PHED ITEM #1
February 10, 2022
Briefing

M E M O R A N D U M

February 7, 2022

TO: Planning, Housing, and Economic Development (PHED) Committee

FROM: Gene Smith, Legislative Analyst

SUBJECT: **Briefing** – Update from Montgomery County Economic Development Corporation (MCEDC) on 2020 Incubator Study

PURPOSE: Briefing and discussion, no votes expected

Those expected for this worksession:
Jake Weissmann, Office of the County Executive (CEX)
Ruth Semple, CEX
Ben Wu, MCEDC
Bill Tompkins, MCEDC
Brad Stewart, MCEDC
Christy Blake, MCEDC
Phil Singerman, MCEDC

The PHED committee reviewed the incubator study commissioned by the County in 2020 on July 26, 2021 (the "2020 Incubator Study") (see ©X-X). Following that review, the PHED Committee requested that MCEDC return with specific recommendations to create an entrepreneurial ecosystem and develop incubator programs as noted in the incubator study. MCEDC provided its recommendations in December 2021 (see ©X-X).

The committee will receive a briefing from MCEDC and Executive staff about the recommendations for the County's incubators as requested in July 2021. Additional details about potential funding models are anticipated in the Executive's recommended FY23 Operating Budget. Council staff also notes that the committee is beginning its review of the Economic Development Strategic Plan, so the committee could also incorporate any of its comments with that document.

Background

The County Business Innovation Network's (BIN) facilities and programming were managed and administered by the Department of Economic Development (DED) before FY17. Prior to FY17, the BIN included five facilities: the Germantown Innovation Center (GIC); the Rockville Innovation Center (RIC); the Silver Spring Innovation Center (SSIC); the William E. Hanna Jr. Innovation Center (WHIC); and the Wheaton Innovation Center (WIC). **Both the WHIC and the WIC are no longer part of the BIN**. The WHIC was converted to the National Cybersecurity Center of Excellence (NCCoE) in 2015 and is a partnership involving the County, the State, and the National Institutes of Standards and Technology (NIST) to address commercial-sector cybersecurity challenges. The WIC's lease expired in June 2016, and rather than renew the lease, the County's designated these funds in FY17 to support the Wheaton Technical Assistance Program as part of the Small Business Assistance Program.

The County chose to pursue a new model for the BIN in FY17 to complement the planned transition of economic development from a public department to a private organization. The revised model for the BIN was that the County would fund debt service obligations related to the BIN facilities but would contract with third-party operators for the BIN programming.

The third-party operators were private organizations with expertise in a specific industry (e.g., biotechnology, health care, information technology, etc.) and provided relevant guidance, programming, and support to the incubator companies. The expectation was that these industry-specific operators will be in a better position than the County to identify the necessary resources and to determine the viability of the current and future incubator tenants. The County implemented this operating model from FY17-FY21.

2020 Incubator Study and MCEDC Recommendations

The 2020 Incubator Study's primary recommendation supports the strengthening of the connections between the County's physical incubators, incubator tenants, entrepreneurs generally, and the other business resources available in the County. The term used in the study was creating a "Entrepreneurial Ecosystem," and this ecosystem, as the study envisioned, was not limited to the incubators and those tenants exclusively.

MCEDC's recommendation generally supports the approach recommended by the 2020 Incubator Study. In addition, MCEDC recommended the following:

- Create the "Entrepreneurship and Innovation Center." This center would be managed by MCEDC and would support the County's efforts with the incubators.
- Target the incubators on key industry sectors that include life sciences, hospitality technology, quantum computing, and advanced technologies. MCEDC identified some potential action steps for each of these industries.
- Provide support for underrepresented business incubation and consider additional community partner opportunities.

There is no specific proposal or funding model before the committee for today's discussion. There are two appropriation requests related to incubators, and these items are more related to the County's ongoing obligations and commitments, not to changing the approach. Below are some topics for the committee's consideration as it discusses these recommendations. The committee should focus on high-level comments and questions because the Executive's recommended FY23 Operating Budget is expected to include elements related to the revised approach and because the committee is reviewing the Economic Development Strategic Plan.

- Incubator management. The County has implemented different models for incubator management recently. The current recommendation by MCEDC is for the County to manage the day-to-day operations of the facilities with MCEDC providing support. Incubator management can be administered by the County, by a third-party, or by both. Both the County-only approach and third-party approach have been tried in the County. The 2020 Incubator Study and MCEDC support the County managing all elements of the incubators, like it did prior to FY17.

  The committee should discuss with the participants the necessary elements (e.g., County staff expertise and capacity) and the best approach for the County to successfully manage the incubators as an ecosystem moving forward.

  Key industry sectors. MCEDC identified four key industry sectors for the incubators to focus attraction efforts. In addition, the committee is considering the Economic Development Strategic Plan that will also identify key industry sectors. The County's previous approach was to focus each incubator on specific industries (e.g., biotech).

  The committee should discuss with Executive staff whether these industry sectors are appropriate and aligned with the 2020 Incubator Study.

  Underrepresented business incubation. MCEDC notes that the SSIC could be a location to "support minority and differentially abled entrepreneurs." The County's entrepreneurship ecosystem must target resources to underrepresented businesses across the County, the incubator system, and across industries.

  The committee should discuss how Executive staff will integrate support system-wide for minority and differentially abled entrepreneurs.

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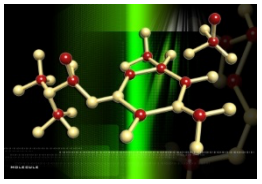

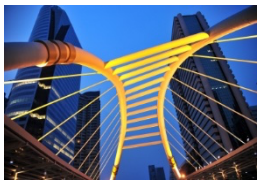

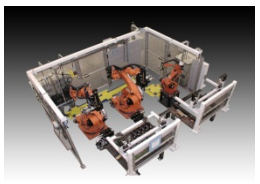

Business Incubator Review and Entrepreneurial Ecosystem Study

Prepared For

Montgomery County, MD

Final Report – Executive Summary

Axcel Innovation LLC

December 10, 2020

3445 Seminole Trail, #289 ◆ Charlottesville ◆ VA 22911
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Executive Summary

Introduction

The county is home to a population of companies that develop new technologies, and / or use those technologies to enable new products and services spanning a wide range of technical fields and markets. These technology-intensive companies create high-value jobs and bring wealth into the economy by selling their products nationally and internationally. There are also 118,000 businesses in the county that have no employees but provide income and economic independence to their owner, a large. proportion of which are also technology-driven.

