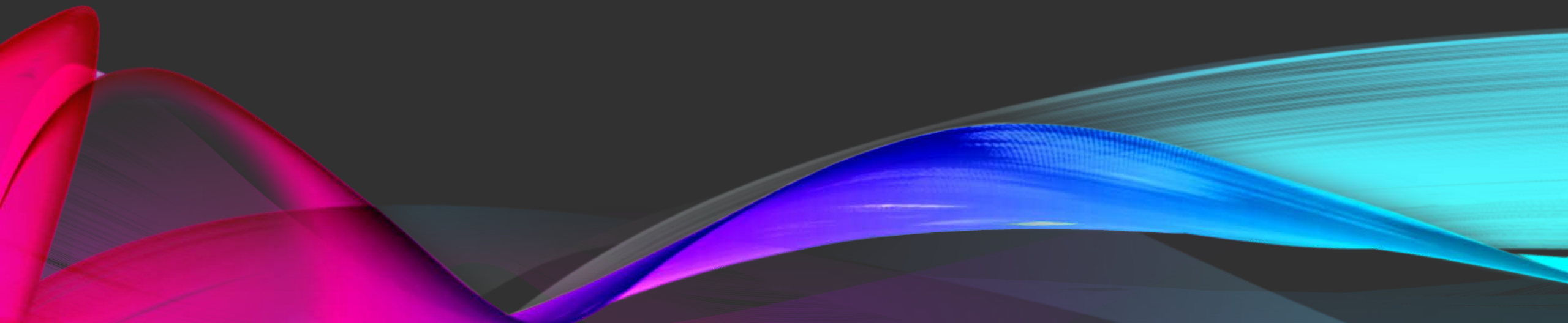
INNOVATION-LED ECONOMIC DEVELOPMENT IN HOWARD COUNTY

Using Cluster Analysis, Network Analysis and Spatial Analysis to Identify Economic Development Strategies

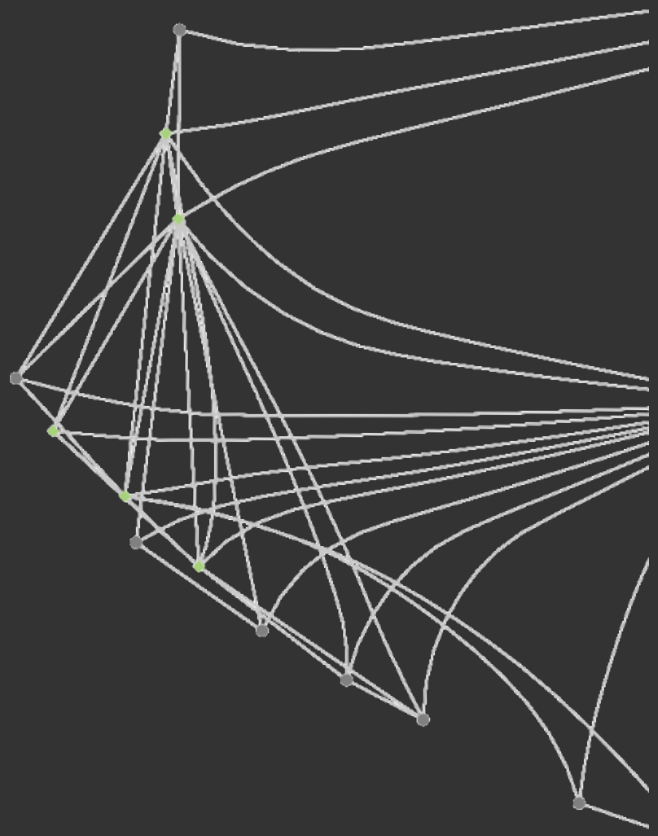


OUTLINE

- Introduction
- Traditional Economic Analysis Methods
- Spatial Analysis
- Network Analysis
- Company and Cluster Profiles
- Recommendations & Conclusion

INTRODUCTION

RESEARCH QUESTION



How do we spur innovation-led economic growth in Howard County?

Goals

1) Analyze the innovation and entrepreneurial ecosystem in Howard County using multiple methods

2) Identify potential Innovation Led Economic Development opportunities based on the analyses

3) Develop detailed actionable ILED strategies around the opportunities identified

MULTIPLE METHODS

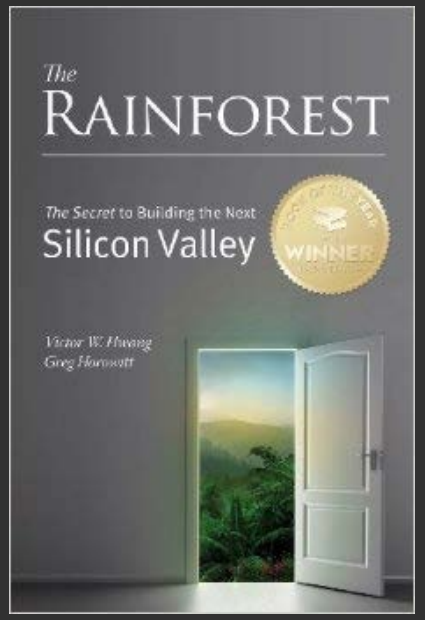
Demographic Analysis

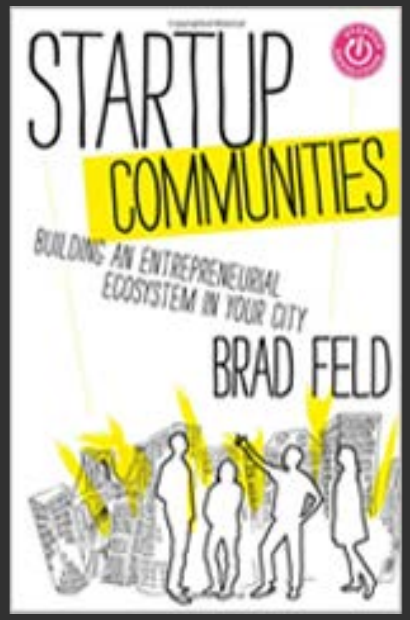
Cluster Analysis

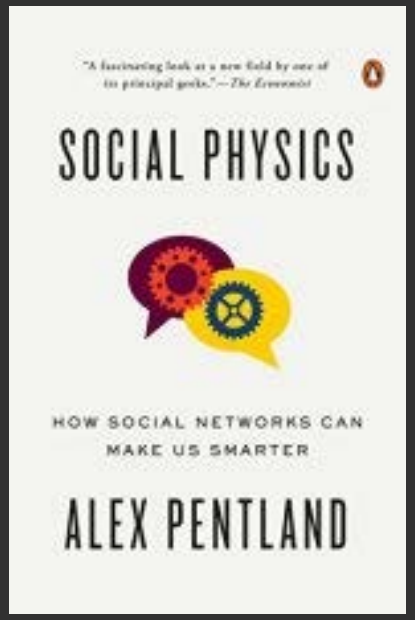
Spatial Analysis

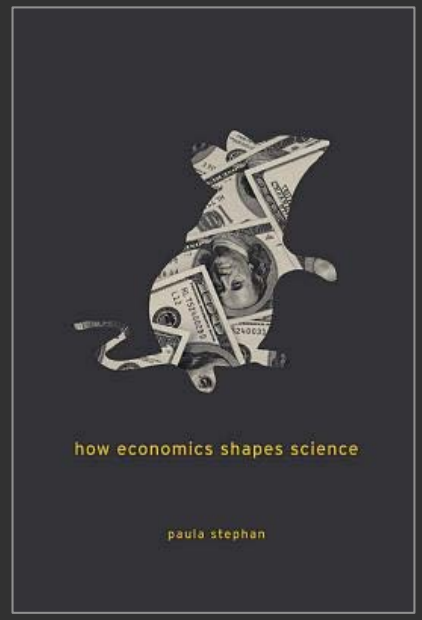
Network Analysis

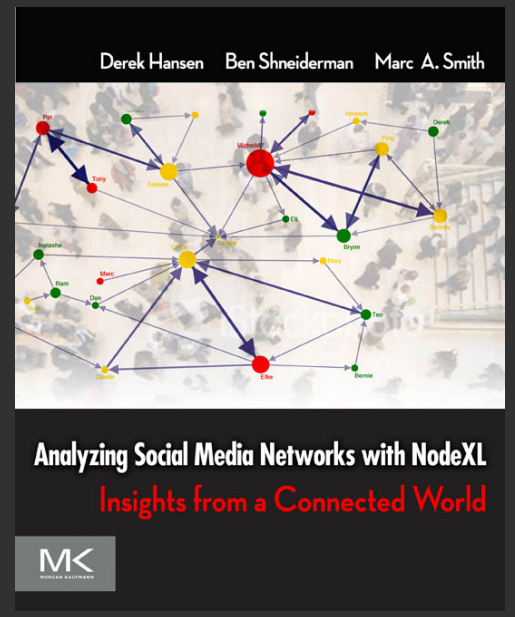
INNOVATION LITERATURE



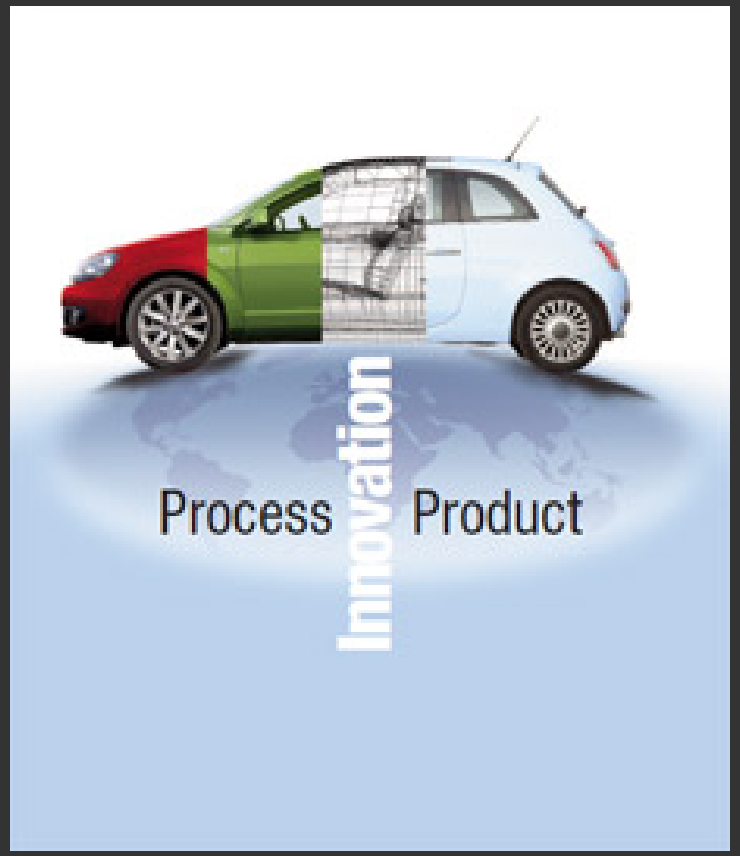








NATURE OF INNOVATION



Innovation…

- Creates value
- Is implementable & impactful
- Can change with context

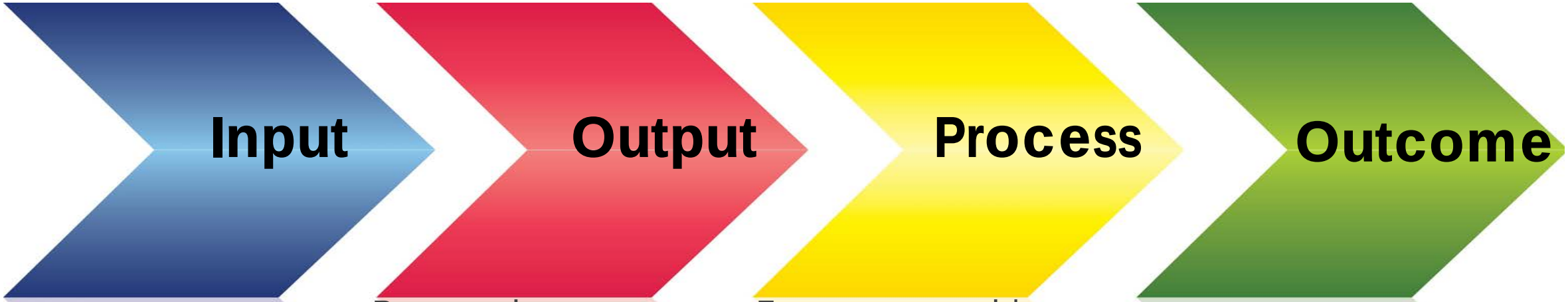
Innovation is the result of:

