • Pitch competition micro-investments	• Proof-of-Concept Funds • SBIR/STTR Matching Grants • Accelerator and Pre-Seed Funding • Refundable R&D and Technology Investment Tax Credits	• Angel Matching/Due Diligence Funds • Angel Investment Tax Credits • Seed Matching Funds	• Fund of Fund Investments (multiple ways to generate funding)

Innovation and Entrepreneurial Development Ecosystem Components

Benchmark Communities				
Austin, TX	← IC² 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 Charlotte Venture Challenge	UNCC NSF i-Corps Site ←Network of accelerators (fintech, cleantech, NC Idea →	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

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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; Vanderbilt NSF i-Corps; ← Bunker Labs – Launch Lab, Veterans-in-Residence program, CEOs Circle →; ← Nashville Entrepreneurial Center – mentoring, Pre-Flight, In-Flight, Music & Healthcare Accelerators →
Raleigh-Durham, NC	← Active student bootcamps/pitch competitions/incubation →; NC State NSF i-Corps Site; ← 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; ← NC Biotech Center →; ← Duke collaboration with privately managed accelerator and incubators →; UNC Carolina Research Ventures $10 m "Seed" Fund
Susquehanna, PA	← Rural Business Innovation network of incubators →; College student internship funding; Micro-startup grants from Rural Business Innovation; ← Keysone Innovation Zone Transferable Tax Credits for Young Firm Revenue Growth →
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

Regional Context:	• A major technology hub with one research anchor that until recently was not aggressive on tech transfer/startups and had no medical school • Chamber of Commerce drove progress where government was passive or lagged • Success at attracting semiconductor consortia in 1980s led to increasing ties to Silicon Valley and its investors • Unexpected success of Dell Computer in 1980s/1990s created local wealth and management talent, all used in startup formation
Key Tools:	• **IC2.** Institute started creating entrepreneurial momentum even in a period when university itself lagged • **Austin Technology Incubator.** Probably the most important outcome of IC2. Industry verticals aligned with Chamber targets. • **Dell Medical School.** Chamber succeeded in lobbying state for new med school at UT Austin, and Travis County matched with local tax levy • **Innovation District.** Next logical step after medical school is an integrated medical district, now under way • **SXSW.** Once a music festival, it deliberately broadened to add film and software/interactive, creating additional ties to coastal media & investors • **Kelleher Center at UT McCombs School.** Finally active in entrepreneurship, UT Austin now has a campus hub in the business school • **Cockrell School of Engineering Innovation Center** offers advice and training to faculty and staff, provides small startup grants, and hosts competitions, among other activities.
Successes:	• Chamber has adopted Innovate Austin initiative, and names annual 'A-list' of emerging, growth, and accelerator-stage ventures • Regional Council of Governments CEDS has unusually sophisticated section on entrepreneurship and growth acceleration, recognizing importance of both launch and expansion • ATI itself claims to have helped clients raise $890 million in capital, cumulatively, $200 million in 2016 alone to 19 companies • Across entire region, Chamber claims $869 million in capital to 123 deals in 2016
Challenges:	• Growing a full, research-oriented biomedical capacity has only just begun and remains a major challenge • Withering of semiconductor initiatives leaves status of J.J. Pickle Research Campus uncertain, isolated by expressway from main campus
Best Practice Lessons:	• Austin is the pre-eminent example of successfully mixing arts and technology into a single message on creative economy • 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 • 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)

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

Regional Context:	• Fast growing technology hub with smaller research anchors • Leveraging position in banking center to generate a rising entrepreneurial community.
Key Tools:	• **Innovate Charlotte (formerly Charlotte Regional Fund for Entrepreneurship)**: 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. • **Packard Place**: 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. • **Network of accelerators**: Includes one in clean energy (Joules Accelerator), fintech (QC FinTech), and tech (RevTech Labs and NC IDEA) • **Ventureprise**: 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.
Successes:	• 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. • 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.
Challenges:	• Long time period to grow university research anchors to match fast growth of overall entrepreneurial activities and offer a deeper driver of innovation. • 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.
Best Practice Lessons:	• Role of community foundation and community leaders in spurring entrepreneurial development.