There has been a loss of businesses, especially small businesses, in key traded sectors since the recession. Advanced manufacturing, for example, is a target sector for the County, and manufacturing creates more indirect jobs than any other traded sector, but 20% of manufacturing businesses have been lost since 2007.

It would be prudent for the County to support entrepreneurs in all of these sectors, which include fields believed to have significant growth potential, including robotics, artificial intelligence, autonomous vehicles, computational biology, sensors, material science, advanced manufacturing, financial services, and 'green' energy technologies.

A number of disadvantaged groups also exist that often face additional challenges as entrepreneurs, and it would be advantageous to the county to ensure that their particular needs are addressed.

Support for Entrepreneurship

Since the emergence of business incubators in the 1960s, many different approaches have been adopted to encourage and support entrepreneurial activity. A key development has been the idea of the entrepreneurial ecosystem - representing the collection of resources, *and the connections between them*, that needs to exist for entrepreneurial activity to thrive. In some circumstances a highly effective ecosystem emerges over time without any deliberate guiding hand, but in most situations, it is the result of sustained, concerted action by both the public and private sectors.

The Entrepreneurial Ecosystem

The county's entrepreneurial ecosystem has a number of strengths, but a critical area of weakness is the lack of essential connectivity among its participants and any concerted, county-wide program to build these connections and more broadly strengthen and grow the ecosystem.

Many other locations are actively focusing on the development of effective entrepreneurial ecosystems both regionally and nationally. with a strong focus on technology-intensive companies – notably Frederick County, Howard County, and the City of Baltimore. Baltimore in particular has been very successful in creating a thriving entrepreneurial ecosystem than continues to grow and exhibits the diversity of resources and kinds of connectivity that are not evident in Montgomery County.

Existing Incubators

The existing incubators have historically generated valuable impacts for the county, but the facilities in Rockville and Silver Spring do not provide specialist facilities or other resources of a kind that cannot be found elsewhere in the county. The wet lab space available in Germantown does appear to be unique and highly regarded within the county's bioscience community. There is also scope for further specialist resources to be created to address needs and opportunities in sectors beyond bioscience. In all cases, there is a need for clear paths for companies that address their specific needs at each stage of their growth.

Proposed Strategy

The primary recommendation is that the County moves from its current approach to supporting entrepreneurship, focused on specific facilities owned or leased by the County, to a strategy in which focuses on the development of the ecosystem as a whole, leveraging partnerships to:

- Increase the number of entrepreneurs active in the ecosystem, supporting them from idea generation to long-term growth, removing barriers, and creating pathways for them to succeed.

- Increase the number and effectiveness of relevant resources that meet the needs of entrepreneurs, directly and through partnerships.
- Increase the number and strength of connections between entrepreneurs, and between entrepreneurs and the available resources.
- Increase the number of connections between the county ecosystem, the wider regional ecosystem, and those in other locations.

Operational Model

The proposed approach to achieving this is to create an Ecosystem Development Team, serving as a catalyst for the whole ecosystem, with responsibility for ensuring that support is available to county entrepreneurs from idea generation to long-term growth, through:

- Outreach, promotion, and education – promoting and supporting entrepreneurship as a pathway to economic independence from K-12 onward, and enabling, convening, and supporting champions who will promote the ecosystem and contribute to its development and building a brand for entrepreneurship in the county.
- Entrepreneur engagement and support, coordinating access to resources for individual entrepreneurs.
- Creating and curating a knowledge / information base (including best practices in ecosystem development).
- Creating connections, communities of interest, and public and private sector partnerships.
- Undertaking ongoing proactive analysis of the ecosystem and identification of gaps / opportunities.
- Building consensus on priorities and areas for action and developing appropriate action plans with partners, and only managing / providing resources directly where it is the most logical solution.
- Developing, curating, and sharing information about the ecosystem, as a resource for participants and to track its development over time.

Implicit in this approach is ensuring that all entrepreneurs have access to the resources that they need. This includes those who are economically disadvantaged and those from minorities who face unique challenges in accessing appropriate support.

It is also implicit that in some cases the county may need to develop and support specific resources where partnership-based approaches are not viable, or to pilot new approaches to demonstrate their viability.

The existing specialist facility in Germantown that provides wet lab space should be included within the management responsibilities of the ecosystem development team. The remit of the team should also include developing specific uses for the Silver Spring and Rockville facilities to address identified ecosystem needs including the provision of support for underserved populations.

Resources

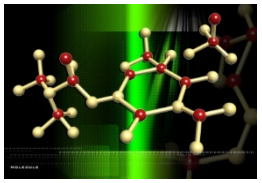
The team should be led by a CEO / Executive Director with a team of four project managers, with appropriate administrative support, and operate from space available at the BIN incubators. This would be consistent with the level of resources deployed in comparable initiatives.

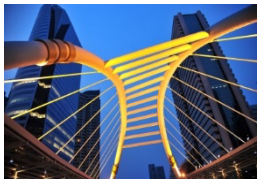
The cost for such a team is estimated to be $925,000 per annum excluding staff benefits. This would be offset by potential savings from the reorganization / repurposing of the existing incubators.

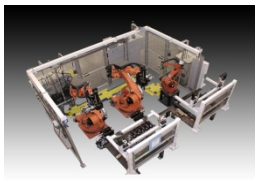
Impacts (Metrics)

Data should be collected and reported on an ongoing basis to track progress against all areas of the Ecosystem Development Team's activities and for development of the ecosystem as a whole, a broadly-based set of short, medium, and long-term metrics.

Executive Summary







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Prepared For

Montgomery County, MD

Final Report

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December 10, 2020

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1 Introduction

This report presents the findings of a study undertaken by Axcel Innovation on behalf of Montgomery County to provide an analysis of the county's existing entrepreneurial ecosystem and an analysis of the potential future ecosystem. The full scope of work for the study is as follows:

A. Analysis of the county's existing entrepreneurial ecosystem

1) Assess effectiveness and necessity of the County's incubators to meet County goals
2) Ability of innovation centers to respond to current and future market needs and gaps (including examples of other programs regionally and nationally)
3) Ascertaining management options for existing facilities
4) Determine positioning – focus, target clients, environment / services to be provided
5) Strategic recommendations – policies, programs, required resources

B. Analysis of the county's future entrepreneurial ecosystem

1) Areas in which incubator could help meet other county goals – including underserved or disadvantaged residents, energizing under-utilized real estate, bolstering neighborhood economies
2) Identify new and emerging industry clusters with potential to leverage and drive job growth for local citizens

A comprehensive body of data was collected and analyzed to support the conclusions and recommendations of the study. Selected charts and tables are included in this document to illustrate or emphasize specific aspects of the analysis. A much larger selection of data is included in a separate appendix, organized in accordance with the structure of this report, and can be consulted to further explore specific topics.