- Diversity of people, ideas, and expertise
- Trust, connection, communication
- Trial & error
- Capital & investment
- Suitable regulatory environment (few barriers)

INNOVATION AS AN ECONOMIC DRIVER

- Innovation alone does not contain $$$
- Innovation often requires economic incentives
- Innovation is not a linear process
- Character of innovation is industry-based and reactive to economic climate

MEASURING INNOVATION



R&D Spending
Grants

Research
- ➔ *Publication Count*

Invention
- ➔ *Patents*

Prototyping
- ➔ *SBIR/STTR Phase I*

Commercialization
- ➔ *SBIR/STTR Phase II*

Entrepreneurship
- ➔ *Start-Ups*
- ➔ *Early Stage Investment*
- ➔ *Incubator & Accelerator Participation*

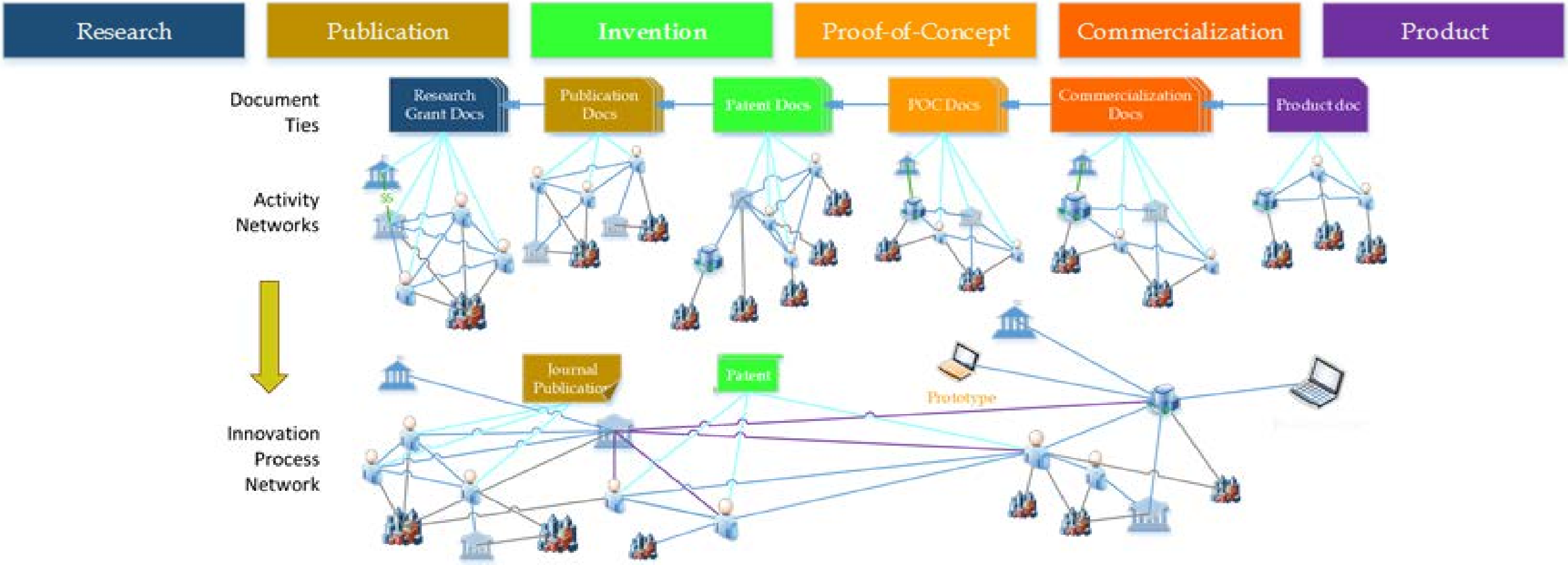
Indexes
- ➔ *Innovation Indexes*

Clusters
- ➔ *Innovation Clusters*

Commercialization
- ➔ *Innovation/Social Networks*

Economic Impacts
- ➔ *Solow Residual*

NETWORK ANALYSIS OVERVIEW



Combining activity networks yields an innovation process network

TRADITIONAL ECONOMIC ANALYSIS

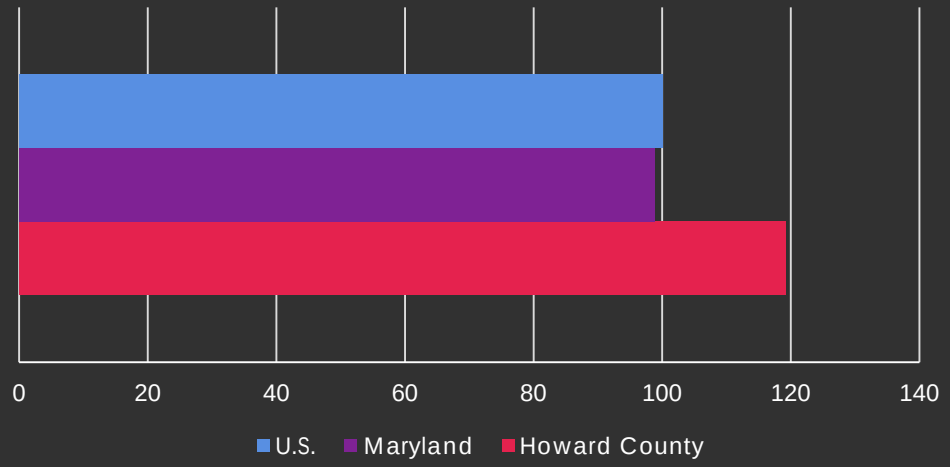
HOWARD COUNTY PROFILE

Quick Facts

Total population (2014):	299,269
Median Age:	38.6
Median Household Income:	$110,133
Number of Business Establishments:	8,946

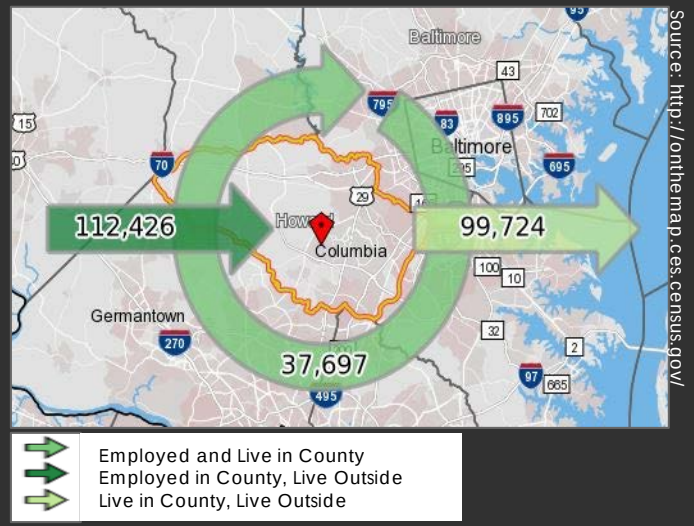
Sources: ACS 2010-2014 ACS estimates, U.S. Census Bureau, 2013 County Business Patterns

Innovation Index



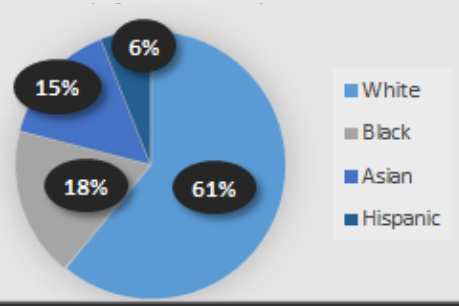
Source:http://www.statsamerica.org/innovation/innovation_index/index_display.asp

Commuting Flows



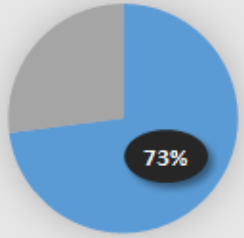
RACIAL COMPOSITION

Source: ACD 2009-2013 estimates



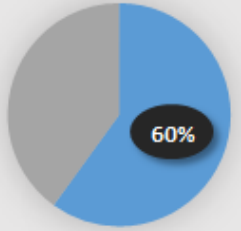
LABOR FORCE PARTICIPATION RATE

Source: U.S. Census Bureau, 2011-2013



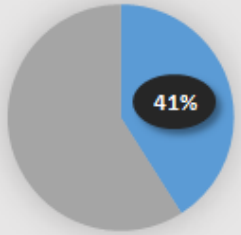
RESIDENTS WITH BACHELORS DEGREE

Source: U.S. Census Bureau, 2011-2013



COUNTY JOBS HELD BY RESIDENTS

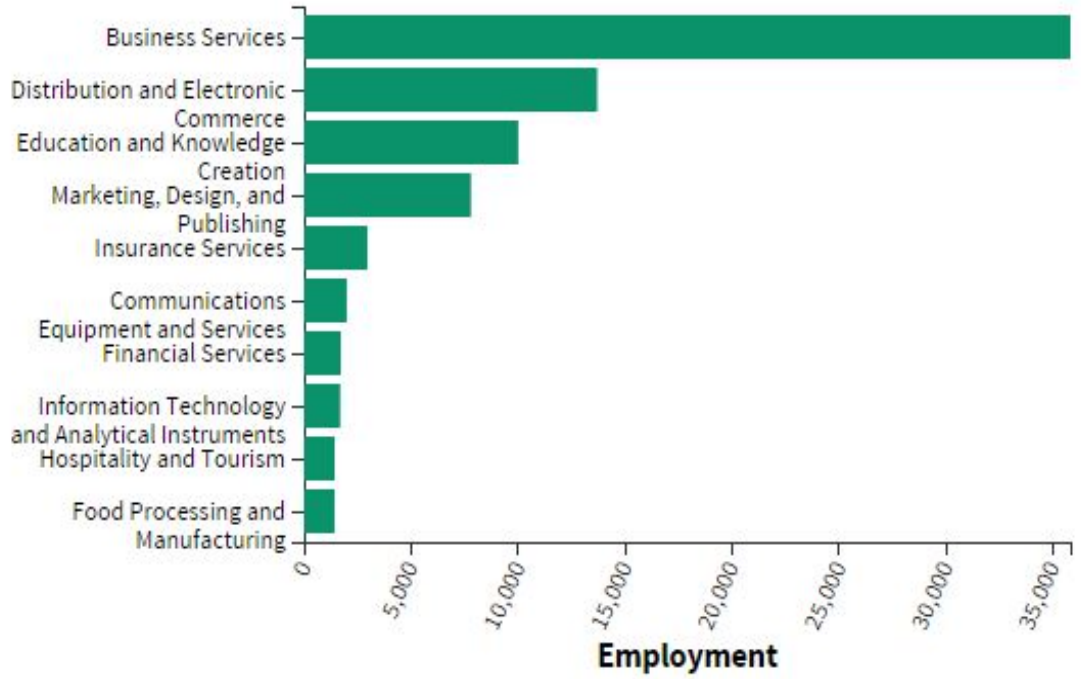
Source: MD Department of Planning and Maryland DBED, 2009-2013



Top Clusters by Location Quotient

vs.