Benchmark Case Study: Chattanooga, TN

Regional Context:	• Mid-sized region with limited research anchor. [RYAN, CAN YOU ADD BENCHMARKING INDICATORS?]
Key Tools:	• 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. • 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. • 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. • 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 proximate to downtown, and the rebranded Innovation District involved mixed use developments.
Successes:	• 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.
Challenges:	• Lack of capital is viewed as a key constraint to high-growth companies
Best Practice Lessons:	• 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 • Critical role of local foundations in catalyzing activities and combining placemaking, unique tech infrastructure development and entrepreneurial programming.

Benchmark Case Study: Dayton, OH

Regional Context:	• 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. • Challenge of moving beyond federal contract activity to drive new traded sector company growth.
Key Tools:	• **Wright Brothers Institute (WBI)**: 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. • **The Entrepreneur Center (TEC):** 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.
Successes:	• 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. • 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.
Challenges:	• Creating more commercially focused technology-based companies.
Best Practice Lessons:	• While advancing industry partnerships with federal labs can be effective, it does not always translate into new commercially-focused technology businesses.

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 (1ll 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

Regional Context:	• 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.

Key Tools:	• **New innovation center campuses outside of the main Clemson University campus with focus on specific technologies, including:**
	  • **Clemson University International Center for Automotive Research (CU-ICAR), Greenville:** Significant public-private partnership between growing automotive industry, Clemson University and the state to create a new R&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&D Center, plus offers a 60,000 sq ft Center for Emerging Technologies.
	  • **Clemson University Biomedical Engineering Innovation Campus, Greenville:** 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.
	  • **Clemson University Innovation Campus and Technology Park, Anderson, SC:** 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
	• **Rise of mix of accelerator, incubator and maker-spaces in Greenville region:** 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.

Successes:	• $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. • NEXT Innovation Center reports assisting 102 companies, attracting $23 million in new capital in 2017 and 261 new jobs paying on average $69,443.
Challenges:	• Linking major public-private innovation center developments with entrepreneurial activity.
Best Practice Lessons:	• Creating new anchor research and innovation centers around industry clusters through university, industry and state partnerships

Benchmark Case Study: Nashville, TN

Regional Context:	• Mid-sized region anchored by a major research university, strong music scene and leading healthcare companies

Key Tools:	• 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:
	  • Co-Working space and Community access
	  • Pre-Flight program for entrepreneurs to advance business ideas
	  • In-Flight program for early-stage startups with up to three employees and $150,000 in revenue
	  • Accelerators focused on music industry and healthcare industry verticals that accept startups nationwide
	• 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
	• Bunker Labs

Successes:	• 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.
Challenges:	• Very diffuse entrepreneurial community, with need to create stronger presence of innovation in the region, including more placemaking
Best Practice Lessons:	• Importance of having a one-stop entity for entrepreneurship

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

Regional Context:	• Rural region with no university research anchors, but presence of non-research oriented colleges and universities.

Key Tools:	• 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.
	• Rural Business Innovation serves as hub for entrepreneurship including:
	  • Network of incubators located near local colleges and universities
	  • Business technical assistance for accessing financing
	  • Micro-startup grants of up to $5,000
	  • Student internships of up to $2,000 per semester
	  • Coordinator of local KIZ involving outreach and engagement with local businesses

Successes:	• Diversified range of approximately 30 companies served across manufacturing, IT, and bio-health through incubators, internships, micro-loans and KIZ tax benefits • Eleven companies received KIZ benefits in 2017 generating nearly $1 million in new sales and receiving $444,000 in transferable tax credits.
Challenges:	• Sustaining a rural economy by having new and small businesses generate job opportunities
Best Practice Lessons:	• Demonstrates role that an entrepreneurial focused entity can have across a rural region partnering with local institutions • Shows that a targeted tax credit oriented towards young growing businesses in traded industry sectors can be effective in rural communities.

Benchmark Case Study: West Lafayette, IN

Regional Context:	• Rural region with major research anchor
Key Tools:	• 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. • 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.
Successes:	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.
Challenges:	• 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.
Best Practice Lessons:	• 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.

Innovating Tomorrow's Economic Landscape

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