The remainder of this introduction provides a brief explanation and discussion of some key aspects of ecosystem development which are referenced in this report and its appendices.

1.1 Competitive Advantage and Innovation

All businesses rely on some form of competitive advantage to be viable. This may derive from a number of factors such as:

- Proximity to customers or to necessary raw materials.
- Financial or regulatory barriers that deter competitors.
- The operational business model being deployed; or
- Trade secrets, copyright, or patents.

Few of these sources of competitive advantage are perpetual – competitors may locate equally close to the same customers, financial barriers can be overcome given sufficient investment, regulatory barriers may be removed by changes in the law, trade secrets may be exposed by staff who leave, and copyright and patent rights have a fixed lifespan. It is consequently those companies that are able to innovate and create new sources of competitive advantage on an ongoing basis that are likely to be able to sustain their position in the market over time.

These innovations may be applied in the context of an existing business model or leveraged in ways that enable entirely new business models to be deployed, as has been seen with many internet-based businesses.

1.2 Innovation and Entrepreneurship

Innovation and entrepreneurship are closely linked but they are not synonymous – someone who opens a new nail salon, for example, may be an entrepreneur but may not be doing anything highly innovative. Equally, a university professor may create many highly innovative ideas, but these may not necessarily have any commercial application. The value of innovation in a commercial context has nonetheless been recognized throughout history as a key source of opportunity for entrepreneurs, and possibly never more so than in the global markets that now exist in many industries.

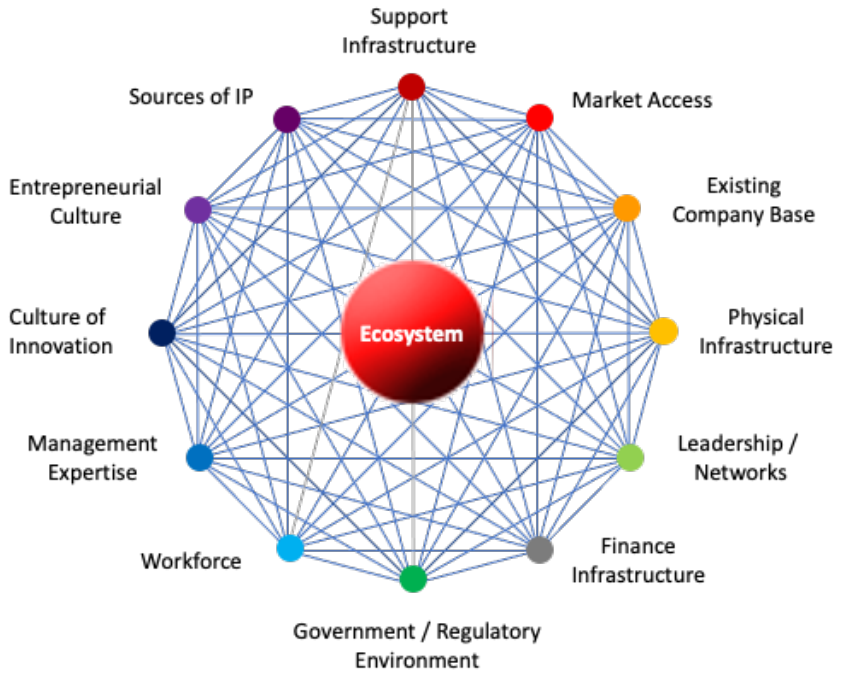
1.3 Entrepreneurial Ecosystems

The collection of resources that exist in a given location that are of value to entrepreneurs can be viewed as being analogous to a biological ecosystem - with multiple factors operating on both large and small scales, and multiple components of the system forming interconnected networks and interacting in often complex, inter-dependent ways. It is these connections and inter-dependencies that in many respects bring the ecosystem to life and make it more than just a group of resources that happen to exist in the same location.

Unlike biological ecosystems, it is unusual for highly effective entrepreneurial ecosystems to emerge over time without any deliberate guiding hand. In most situations, it is the result of sustained, concerted action by both the public and private sectors working to achieve mutually beneficial objectives.

Like biological ecosystems, entrepreneurial ecosystems tend to evolve over time in response to external factors, and some may be able to respond to changes in the external environment more effectively than others.

There are several models that have been developed over time by different groups to represent entrepreneurial ecosystems. These range from being very simple to relatively complex, but all seek to capture the key elements of an 'ideal' ecosystem as a means for evaluating the extent to which these elements are present in any given geographical area. Axcel Innovation often makes use of a relatively simple ecosystem model which represents twelve factors that experience has shown to be relevant to understanding ecosystems, and the interconnections between these factors, as shown below:



Where an ecosystem is not highly developed or is not responding to changes in the external environment, action may be taken to strengthen those elements that are not functioning at a level, or in a manner, that meets the full needs of the ecosystem as a whole. This is as much an art as a science, and it is important to continually monitor the functioning of the ecosystem to identify needs, develop appropriate responses, and monitor the extent to which actions taken are having the desired effect.

It is also important to recognize that few of these models provide a realistic representation of the complex networks that comprise ecosystems in the real world. Their purpose is primarily to provide a framework for organizing, analyzing, and sharing information about the ecosystem to build consensus and provide a basis for the development of appropriate action plans. As such, none of these models are truly accurate and while often very useful as part of a larger process, it is unwise to treat them in a mechanistic way as providing a definitive view, or definitive solutions

1.4 Value Chains

The value chain concept describes where companies fit within their industry in the context of the different stages at which value is added from going from raw materials or other basic inputs, to a finished product in the hands of the customer. In most industries, value is not added uniformly across all stages, with the earliest stages in the process tending to capture the least added value. A ton of iron ore, for example is worth much less than a ton of steel produced by a steel mill, which is in turn worth far less than the household appliances in which it is a key material.

The locations where the highest value-added stages of the value chain take place capture the largest share of the associated economic benefits and so it is desirable to take action to create, attract, and retain the associated companies. Where a location does not have any companies active at any given stage of the value chain, that activity will take place elsewhere.

Multiple stages of the value chain may be concentrated in specific locations, particularly where this reduces transportation costs and leads to other increases efficiency.

Locations that lack key elements of the value chain for a given industry may lose companies from that industry to other locations. Taking action to increase the breadth and depth of capacity across the whole value chain for an industry in a given location can yield economic benefits.