Top Clusters by Employment

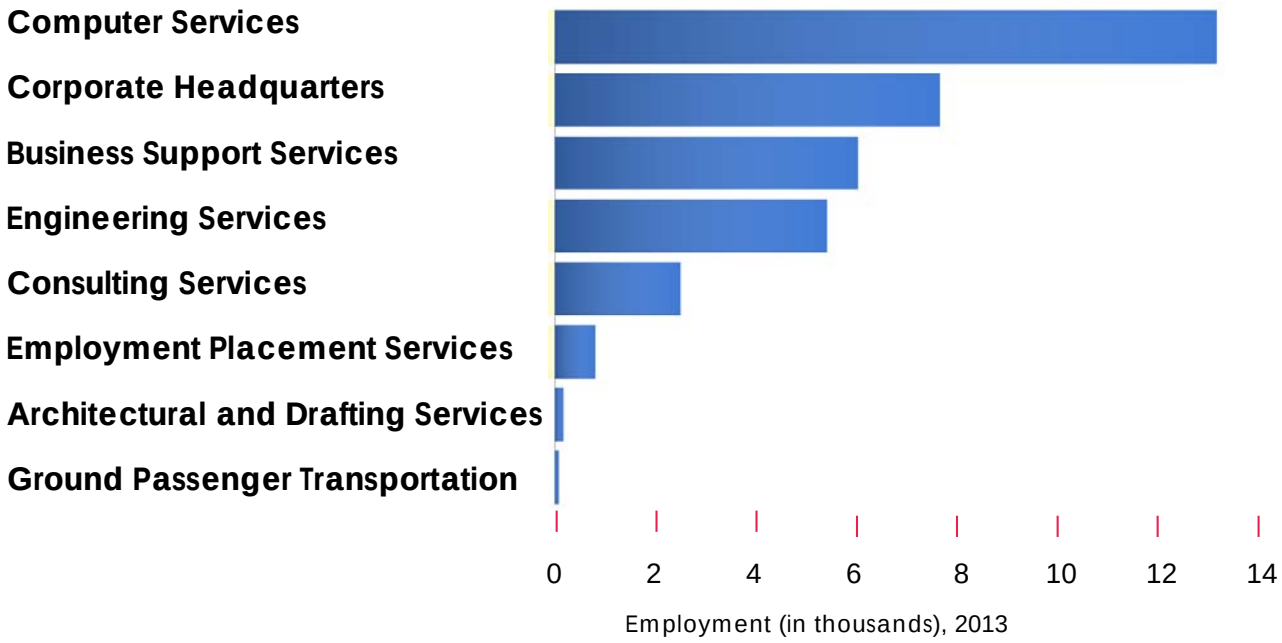


SUBCLUSTERS

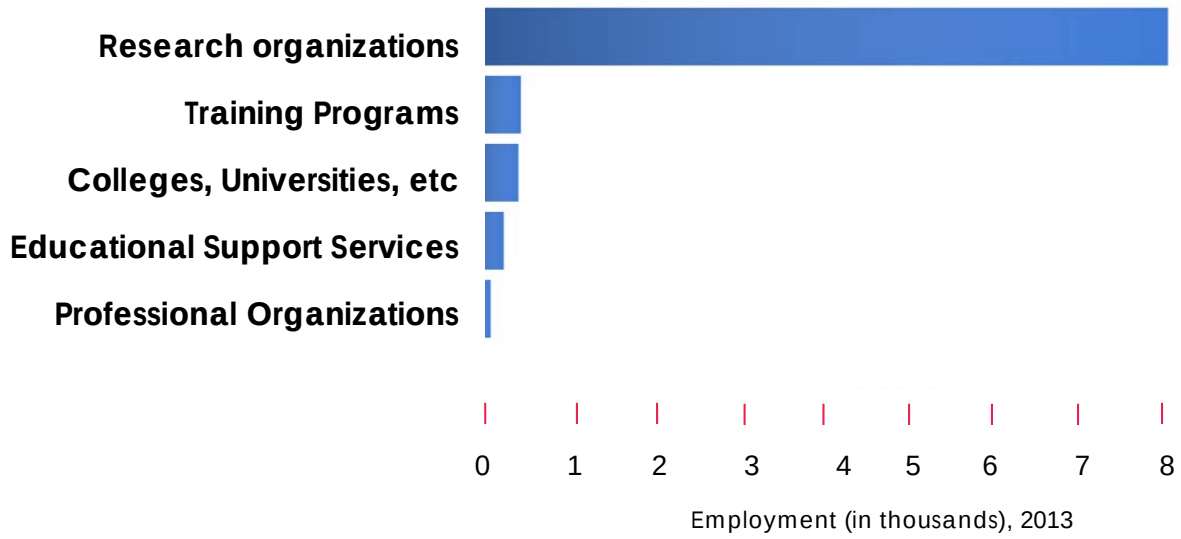
(U.S. Cluster Mapping)

Several clusters are influenced by one or two strong subclusters:

Business Services



Education and Knowledge Creation



CLUSTER ANALYSIS COMPARISON

StatsAmerica

Top Industry Clusters by Employment Location Quotient (2012)

Description	Employment	LQ
Info. Tech. & Telecommunications**	20,555	3.37
Defense & Security	22,936	2.62
Business & Financial Services	29,312	2.08
Energy (Fossil & Renewable)*	14,295	1.99
Advanced Materials	9,326	1.81
Computer & Elect. Product Mfg	1,371	1.1

Data Source: www.statsamerica.org

U.S. Cluster Mapping

Top Traded Clusters by Employment Location Quotient (2013)

Description	Employment	LQ
Marketing, design and publishing	7,805	3.1
Environmental services	396	2.31
Communications equipment and services	2,000	2.16
Recreational and Small Electric Goods	528	1.71
Education and knowledge creation	10,018	1.69
Business Services	35,828	1.64

Data Source: www.clustermapping.us

***Cluster may be a false positive - industry may not have a significant presence in the County.**
****Skewed by strong subclusters**

SPATIAL ANALYSIS

SPATIAL METHODS

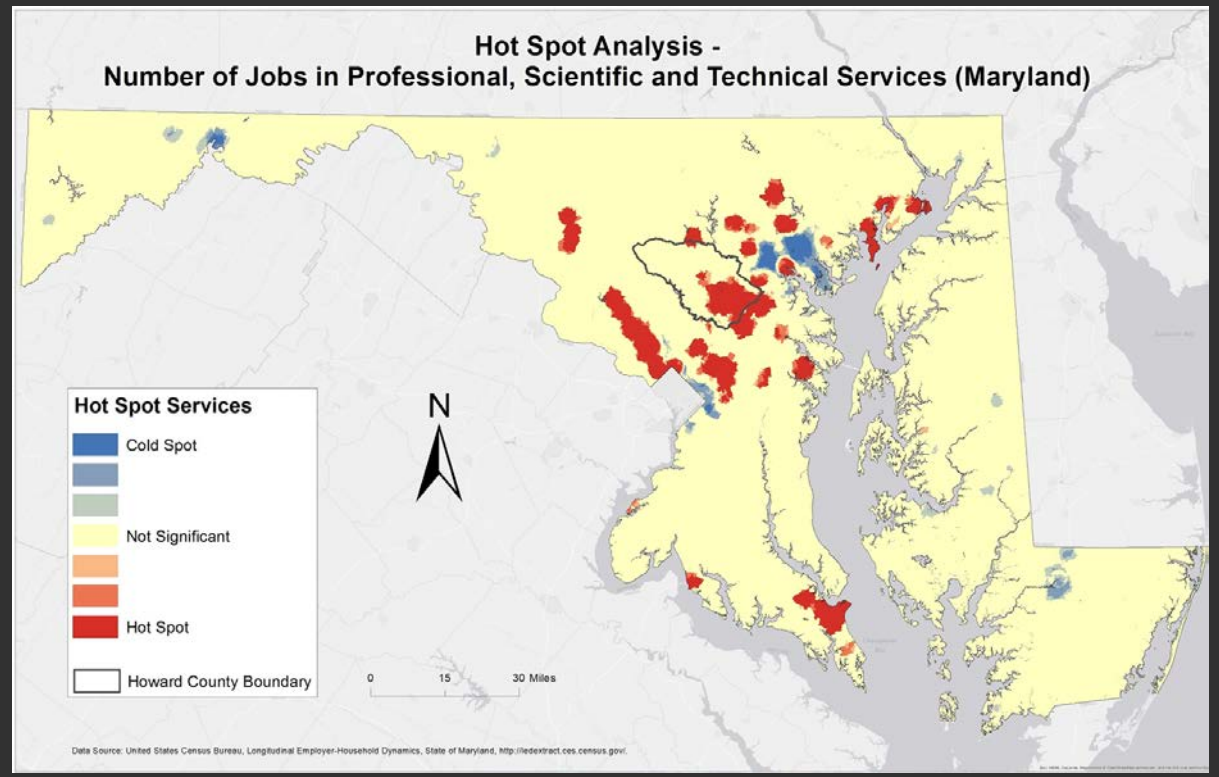
Background

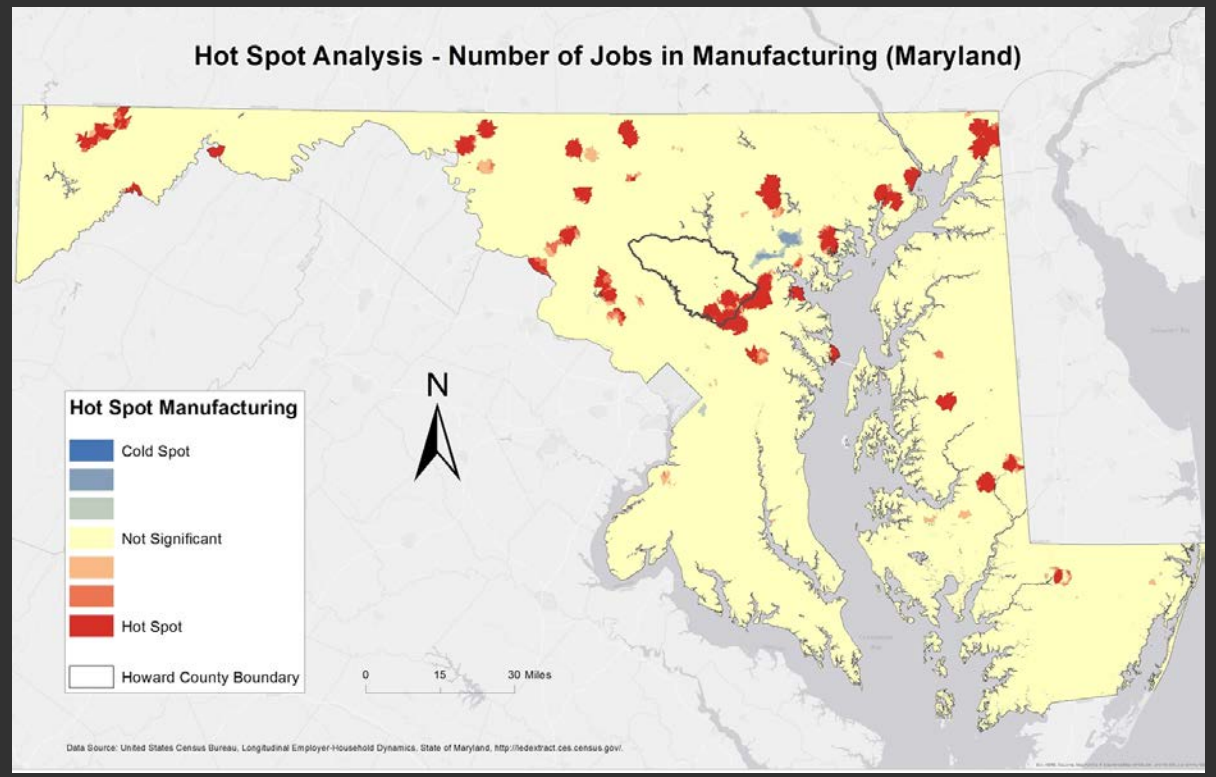
- Innovation Cluster Mapping and Identification
- Spatial Point Pattern Analysis

