Regional Entrepreneurial Assessment Project and Quantitative Profile

Region 9: Piedmont Opportunity Corridor



August 29, 2018

Today's Agenda

- Review purpose/intent of engagement
- Review preliminary regional data profile and trends analysis
  - Discuss any refinements needed
  - Discuss implication moving forward

Next Steps

## Purpose/Intent of Engagement

GO Virginia Project: Addressing Challenge of Entrepreneurial Development across Regions GO Virginia recognizes that Virginia lags in the development of innovative small- and mediumsized companies

But raising the state requires each region to address their specific needs:

- Recognize entrepreneurial development is a very localized phenomenon
- Enable regions to have access to key tools, but tailor to needs of specific regions and allow local stakeholders to have key role in governance and oversight

Leverage the ongoing work of Virginia Research Investment Committee (VRIC)

In its implementation planning, VRIC examined entrepreneurial ecosystem surrounding the community around University of Virginia.

Will leverage and expand upon:

- the inventory being developed
- the stakeholder interviews
- the data analysis
- the best practices being identified
- the need for statewide approaches to supporting regional entrepreneurial ecosystems

(For VRIC Strategic Directions Study released in January of 2018, please see <u>http://www.schev.edu/docs/default-</u> <u>source/VRIC/Asset-Assessment-Study-Reports/full-</u> <u>report---corrected----assessment-of-virginias-research-</u> <u>assets.pdf</u>)

# Key Deliverables and Tasks for GO Virginia Efforts to Catalyze the Development of Entrepreneurial Ecosystems in the GO Virginia Regions

GO Virginia's project will result in the following deliverables:

- Develop a common template of data, inventory and stakeholder perspectives to help GO Virginia regions develop their own strategic directions
- Offer best practice lessons and benchmarking to national peers
- Have each GO Virginia region prioritize key investments/activities to catalyze the development of a robust innovation ecosystem
- Consider statewide approaches to address common needs and gaps

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



Framework for Assessing Entrepreneurial Development Elements of a Robust Innovation/Entrepreneurial Ecosystem that have the Capacity to Impact the Economic Vitality of a Region/State



**Skilled Talent** both developing and deploying new technologies and products

Preliminary Entrepreneurial Dynamics Trends Analysis In Traded Sector Activities

## 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: 0-1Years; 2-3Years; 4-5Years; 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

Why Focus on Traded Industry Sectors

- Not all new start-ups drive economic growth for state and regional economies -> need to focus on new start-ups in traded sector activities that serve customers and markets beyond their local community
  - Traded industries serve broader reaching markets beyond the region in which they are located, often at a national or global scale
    - Includes: manufacturing; professional, scientific and technical services; information; finance and insurance; transportation and warehousing; mining; agriculture and food processing; and tourism related industries
  - Local industries serve the local market and are prevalent in most regions and correlated to size of population
    - Examples might include local Retail Services or local Utilities industry clusters

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."

Regional Employment Distribution by Age of Firm for Traded Sector Industries





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



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

## **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	410	126	1,148
2008	263	85	536
2009	167	63	510
2010	386	152	1,059
2011	136	69	462
2012	328	156	1,079
2013	363	170	1,803
2014	239	151	996
2015	262	199	1,267
2016	274	220	1,237
2017	186	186	986

\*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 53.8% compared to a VA statewide rate 54.1%



## 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

## 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

8,000

7,000

6,000

5,000

4,000

3,000

2,000

1,000

0

Employment

igh growth startups –			Total VA Regular Startup Firms	Total VA High Growth Startup Firms
ing gains in employment ups exhibiting high		Initial Jobs Generated	124,266	10,474
tops exhibiting high		Net Job Growth Since Formation	-959	52,944
		Region 9 Share of Statewide Net Job Growth		6.2%
35		<ul> <li>Net Job Change Since Formation</li> <li>Initial Jobs Generated</li> </ul>		
7,213				
		3,261		
		578		
Regular Startup Firms		High Growth Startup Firms	5	
Region	9: Greater	Charlottesville*		

\*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 <u>Diversification Plan</u>:

- 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	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	318	195	27	1,056	2.57
<b>Business Services</b>	1,223	637	74	2,653	0.79
Energy, Natural Resources, & Finished Products	111	63	11	406	0.86
Engineering, R&D, Testing & Technical Services	154	97	26	654	0.89
Financial & Insurance Services	348	170	13	613	0.82
Health Care Services	56	28	9	710	0.91
Information Technology & Communications Services	126	74	15	577	0.54
Life Sciences	82	42	8	389	1.34
Manufacturing	103	58	12	608	1.13
Ship Building, Aerospace, & Defense	6	4	3	78	0.88
Transportation, Distribution and Logistics	235	97	20	574	0.73
Other Traded Sectors	1.154	543	118	5.510	1.39

\*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

## Geographic Distribution of Traded Sector Startup Activity in Region

High Regional Startup Activity Levels

Low Regional Startup Activity Levels



### 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

**2016** \$397.5

• Also presence of federal lab R&D

#### Academic R&D Expenditures (Millions)

Region 9: Greater Charlottesville	e 2010	2011	2012	2013	2014	2015
University of Virginia, Charlottes	ville \$276.3	\$398.1	\$383.4	\$385.8	\$358.6	\$373.2
Indexed Acade	emic R&D E	xpenditu	ires			
<u>8</u> 160						
140						
ຊີ້ 120						
100						
Ex 80						
<sup>□</sup> 2 60						
Region 9: Grea	ater Charlotte	esville				
virginia Virginia						
U.S.						
2010 2011 2	012 2013	2014	2015	2016		
Sources: National Science Found	dation (NSF) H	ligher Edu	cation Res	search		
and Development (HERD) Surve	Y					

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

Region	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)

Region	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: Greater Charlottesville	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.

- 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

## Venture Capital



Region 9: Greater Charlottesville	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: Greater Charlottesville 2010-2017	<sup>2</sup> , 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





Venture Capital by Industry Clusters

- Life sciences and IT/Communication services stands out in driving venture capital funding
- Still, many other clusters represented with multiple deals over the period of 2010-2017

Total Venture Capital Investments by Industry Cluster, 2010-17

Region 9: Greater Charlottesville	Deal Counts	Investment Totals (Millions)	% of Total
Life Sciences	55	\$148.74	46.8%
Information Technology & Communications Services	47	\$81.52	25.6%
Other	15	\$37.80	11.9%
Energy, Natural Resources, & Finished Products	8	\$22.12	7.0%
Health Care Services	4	\$9.22	2.9%
Manufacturing	9	\$6.07	1.9%
Business Services	6	\$5.32	1.7%
Transportation, Distribution and Logistics	1	\$4.00	1.3%
Agriculture & Food Processing	6	\$3.32	1.0%

## 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	Co's Receiving Loans	Total No. of Loans	Total Loan Amounts (\$)
Total, Traded Sectors	90	100	\$25,279,556

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

Establishments, 2017 7.00 6.00 5.00 4.28 4.00 3.00 2.59 2.00 1.00 Region 9 Virginia U.S.

SBA 7(a) Loan Counts, Traded

Sector Companies Per 1,000

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



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: Greater Charlottesville	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

Summing Up Initial Trends Analysis

### **Strengths**

- Diversity in start-up activity by industry cluster
- Wide geographic footprint of start-ups across the region
- Growing university research base + well-performing technology transfer
- Significant patent activities in both IT and Life Sciences
- Strong growth in venture funding, led by angel investors

### **Gaps or Weaknesses**

- Recent fall-off in business formation
- Recent fall-off in SBIR awards
- Despite strength of venture capital, level of high growth companies does not stand out (is there a leaky bucket?)
- Lower levels of SBA 7(a) loans used by broader base of traded sector industries

## Next Steps:

- Work with the Innovation and Entrepreneurship Taskforce to:
  - Address key questions and finalize regional data profile and trends analysis
  - Complete inventory entrepreneurial program activities, documenting types of assistance, sources and level of resources, available results and companies assisted
  - Complete stakeholder outreach to learn on-theground perspectives
  - Develop regional benchmarks
  - Meet in October with Taskforce to review findings from the situational analysis and to facilitate identifying priorities and possible actions

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