It is beyond the scope of the current study to undertake detailed value chain analysis for industries present in Montgomery County, but the value chain concept underpins many aspects of ecosystem development.

1.5 Entrepreneurial Ecosystems and Economic Development

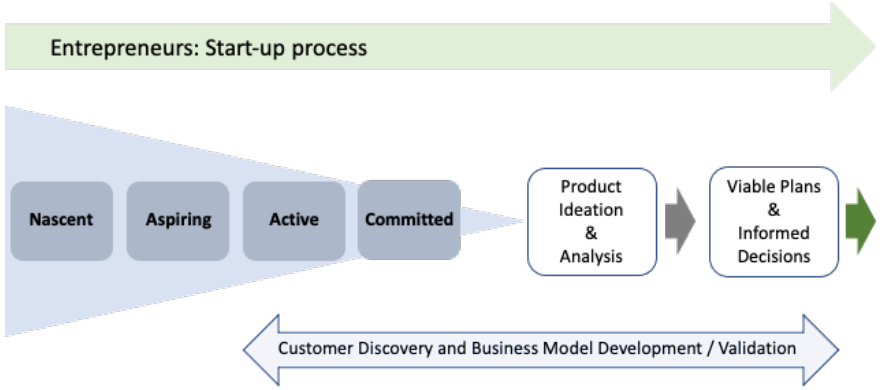
One of the key challenges in supporting entrepreneurship in an economic development context is trying to determine which companies are likely to be most successful in delivering desired economic development objectives. To a significant extent, an ecosystem-based approach avoids this challenge by creating an infrastructure that supports a population of entrepreneurs rather than relying on the ability to pick individual companies that are believed to be 'winners'. This is not to suggest that a degree of focus is inappropriate - different locations are likely to present conditions that are more amenable to the success of certain types of business than others but picking winners has been proven to be notoriously difficult even for those whose business relies on it such as venture capitalists.

1.6 The Company Creation and Growth Process

While the term '**Startup'** is widely used to describe any kind of new business or business in the early stages of its development, it has become common to apply a more specific definition of the term based on the

terminology used in the 'Lean Startup' model. In this model, a start-up is essentially considered to be a time-limited entity (which may not even be formally constituted as a business) the purpose of which is simply to define a viable business model. If the process does not yield a viable business model, then the entrepreneur should not continue to pursue it and should turn their energies to identifying other, more viable opportunities.

Although there are structured programs which guide aspiring entrepreneurs through the startup process in a fixed time frame (of which one of the most prominent is the National Science Foundation I-Corps program), for many entrepreneurs, the process is more of a gradual one in which they pass through a variety of stages from a nascent interest in entrepreneurship through to committing to pursuing the creation and growth of a company. This is illustrated in the figure below:



At the **nascent** stage, the individual is at a point where they first think of themselves in an entrepreneurial role. The '**Aspiring'** stage represents them giving more thought to entrepreneurship and seeking more information about what that may mean for them individually.

If their interest is still sustained as they seek to develop their ideas, they will generally then progress to the '**Active'** stage in which they explore in more detail what particular type of business might be appropriate for them to pursue, what resources might be required, and how they might take further action.

They will then move to a point where they have mentally **committed** to pursuing some entrepreneurial activity, after which they must clearly define the specific product or service that they intend to offer and develop appropriate plans for how this might be achieved. With a specific plan that they consider to be viable they can make an informed decision about whether to proceed with implementing the plan or not.

As illustrated in the figure, from the 'Active' stage onward, the entrepreneur should be undertaking a process of **customer discovery** – identifying people, and as appropriate, organizations that represent potential customers and engaging with them to learn about their intended market and customer needs and developing a business model that is supported by the information that they have gathered.

While customer discovery can be taken simply to mean finding customers, in the context of contemporary thought on entrepreneurship it has a specific meaning and represents a structured, iterative process in which a large number of prospective customers are identified and interviewed about their needs. The information gained is then used to develop a deep understanding about the structure of the market and develop one or more clear value propositions that are believed to reflect customer needs and wants, and to develop a model for the business that encompasses all of its operational elements, resources, and financial flows. This is at a less detailed level than a full business plan but should be sufficient to form the foundation for such a plan.

Undertaking this process in full requires a large number of interactions with prospective customers and may take six months or more to complete. **Going through the entire process from the 'Nascent' to having a viable plan represents a substantial commitment of time and effort on the part of the entrepreneur**, **but the point is that it represents relatively little financial risk compared to actually creating a business** and allows the entrepreneur to exit from the process at any point if it appears that the idea being pursued does not look like the basis for a viable business. In that case, the entrepreneur will ideally have learned from the process and may develop a new idea based on what they have learned. Exploring and testing business ideas in this way ultimately reduces the risk to the entrepreneur of pursuing a business that is fundamentally not viable. If the process leads to the development of a business model that is believed to be viable, it can then be followed by the establishment of an '**Early-Stage Company**' the purpose of which is to implement it.

Once companies begin to gain momentum, they begin a stage of development that can be described as '**Early Growth**'. These companies typically need additional resources beyond those of the founding team, particularly in relation to sales, scaling production, supply chain and distribution logistics, and customer support. A company may still be small at this point but requires more formal management structures and processes in place in order to manage its growth.

Beyond the Early Growth stage, companies may follow a variety of paths and the use of generic labels to describe their characteristics becomes less meaningful. The companies that are generally of most interest in an economic development context at this stage are those that aspire to continued growth, and these are often simply referred to as **'Growth'** companies to distinguish them from the wider population of companies, which, while they may have growth potential, may not pursue growth as a primary objective.

Most initiatives aimed at supporting the creation and growth of companies are focused on Start-ups, Early Stage, and Early Growth companies.

It is vitally important that frameworks of support exist within the ecosystem that ensure that the needs of entrepreneurs at all stages of this process are met. In the absence of these pathways for growth, companies may falter or fail at key stages of the process.

1.7 Barriers to Entrepreneurial Activity

There can be multiple causes for a lack of entrepreneurial activity within a given geographical area, including:

- An insufficient number of people being prepared to follow an entrepreneurial path.
- The people who do want to become entrepreneurs may lack the necessary skills and / or experience to be successful.
- The kinds of businesses that people want to create may not match the strategic priorities of the relevant jurisdiction.
- Prospective entrepreneurs may be able to access the resources they need / want in other locations to which they are willing and able to travel and are considered to be more suited to their needs.
- There may be people who have never considered an entrepreneurial pathway but who would nonetheless have the potential to be successful entrepreneurs.