Methodology

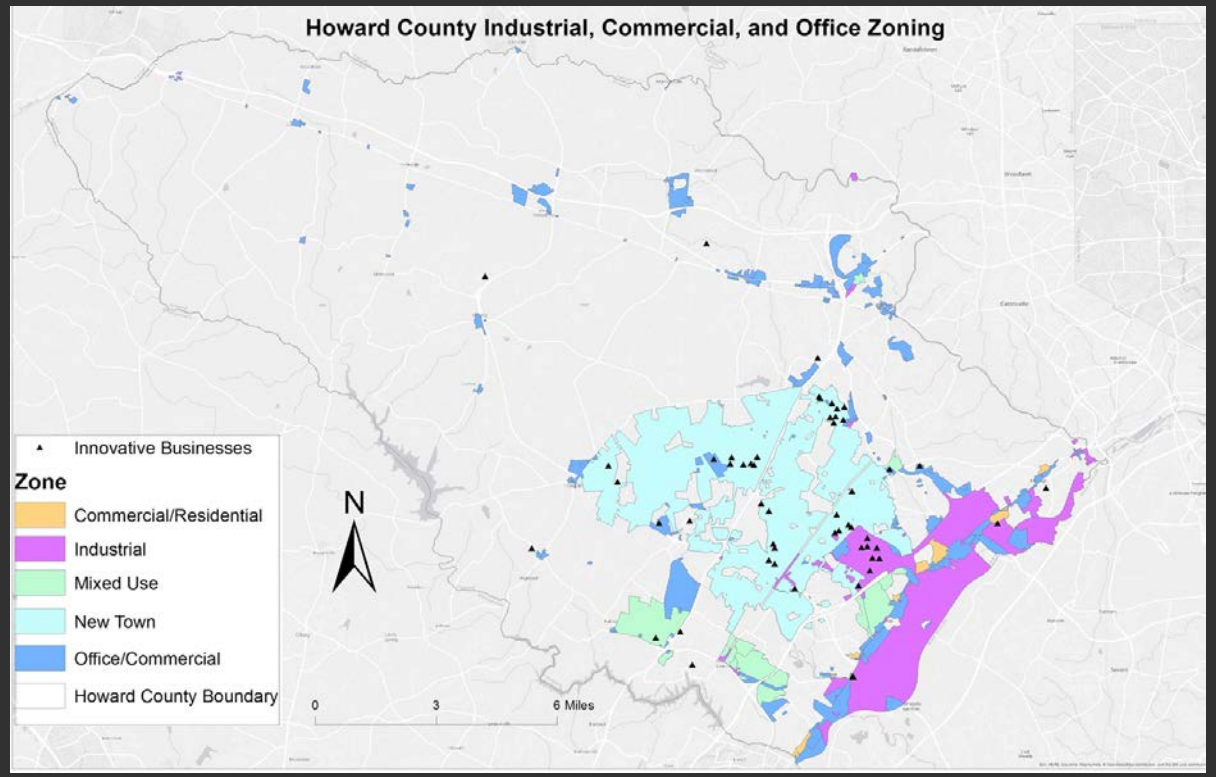
- Identify clusters of innovative firms
- Evaluate locations based on current conditions and company mix
- Select cluster for location based strategy development

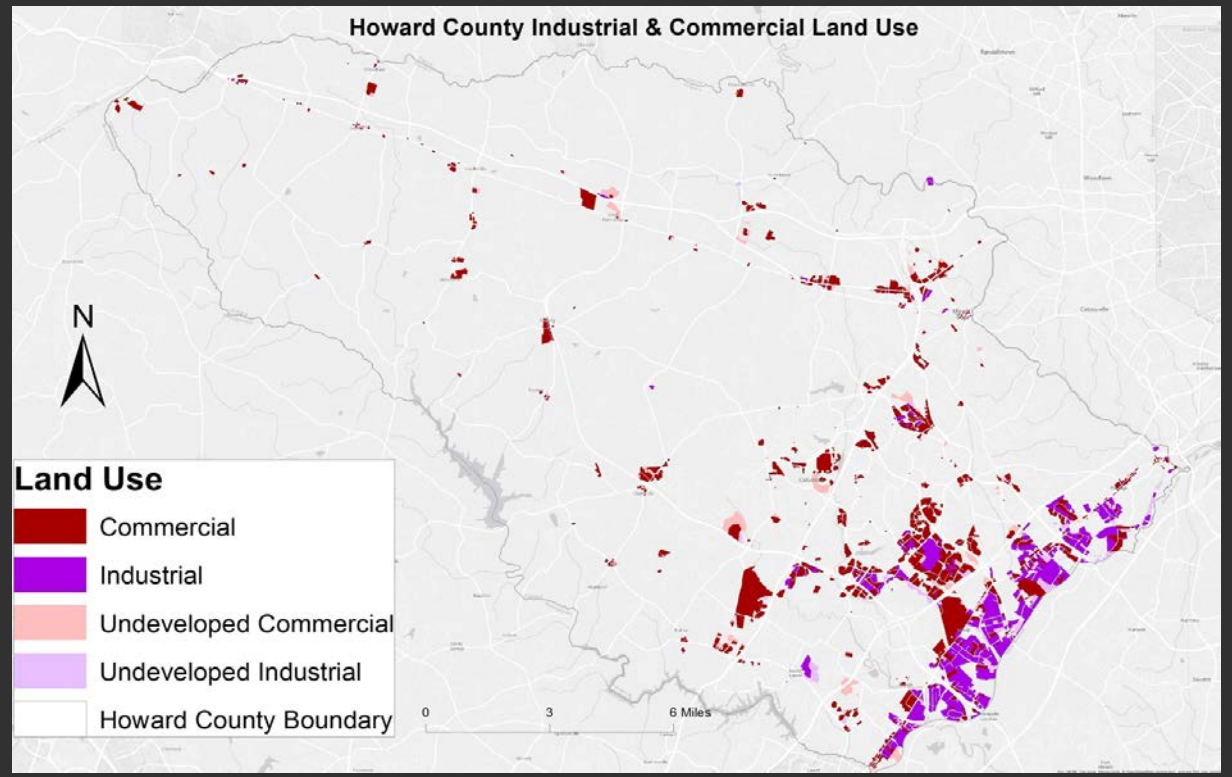
HOT SPOT ANALYSIS BASED ON LONGITUDINAL EMPLOYER-HOUSEHOLD DATA (LEHD)