A wide variety of different approaches have been adopted to address these different causes, and to encourage higher levels of entrepreneurial activity within given locations, including training and educational programs, sources of assistance to intentionally provide connections to the appropriate resources, and programs to make these resources accessible.

The key to achieving success with these kinds of activities is to ensure that they are tailored to meet the specific needs of the people that they are targeting as they exist in that location at each stage of the company creation and growth process..

1.8 Technology Transfer

Companies that leverage new technologies as a key component of their competitive advantage are often seen as being attractive in an economic development context as they are expected to create high value jobs and tend to operate in traded sectors. As such, they have the potential to generate significant financial flows into the local economy. This is particularly the case in locations where there are university or government institutions that undertake scientific research.

The processes by which intellectual property, in the form of patents, copyright material, and know-how are used to create a new commercial product or service (or enhance an existing one) are generally referred to collectively as 'Technology Transfer'. This may involve licensing the necessary intellectual property from a university, federal laboratory, or in many cases, another company, and / or engaging in collaborative projects in which there is some form of joint ownership of the intellectual property.

On paper, this is a simple process, but in practice it is often complex and needs appropriate organizational structures and expertise on both sides of the transaction to achieve. It involves not only a legal process, but extensive human interaction in order to ensure that all of the necessary information is shared in a sufficiently effective manner for the licensee to be able to use it as intended. The key to the process is effective interpersonal relationships between people on both sides of the transaction.

Technology transfer is a high-risk endeavor, and it is not uncommon for projects to fail to yield the anticipated outcomes despite good faith efforts by all parties involved. In practice however **it is often the case that the relationships established during the process prove to be of lasting value even if the original project fails**. There may be an ongoing exchange of information and ideas between the parties and new, more viable opportunities may be identified over time.

Given the presence of many research organizations in the County it is logical for technology transfer to be a focus of support for entrepreneurship in the county. Companies that successfully transfer new technologies to the marketplaces tend to have significant potential for growth and economic impact, but it is important to acknowledge that in practice too narrow a focus on technology transfer may lead to other opportunities being missed.

1.9 People

Companies generally rely on several different categories of expertise to successfully create, develop, and grow their businesses:

- **Entrepreneurial** – provided by the founders, who typically have specific industry and / or technical knowledge, have developed the business model for the company, and provide the drive and energy to make the business a reality. While many businesses are founded by a single individual, the involvement of others can alleviate some of the challenges involved by bringing addition expertise, experience, and knowledge.
- **Management** – beyond a certain size, companies need expertise in key management functions that go beyond the ability of the founders to provide. Depending on the specifics of the company concerned, this could include expertise in: Finance, Operations, Supply Chain, Regulatory Affairs, Quality Control and Quality Assurance, Distribution, and Marketing, among other disciplines.

- **Technical** – the technical expertise required to operate the functions of the business. This might, for example, include machine operators, maintenance engineers, lab staff, process control specialists, software developers, and a whole range of other technical specialists whose qualifications may range from associates degrees or trade certifications through to doctorates depending on the specific nature of the business.
- **Administrative** – the expertise to maintain the administrative functions of the business: accounting, bookkeeping, human resources, and other 'back office' functions.

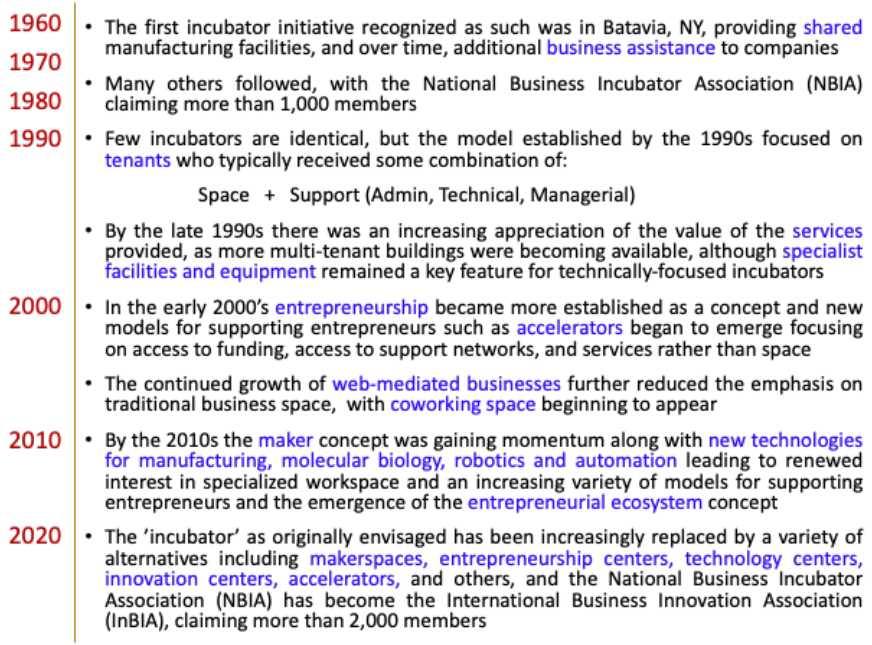
Most companies will also require other operational staff.

1.10 Incubators and Other Resources for Entrepreneurs

The chart to the right provides a timeline for the development of approaches to support entrepreneurs from the 1960s when what is recognized as the first business incubator was established in Batavia, NY.

Incubators typically provide space along with support services to businesses that historically were referred to as tenants but are now frequently referred to as *members* or *clients*, reflecting the importance of forms of support other than the provision of physical space from which to operate. In addition to providing office space, some incubators offer virtual membership, offering support to virtual members with access to meeting space, drop in workspace, mail service and more on a sliding monthly scale or 'a la carte' as a fixed fee. Some incubators are also focused on a specific technology, service, or business model, while many remain somewhat open and flexible with regard to the entrepreneurs and companies they support.

Accelerators are essentially cohort based mentored training programs, generally focused on a specific technology or market. They are typically time-limited (typically 3-6 months) and need not be tied to a specific location although many are run by incubators. They may include some form of financial support, and possibly a final pitch competition with a prize. They are widely seen as a highly effective way to support entrepreneurs, particularly in the earliest stages of the business creation process.



Makerspaces offer tools and equipment that are too specialized and / or expensive for most people to own on an individual basis. They do not typically offer the kinds of services that incubators provide (business assistance, connection to mentors and industry experts, education, etc.), and their focus may not necessarily be on entrepreneurship with many users simply being hobbyists pursuing projects for their own interest. Some do nonetheless have a stronger emphasis on entrepreneurship, often by way of being affiliated with an incubator or an academic institution.

At present, while many incubators still exist that were created in earlier decades, new initiatives are deploying a much wider range of models, often combining different elements and / or serving a broader role within their entrepreneurial ecosystems.

1.11 History of Business Incubators in Montgomery County

The period in which the County has provided incubator space in some form spans from 1993 to the present day, as summarized below:

- In **1993**, Montgomery County leased space in Rockville to create the **Montgomery County Technology Enterprise Center**. This center was closed when the Maryland Technology Development Center opened (see below), with a number of companies transferring to the new location and others moving to other locations in the county.
- In **1999**, the **Maryland Technology Development Center** was opened in Shady Grove in a building owned by the County. The Center was subsequently renamed as the Shady Grove Innovation Center, and then again as the William Hanna Center for Innovation at Shady Grove. The Center included wet lab space and a resident management team and could house up to 40 companies. The Center appears to have been highly popular with tenants and was widely seen as a key asset in the development of the county's bioscience industry.

  By **2014**, it was felt that the facility needed to be renovated, at an estimated cost believed to be in the region of $3 million. At this time, the opportunity also arose for the county to provide a location for a new National Cybersecurity Center of Excellence (NCCoE) being planned by the Gaithersburg–based National Institute of Standards and Technology. **The decision was made to close the Center** and for the facilities to be used to house the NCCoE, resulting in the need to relocate the companies housed there.
- In **2004**, the **Silver Spring Innovation Center** was opened, following what was then the established incubator model, offering individual office units for rent by companies. The building is owned by the County and comprises office space with some more open plan co-working style space. The Center is located in a HUBZone.
- In **2005**, an additional facility, the W**heaton Business Innovation Center**, was opened to provide support for small businesses with the area. This was subsequently closed in 2015.
- In **2006**, the **Rockville Innovation Center** was opened in space **purchased by the County i**n a condominium office building in Rockville Town Center.
- In **2008**, the Germantown Innovation Center was opened at the site of the Germantown Community College, comprising 12 wet labs and 32,000 square feet of office space in a facility leased from the college. Following the closure of the facility at Shady Grove in 2014, this became the only location that offers such space for startups and early-stage companies in the county.

The three current incubators in Silver Spring, Rockville Innovation Center, and Germantown, collectively comprise the Busines Incubator Network (BIN). Until 2016, the BIN facilities were staffed by the County, but with the restructuring of the County's economic development operations, the management of the three facilities was contracted out.

At present, the Rockville and Germantown facilities are managed under contract by Jones Lang LaSalle (JLL) – a real estate services company with a global operational footprint. JLL also staffs the reception desk in these locations. The Silver Spring facility is managed under contract to Launch Workplaces (based in Edgewater, MD) which is also contracted to provide some programming to all three Innovation Centers.

For almost the full period of the study, the three Innovation Centers have been subject to restrictions resulting from the Covid-19 pandemic, with the result that the usage is below normal, and no programming is being offered at any of the locations. It is understood that prior to the pandemic, the programming offered by Launch Workplaces comprised informal networking sessions, including brown bag lunches, and informational sessions on topics believed to be of interest to tenants.

In 2014, the net annual operating loss across the three facilities was $644,913 which had risen to $1,270,901 by 2018. Detailed financial reports for each center were not examined as part of this study, but it appears that the increased loss is due to a combination of significant increases in operating expenses at the Rockville and Germantown locations, and declining revenues - primarily at the Rockville and Silver Spring locations. The increase in operating expenses was in part a result of contracting out the management of the facilities.

2 Interview Program

A comprehensive interview program was conducted with current and past tenants of the BIN and a range of subject matter experts and thought leaders both within the county and elsewhere. All interviews were conducted on a confidential basis. While the interviews were undertaken with a set of topics to be addressed, they were conducted as a conversation rather than as a set of specific questions in order to allow the interviewees to raise any points that they felt relevant, and also to allow the interviewer scope to pursue any topics that arose during the discussion. The interview data was then analyzed to identify themes, and these are reported and discussed here.

2.1 Tenant Interviews

Contact information was provided for 45 current client companies of the BIN centers plus 18 graduates of the Rockville Center. A total of 28 current clients were interviewed but only three graduates responded to requests for interviews. In the absence of the pandemic higher response rates would have been expected but the percentage of current clients interviewed is believed to be sufficient for meaningful information to be obtained. In addition, five Montgomery County startup companies that were not BIN members were also interviewed.

A summary of the key themes and topics that emerged from the interview program is provided below, with the findings grouped under several headings to aid clarity.

2.1.1 Facilities and Equipment

- Overall, companies are highly appreciative of the incubators as facilities offering space, conference rooms, training, equipment and other resources. The availability of shared lab space in particular is seen as extremely important. While lab space is available elsewhere in the county, small lab units are not readily available, and building owners require longer lease terms than an early-stage company can realistically accommodate.

2.1.2 Staffing

- The remaining County staff that are involved with the BIN facilities are highly regarded by the tenants. They are seen as professional and genuinely interested in the tenant companies.
- The absence (or limited presence) of staff beyond those involved in the administrative / reception services under the current management arrangements was seen as a negative. Comparisons were made with the Shady Grove Center where the management team were highly visible and accessible to tenants.

2.1.3 Support Services / Programming

- There is an apparent lack of clarity in the minds of many of the tenants regarding who has responsibility for the delivery of services to them.
- Many tenants felt that only limited services and programming are available to them. There was some sense that this used to be greater in the past, but few specific examples could be provided of services that were available in the past that are no longer available now.
- Several interviewees expressed the view that they would benefit (or would have benefited at an earlier stage) from management support and assistance in some form.

- A number of areas were identified by tenants in which they feel support would be highly valuable. These included mentoring; assistance with the legal aspects of the startup process such as the appropriate legal form, partnership agreements, and intellectual property strategy and agreements; understanding the investment capital process and deal terms; negotiation of agreements; finding, hiring, and managing staff; financial management processes; and access to specialist consultants in specific areas relevant to the company such as marketing.