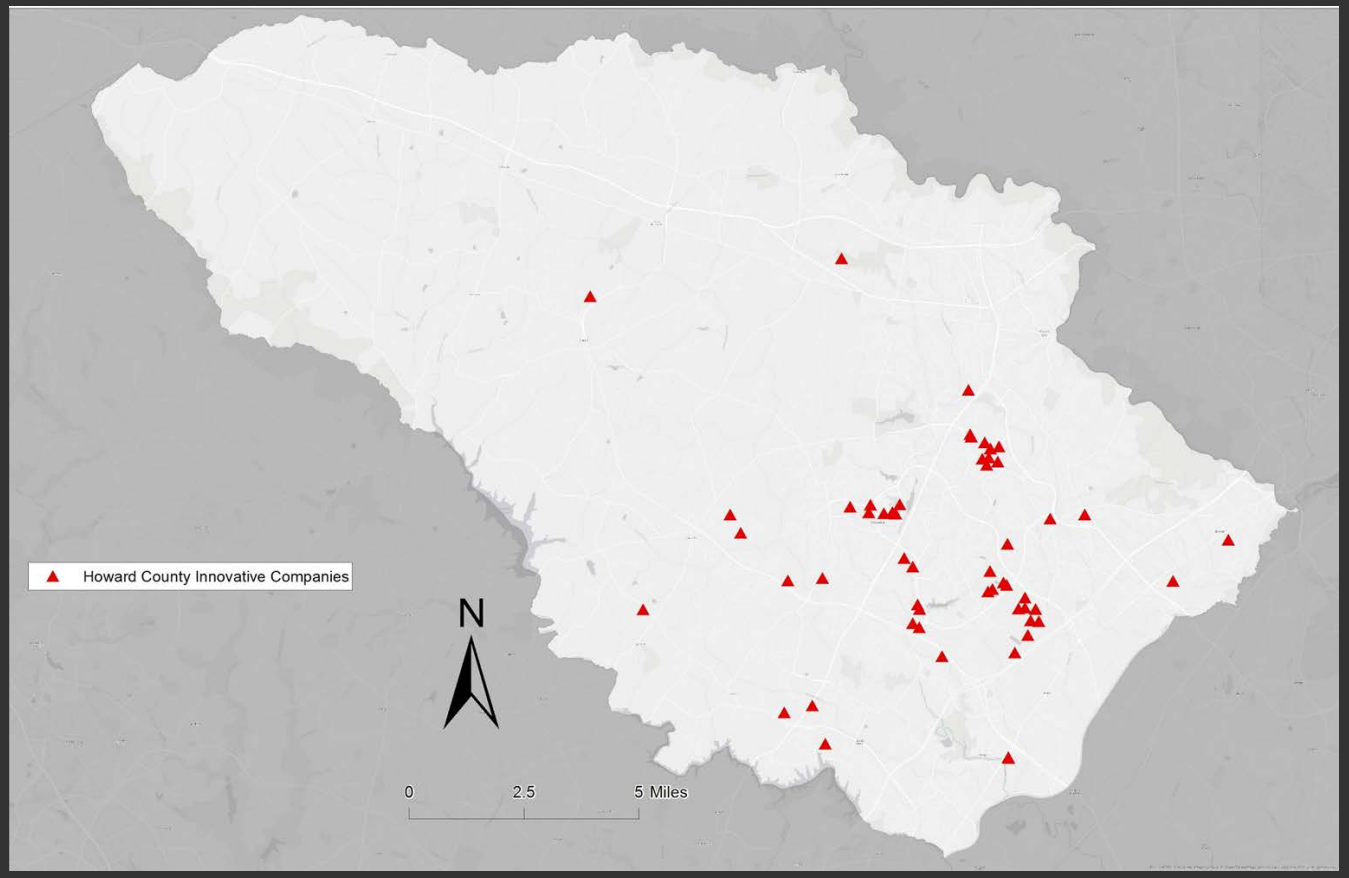


HOT SPOT ANALYSIS OF INNOVATIVE BUSINESSES

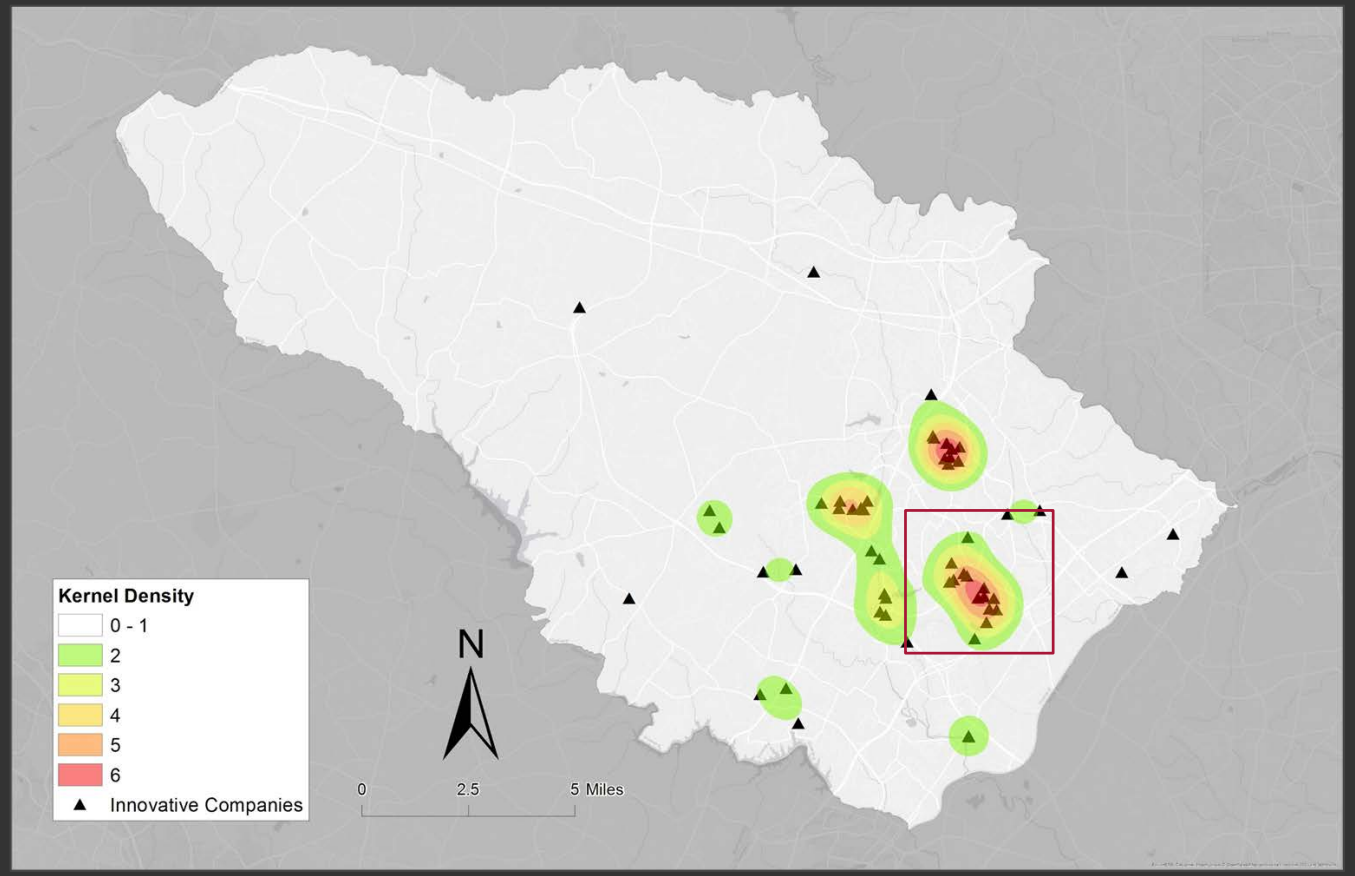




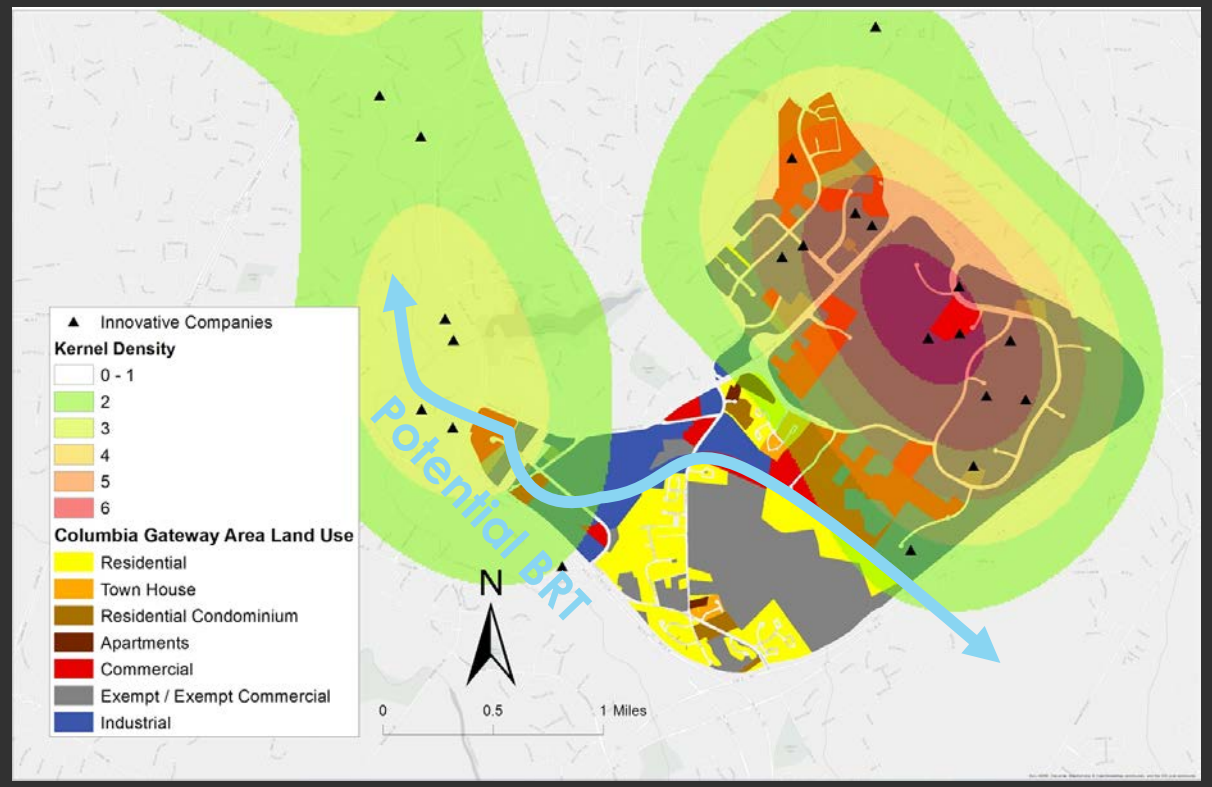
INNOVATIVE COMPANY LOCATIONS



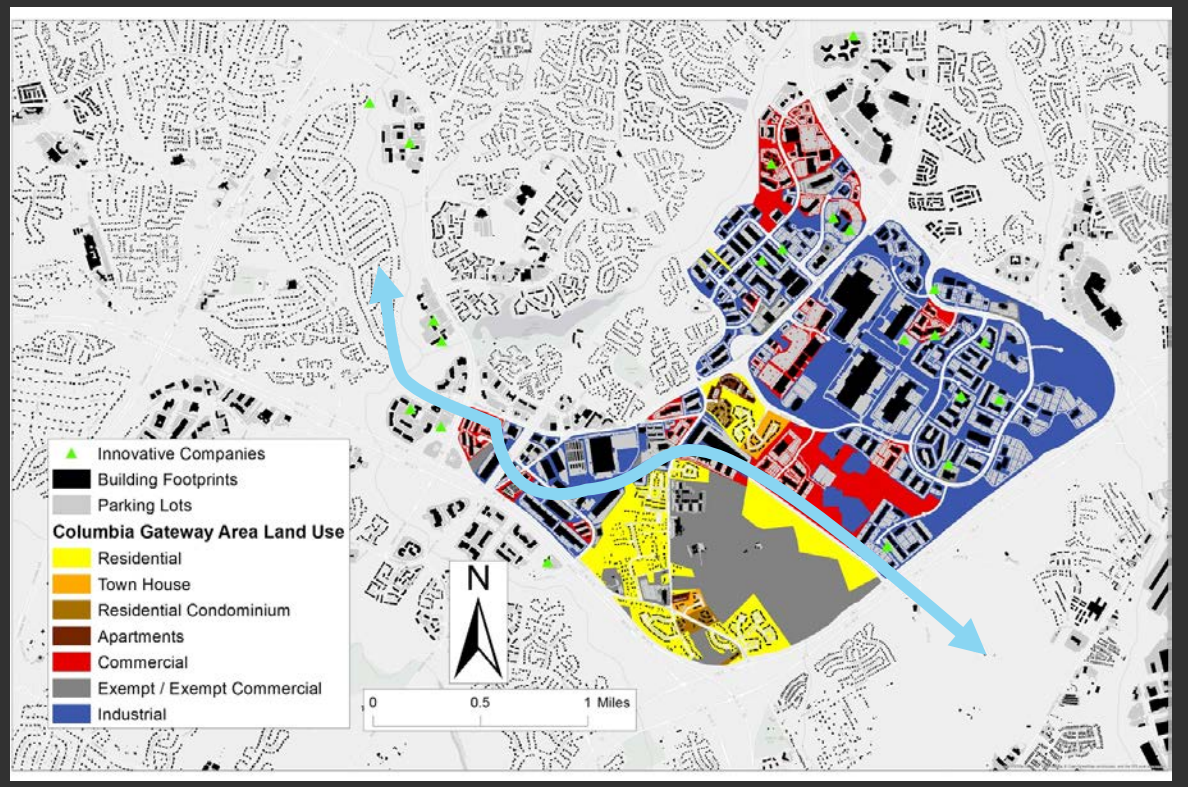
KERNEL DENSITY ANALYSIS RESULTS



COLUMBIA GATEWAY INNOVATION DISTRICT: EXISTING CONDITIONS



Innovation District Land Use and Kernel Density



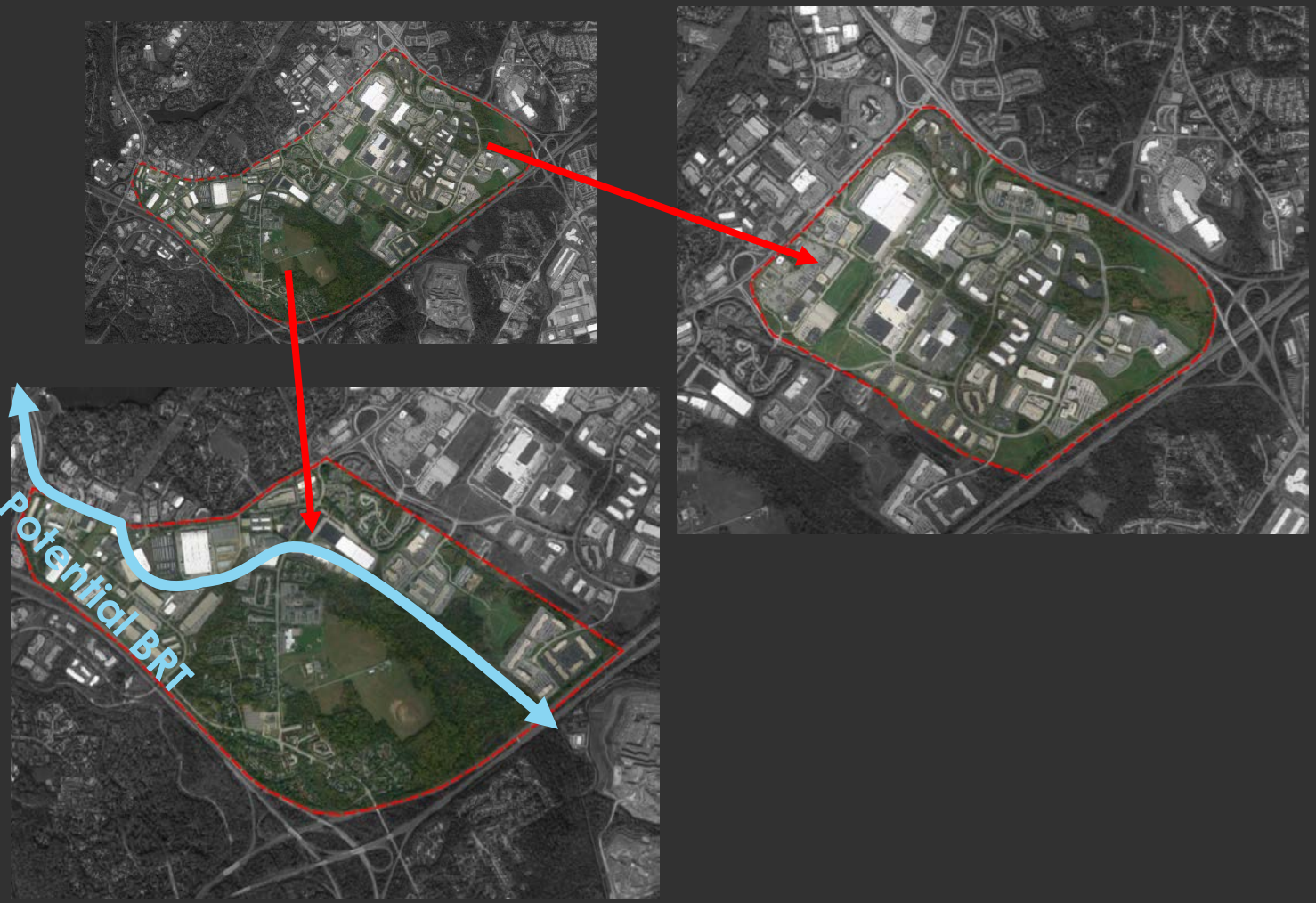
Innovation District Building Footprints and Parking