2.1.4 Networking

- Many tenants feel that there are limited opportunities for networking with other tenants and more broadly with other companies in the county. Ad hoc interactions occur to some extent, but some tenants expressed the view that other tenants tend to be reclusive and disinclined to engage in informal interactions.
- The specific lack of managed or structured networking events was noted by a number of tenants.
- Some tenants felt that the internal BIN ecosystem was weak, with companies not interacting or getting to know each other. Several expressed the view that there was a networking / information sharing dynamic at the Shady Grove location that has been lost since its closure.
- Some tenants expressed the view that the overall entrepreneurial ecosystem is not cohesive or supportive (in comparison to locations like Boston, San Francisco, and Research Triangle with which they are familiar). These locations were felt to be ones where there are strong connections between organizations and individuals, and particularly between universities and the economic development community, and with individual entrepreneurship initiatives.
- Several tenants expressed a need for structured opportunities to connect with venture capital firms and angel investment groups.
- Many tenants would like assistance with identifying services and resources to support the transition from research to product.
- Awareness of other resources available at the state level, such as the Maryland Regional Manufacturing Institute or the Maryland Manufacturing Network, was limited, although most were aware of TEDCO.
- Several tenants expressed a need for assistance in locating affordable space, especially wet lab space, that they could transition into when they graduate from the incubation center. Although it is difficult to be definitive based on the interviews, the impression was given that some tenants are remaining in the Germantown Center longer because they cannot find other suitable space to grow into.

2.1.5 Training / Education

- While tenants were generally aware of accelerator programs and other forms of training / education for entrepreneurs, detailed knowledge of them was limited, and several commented that no 'in-house' program had been offered.
- There is no evident accelerator, management training / development, or other program associated with the BIN. While some clients have received mentoring from the mentoring program run by the Maryland Technology Council (MTC) program this did not appear to be widely promoted (or necessarily available)

2.1.6 Focus

- A number of tenants expressed the opinion that the BIN is focused too narrowly on bioscience companies and that opportunities are being missed by the county in other industry sectors.

2.2 External Interviews

The interviews with people external to the BIN incubators themselves highlighted a number of common topics:

- The general view is that the County started creating incubators at a time when many jurisdictions were doing so, and **incubators were generally seen as an effective way of supporting startups and early-stage companies**, particularly in locations where access to affordable, flexible space for companies without a financial track record was seen as a challenge.
- Equally, however, the sense is that there was **not a strong connection to a larger economic development strategy, or to a broader strategy for supporting entrepreneurship**.
- While the circumstances and rationale for the **closure of the Shady Grove facility** and the conversion to the NCCoE are understood, many interviewees expressed the opinion that the closure is **seen as counter-productive** and has had a negative impact on the perception of the County among the entrepreneurial community.
- There is a broadly held view that, in its current form, **the BIN does not address the needs of contemporary entrepreneurs** going through the start-up process or those of early-stage companies.
- There is also a **perception that the tenant population has remained relatively static**, which is unusual for an incubator.

The external interviews showed some differences of opinion compared to the tenant interviews. In particular, several of the external interviewees expressed the view that there is wet lab space available in the County beyond that which is available at the Germantown Center, and a number of examples were provided, including the Alexandria Real Estate Equities LaunchLabs facility. Several factors may, however, explain the difference in opinion between the tenants and the external interviewees:

- The external space may not be available at the time when the Germantown graduates need it.
- The size of the available space may not match the needs of Germantown graduates – in particular, what is available may be too large for the graduates' requirements.
- The lease terms for external space may not be suitable for the graduates – with respect to both cost and duration.

2.3 Summary and Conclusions

The nature of entrepreneurship and the nature of support for it have changed significantly since the 1990s when the County's first incubator was created:

- New approaches to supporting entrepreneurs that are not primarily focused on real estate have emerged, including time-limited cohort-based programs, many of which do not provide space for their participants.
- There has been a proliferation of types of space targeted wholly or in part at entrepreneurs, including coworking spaces, maker spaces, prototyping facilities, and combinations of these in single facilities.
- The focus of support for entrepreneurs has broadened to encompass the development of the entrepreneurial ecosystem as a whole, of which individual initiatives such as incubators are only one part.
- Many incubators have responded to these changes by redefining their role, taking on a wider range of activities as key nodes within the entrepreneurial ecosystem.

The BIN incubators have not kept up with these changes. Specifically:

- The rise of coworking space, most of which include individual offices to rent, has made the need for incubators to provide space less compelling, unless the space is in some way specialized, as is the case with the Germantown Innovation Center. The role of the Silver Spring and Rockville facilities in this context is not clear.
- The provision of services beyond space alone has always been an element of the incubator model but the BIN centers are not providing the full range of support that contemporary entrepreneurs need, and in many cases, expect.
- The BIN has not maintained a position as a key actor in the development of the county's entrepreneurial ecosystem, and at present no other organization has taken on this role, with the result that, in this context, the county is not keeping up with other jurisdictions within the region which are home to multiple incubators and other initiatives aimed at targeting entrepreneurs.
- These factors are likely to **impact** the extent to which the county can attract and retain entrepreneurs who have multiple options to establish businesses elsewhere in the region.
- There are many entrepreneurial companies in the county that are not located in any of the BIN centers that would benefit from access to support for their development, and which have the potential to create significant economic impact. **Moving the focus of support from the innovation centers to the wider entrepreneurial population would have the potential to create much greater impact for the county. At the same time, configuring the innovation centers to provide specialized resources that are not otherwise accessible to county entrepreneurs, rather than flexible office space that is available elsewhere would also increase their impact**.
- There are also many organizations within the county and elsewhere in the region, and state that are valuable components of the entrepreneurial ecosystem, but their impact is lessened by a lack of connectivity and coordination of support for Montgomery County entrepreneurs. All of those that were contacted as part of the interview program expressed enthusiasm for an organization within the county serving a coordinating role and helping them to connect with entrepreneurs.

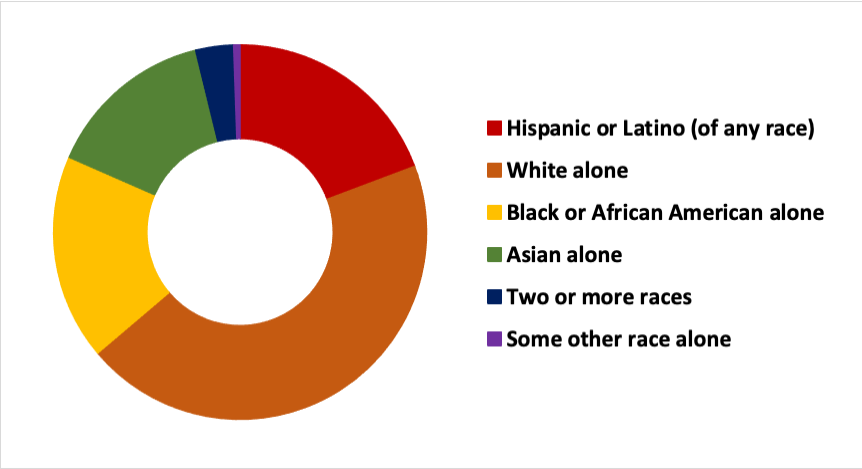
Examples of organizations that can provide relevant resources include, in no particular order (this list is intended to be illustrative rather than exhaustive):