COLUMBIA GATEWAY INNOVATION DISTRICT PROPERTIES

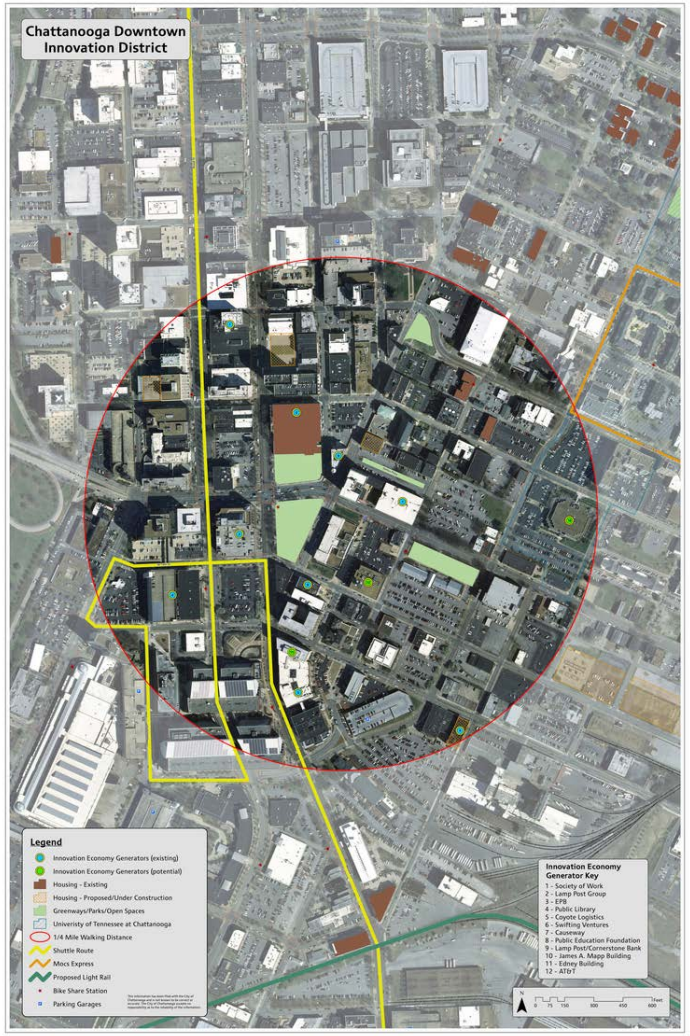
Company	Property Owner	Land Value	Assessed Value	Acres	2015 Property Tax
Science & Engineering Services Inc	AAK LLC	$7,187,400	$13,509,133	15	$202,048
Universities Space Research	Universities Space Research	$4,039,300	$10,779,867	8.43	$101,223
Masstech	GATEWAY CROSSING 95 LLC	$3,938,600	$6,357,500	8.22	$95,663
ACELL	6711 GATEWAY LLC	$3,061,800	$14,733,333	6.39	$208,669
Advanced Technology & Research Corp	GATEWAY A 74 & A 76 LLC	$22,650,100	$42,000,000	115.55	$667,125
Envieta LLC	MOR GATE LLC	$5,122,200	$13,382,000	10.69	$194,804
Osiris Therapeutics	EM CORP UNIVERSITY OF MD MEDICAL	$2,467,600	$7,417,400	5.15	$10,979
Agnik LLC	MERRITT-CCP II LLC	$2,607,000	$11,685,067	6.65	$167,885
Martek Biosciences Corp.-(acquired by DSM)	COLUMBIA BUSINESS CENTER GREEN LLC	$844,100	$4,021,300	3.23	$59,344.70
Raba Equity Partners LLC	MERRITT CCP III LLC	$3,014,700	$19,317,200	7.69	$275,305.93
Ibiquity Digital Corp.	MERRITT CCP V LLC	$2,211,100	$14,955,067	5.64	$212,784.35
Bowles Fluidics Corp.	BROADSTONE BFC MARYLAND LLC	$1,633,500	$5,291,167	6.25	$79,123.92
Next Century Corp.	AAK II LLCMARYLAND LLC	$9,516,100	$21,492,633	19.86	$317,872.89

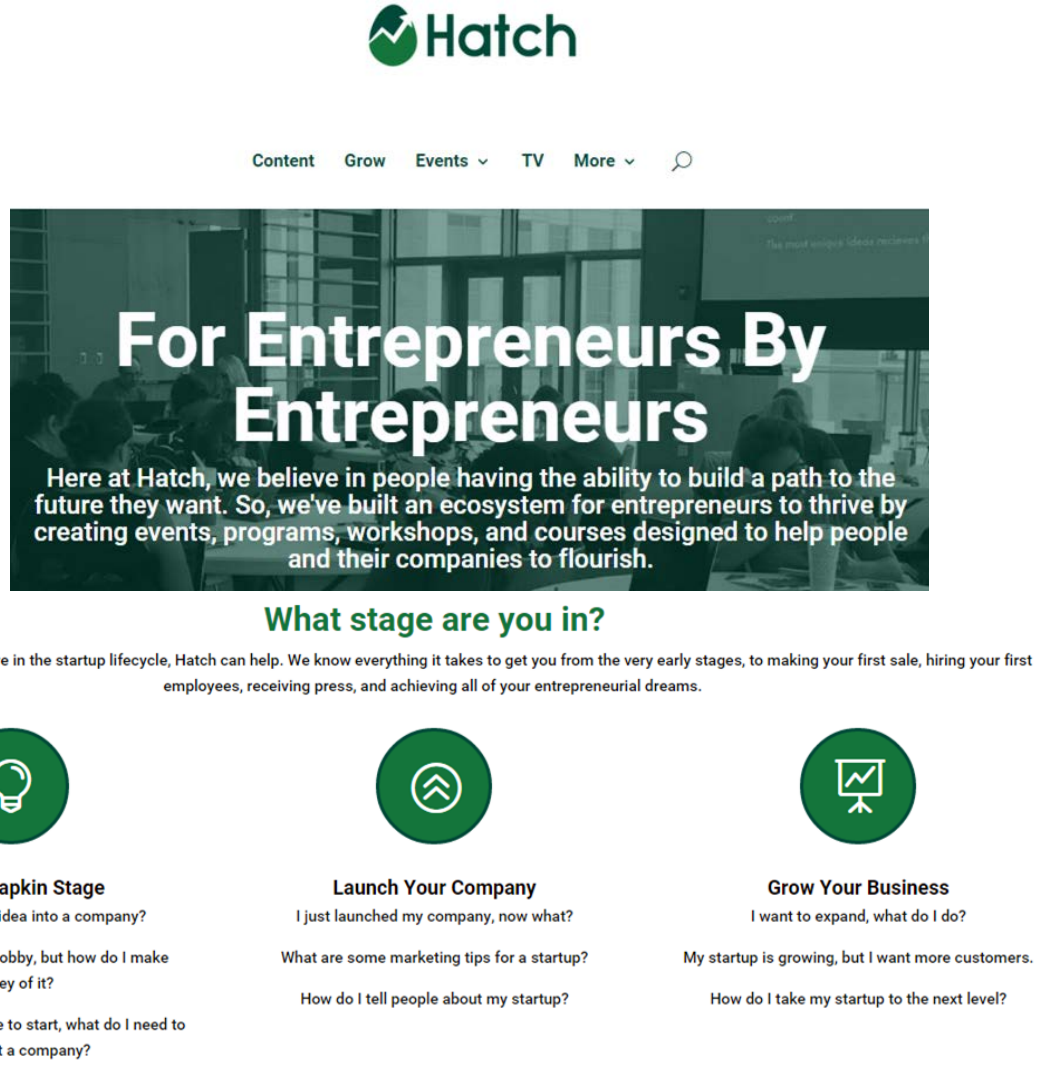
SPATIAL ANALYSIS RECOMMENDATIONS

- Walkable innovation district at the Columbia Gateway area located south of Snowden River Parkway, west of 175, north of interstate 95 and east of route 32
- Laboratory space for Regenerative Medicine companies
- Warehouse space for startups



EXAMPLES ACROSS THE U.S.





NETWORK ANALYSIS

HOWARD COUNTY FULL INNOVATION NETWORK

Keystones

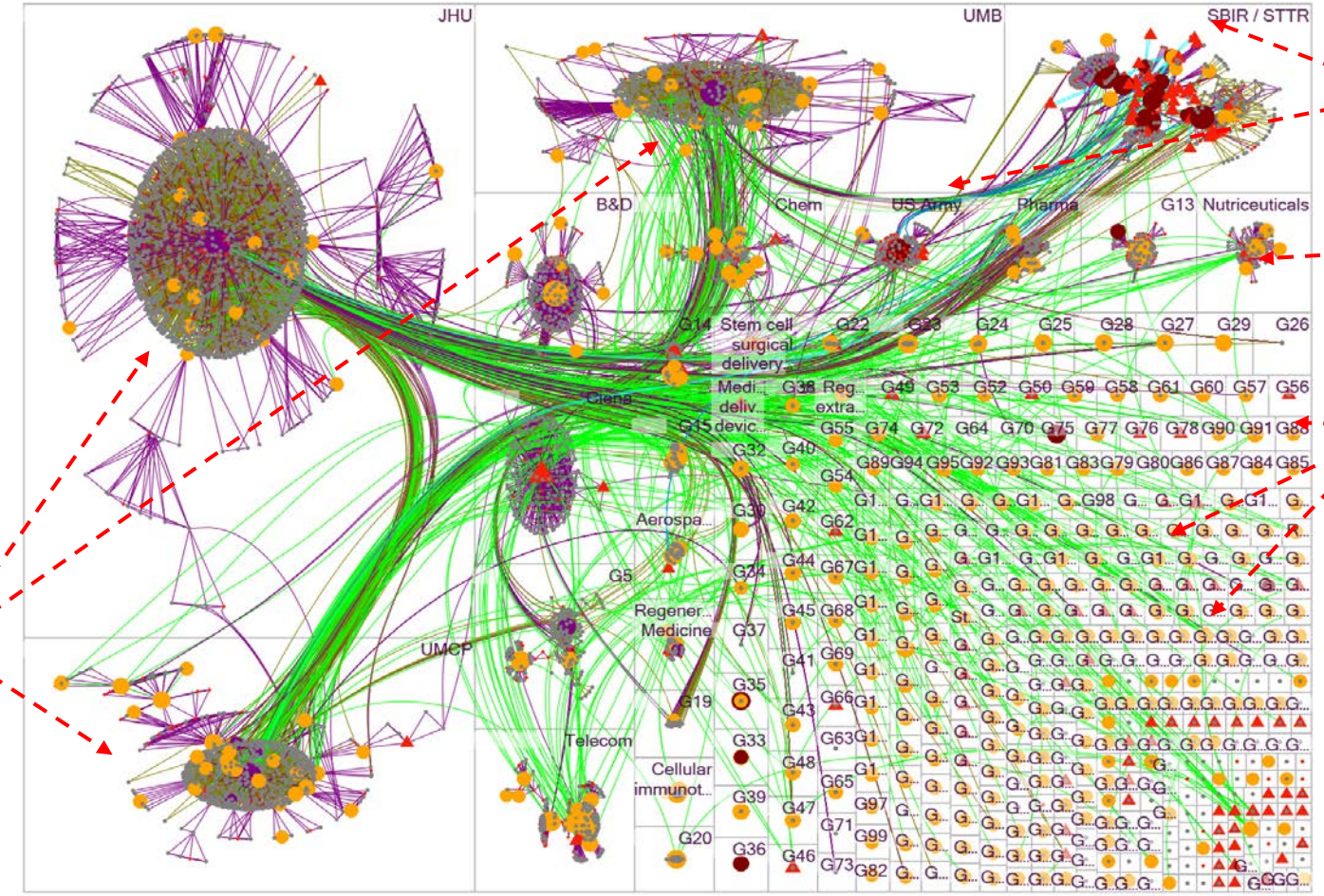
- Identify & cultivate keystones in each innovation cluster
- Identify & cultivate capital networks around each innovation cluster

Workforce Development

- Develop industry partnerships (EARN) around innovation clusters
- Work with universities & community colleges on talent pipeline

Universities (JHU, UMCP, UMB, UMBC+)

- Leads for licensing & research
- Identify key labs for expansion / enhancement
- Identify potential faculty spin outs
- Accelerate student startups & seed them in clusters
- Build long-term sponsored research relationships



Business Expansion & Expansion (BRE)

- Focus BRE on growth stage & mature companies
- Develop keystones

Foreign Direct Investment (FDI)

- Engage MD DOC on FDI
- Engage foreign-owned companies & expand FDI

Business Attraction Opportunities

- Focus on early stage companies with County connection
- Develop relationships with growth stage companies;
- Make their next move to Howard County
- Connections to capital

Accelerate Entrepreneurship

- Support local startups
- Assist with market development
- Connect to capital & cluster firms

REGENERATIVE MEDICINE NETWORK CLUSTER

Regenerative Medicine & Nutraceuticals groups

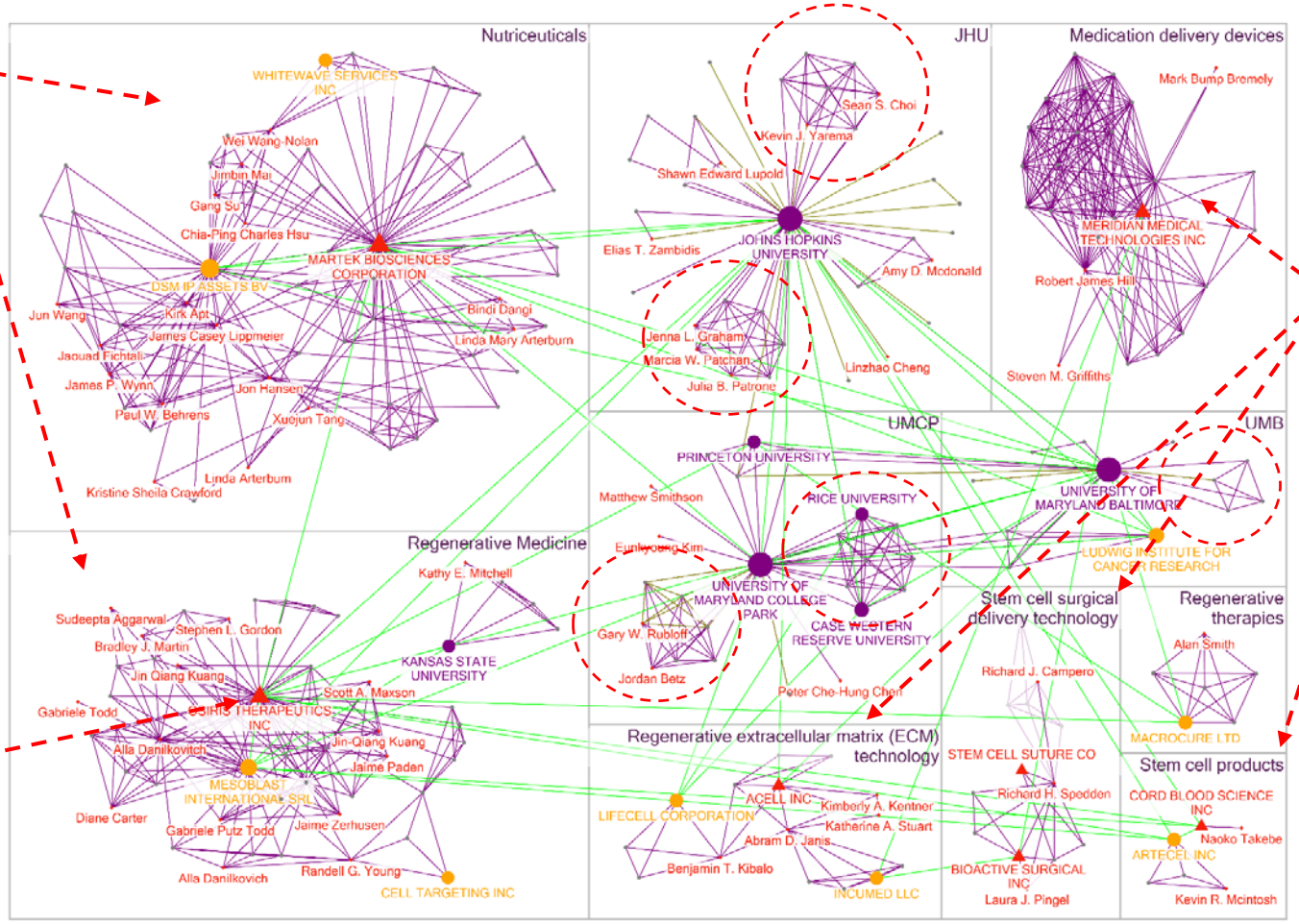
- Develop 'keystone companies'
- Promote local sourcing to help build cluster around keystones
- Industry partnerships for workforce dev
- FDI / Business expansion
- Business attraction / supply chain development
- Corporate sponsored research relations with universities

University groups (JHU, UMCP, UMB)

- Follow-up leads for licensing (green ties)
- Identify key labs (dense subgroups) and evaluate for expansion / enhancement
- Identify opportunities for faculty spin outs
- Identify / accelerate potential student startups that can be seeded in this cluster
- Build long-term corporate sponsored research relationships with keystone companies

Drill-down to Company Profiles

- Click to follow link



Created with NodeXL (http://nodexl.codeplex.com)

Targeted Economic Development Strategies At the Cluster Level

Delivery devices groups, ECM group

- Facilitate collaboration
- For ECM - assist with niche market development around wound care
- Business attraction

Stem cell products group

- Commercialization, acceleration, entrepreneurial support
- Business attraction
- Assistance with market development & positioning

REGENERATIVE MEDICINE NE

Regenerative Medicine & Nutraceuticals groups

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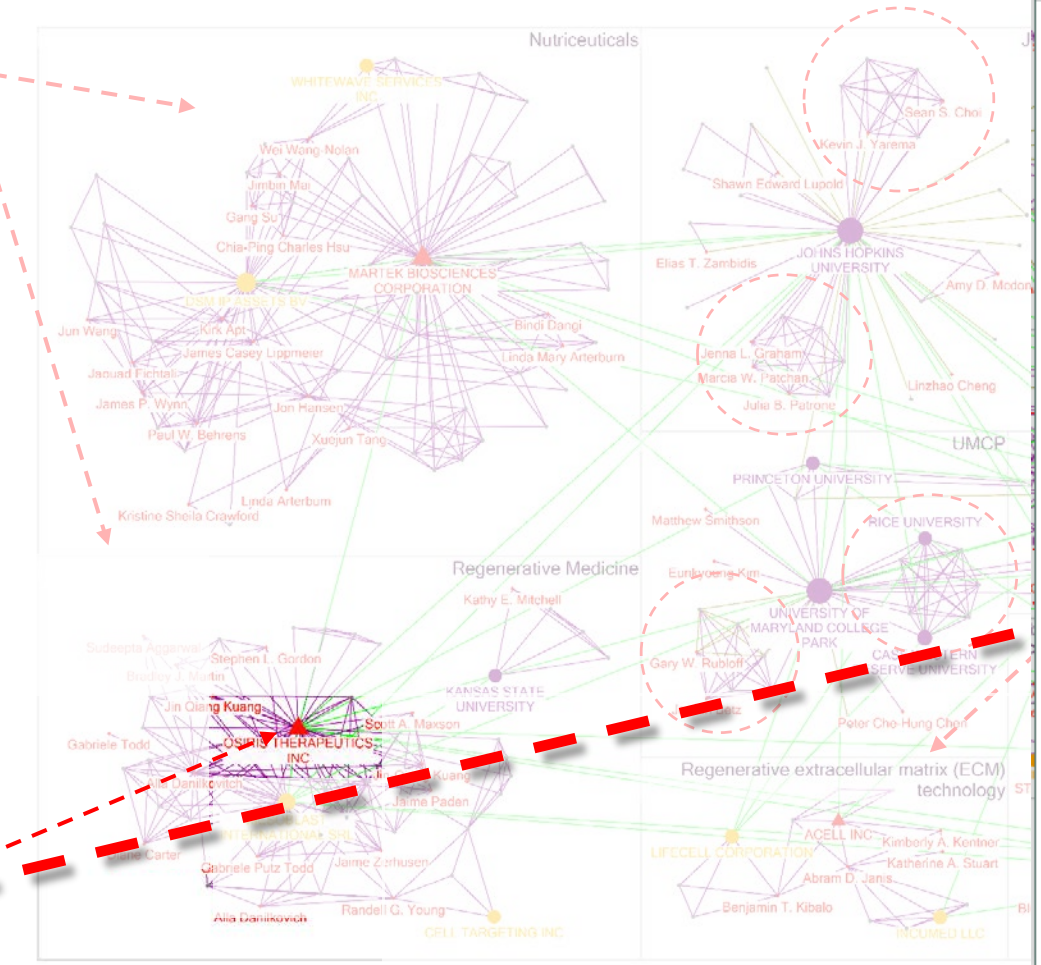
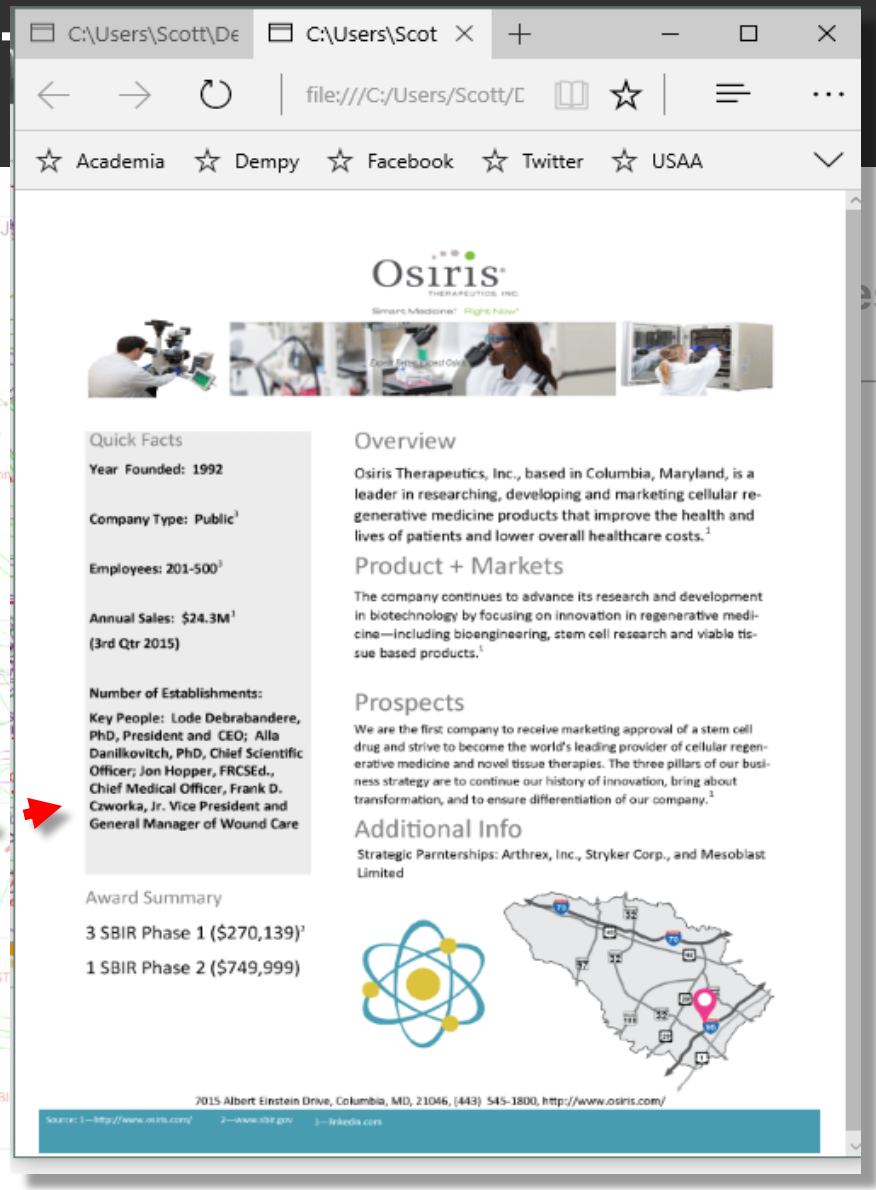
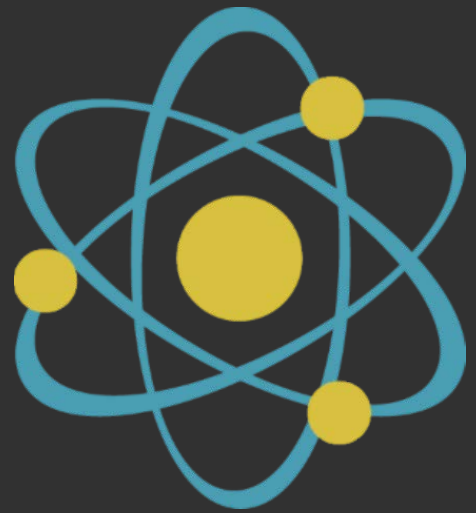




NETWORK ANALYSIS RECOMMENDATION

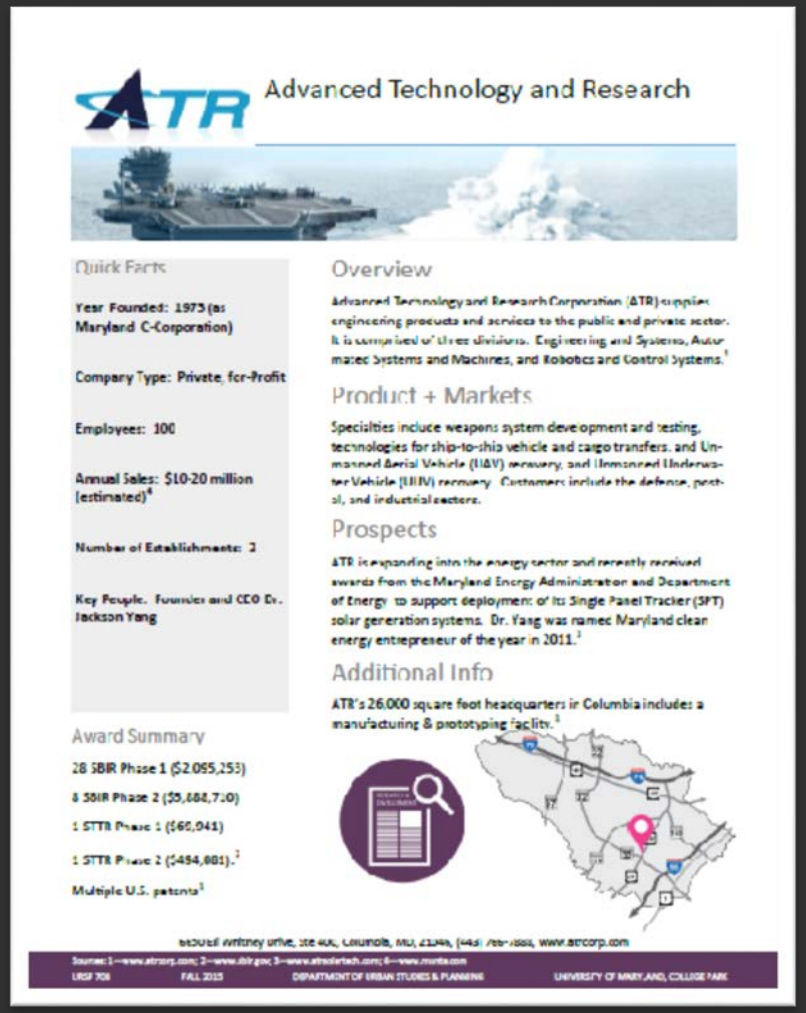
Focus on Regenerative Medicine Cluster

- Regenerative Medicine & Nutraceuticals Group
  - Develop ‘keystone companies’
  - Promote local sourcing
  - Industry partnership for workforce development
  - FDI/ Business Expansion
  - Business attraction and supply chain development
- University Group
- Company Profiles
- Delivery Device Group
- Stem Cell Products Group



COMPANY & CLUSTER PROFILES

HOWARD COUNTY COMPANY PROFILES



- Over 60 individual companies identified
- Criteria include presence in and/or identifiable ties to Howard County
- Individual profiles for each company including information on size, location, activities, customers, innovation activity and key people
- Assigned to 1 of 5 color-coded cluster categories (based on NodeXL results)

TECHNOLOGY PROFILES

Research & Development

Nutraceuticals

Regenerative Medicine

Defense/Intelligence/ Security

Telecommunications

COMPARING TECHNOLOGY & INDUSTRY CLUSTERS

Industry Cluster (StatsAmerica)	**LQ**	**Employment**	**Corresponding Technology Cluster**
Information Technology & Telecommunications	3.37	20,555	Telecommunications
Defense & Security	2.62	22,936	Defense/Intelligence/Security
Biomedical/biochemical (Life Sciences)	0.90	15,732	Regenerative Medicine, Nutraceuticals
Business and Financial Services	2.08	29,312	Research & Development
Advanced Materials	1.81	9,326	

REGENERATIVE MEDICINE

Regenerative medicine is the process of creating living, functional tissues to repair or replace tissue or organ function lost due to age, disease, damage, or congenital defects.

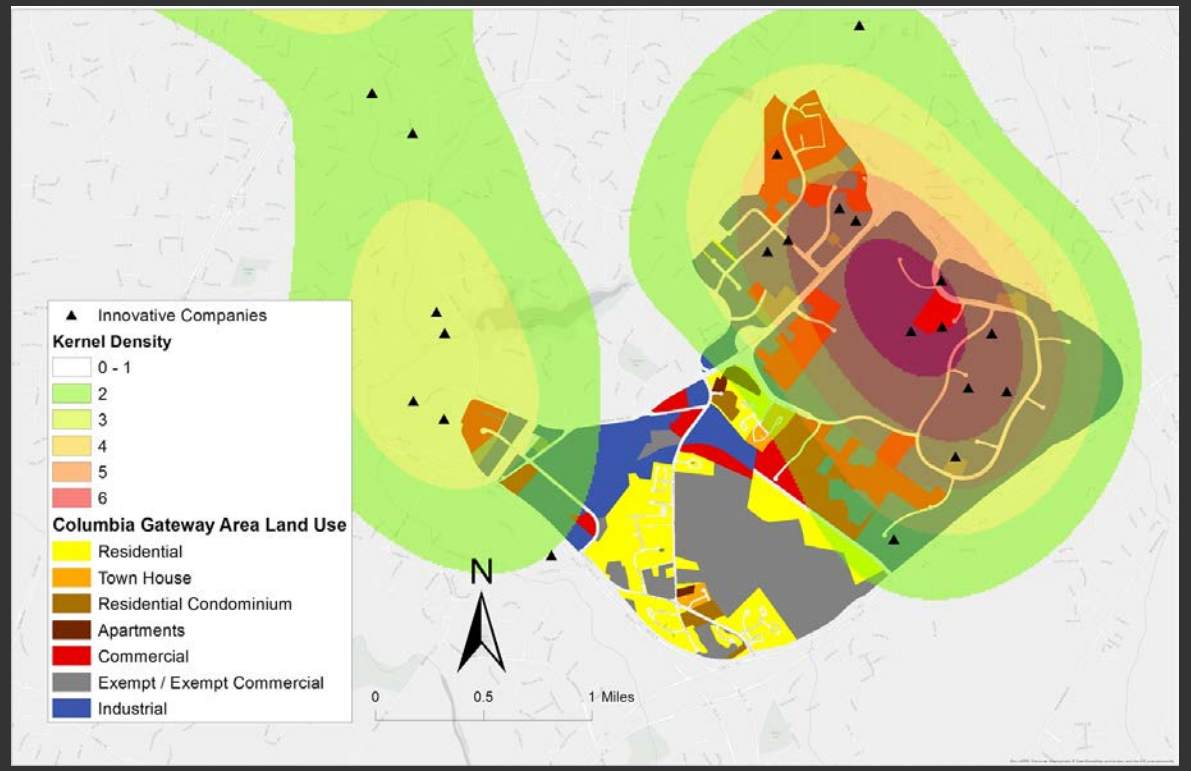
- Acell Inc
- Bioactive Surgical Inc
- Cord Blood Science
- Meridian Medical Technologies Inc
- Osiris Therapeutics Inc
- The Stem Cell Suture Co Inc

source: http://www.osiris.com/

STRATEGIES & RECOMMENDATIONS

RECOMMENDATIONS & CONCLUSIONS

- Traditional Analysis
  - Background and basis for comparison
  - Limited applicability at the local level
- Spatial Analysis
  - Create an innovation district
- Network Analysis
  - Targeted economic development strategies within the Regenerative Medicine Technology Cluster



QUESTIONS & COMMENTS

THANK YOU