- The Small Business Development Center network
- The Regional Manufacturing Institute
- The Maryland Manufacturing Extension Partnership
- The Maryland Technology Council
- The Maryland Defense Technology Commercialization Center
- BioHealth Innovation
- Bethesda Green
- Montgomery County Public Libraries
- The County's Community Colleges
- The University of Maryland
- The Universities at Shady Grove
- The Procurement Technical Advisory Centers

Many professional bodies and industry groups also have a focus on supporting entrepreneurship, and there are relevant national initiatives such as 'Right to Start' (www.righttostart.org), and others that focus on specific disadvantaged groups.

3 Underserved Entrepreneurs

Montgomery County has a highly diverse population, as illustrated in the chart below:



The county has the largest percentage Hispanic population of any county in Maryland, and the second largest percentage Asian population (after Howard County). There are also significant disparities in income between people of different races and ethnicities as shown below

	Median Income	
White alone, not Hispanic or Latino	128,728	100%
Asian	113,357	88%
Two or more races	94,961	74%
Native Hawaiian and Other Pacific Islander	87,500	68%
American Indian and Alaska Native	79,559	62%
Black or African American	76,056	59%
Hispanic or Latino origin (of any race)	74,621	58%
Some other race	65,992	51%

Poverty rates for the non-white population are also significantly higher:

	Percentage	Multiple
Native Hawaiian and Other Pacific Islander alone	16.0%	444%
Some other race alone	14.5%	403%
Hispanic or Latino origin (of any race)	11.4%	317%
Black or African American alone	10.6%	294%
Two or more races	8.1%	225%
Asian alone	6.1%	169%
American Indian and Alaska Native alone	4.8%	133%
White alone, not Hispanic or Latino	3.6%	100%

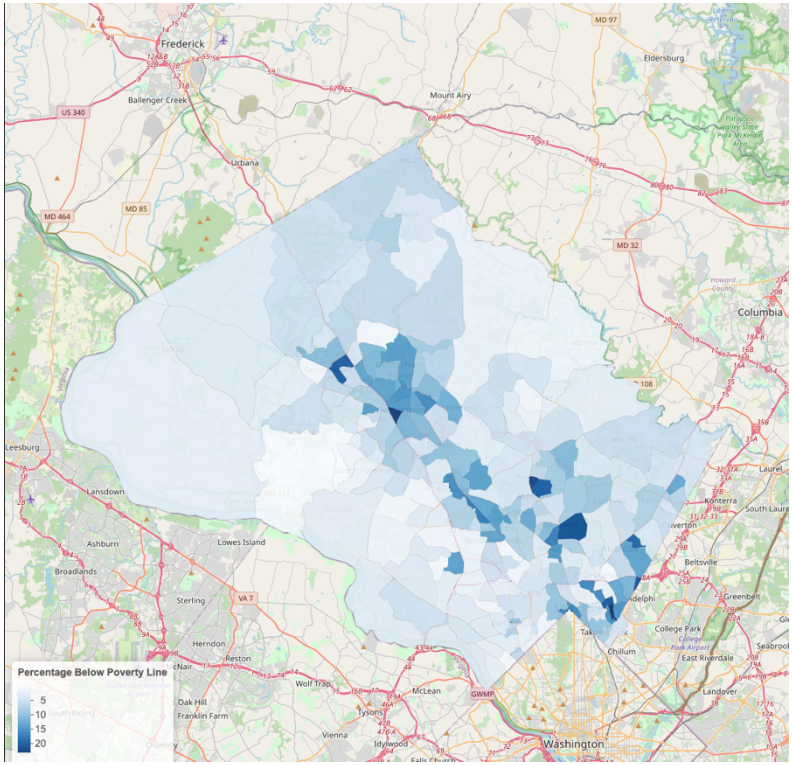
As is the unemployment rate:

	Percent
Native Hawaiian and Other Pacific Islander alone	8.1%
Black or African American alone	7.9%
Some other race alone	7.4%
Two or more races	7.0%
Hispanic or Latino origin (of any race)	6.1%
American Indian and Alaska Native alone	5.6%
White alone	3.7%
Asian alone	3.7%
White alone, not Hispanic or Latino	3.5%

These and other related characteristics create challenges for people seeking to pursue entrepreneurial activity within the county. These challenges may, for example, relate to financial constraints, physical access

to facilities and programs due to availability of transport, and language barriers for those whose first language is not English.

When the poverty data is mapped by individual census tract within the county, it is evident that those tracts that have the highest percentage of people who are living below the poverty line are in close proximity to the I-270 corridor in the center of the county, and to the south of Route 29 and between Route 200 and Route 586 in the southeast of the county, as shown in the map below:



Note: Additional maps relevant to other content in this section are provided in the Appendix to the report.

The distribution of the data is of interest given the locations of the three BIN Centers. Analysis of the distance that can be traveled from each center by road in specific time intervals shows that most of the areas with the highest poverty rates are within a 10- to 20-minute drive of at least one of the BIN Centers. These areas are also served by county bus routes and the Silver Spring Innovation Center is close to the Silver Spring Metro stop.

Mapping the census tracts to identify those that have the highest non-white population shows a similar, but not identical, pattern, suggesting that the three centers should be relatively accessible to the population in these areas.

Out of 1,711 VC deals identified in Maryland as part of this study, only three were identifiable as being companies founded by African Americans and only one was identifiable as being Hispanic / Latinx founded.

The interview program included representatives of a number of groups that serve minority businesses within Montgomery County, which highlighted a number of relevant themes.

- It would be very beneficial if minority entrepreneurs could access support in one location.
- If minority Chambers of Commerce and business associations were collocated it would also allow them to work together and learn from each other, and to leverage each other's resources to achieve more efficient operations.
- Many minority entrepreneurs work in industries where certifications are required and creating a single location where they could go to get

support and assistance with obtaining relevant certifications would save them time and money.

- There are often limited opportunities for minority entrepreneurs to network in a business context and being able to participate in managed network activities would be of great value to them.
- Having a shared location would also allow for technical assistance resources to be shared and be more widely available.
- Many minority entrepreneurs are engaged in small batch manufacturing of products such as hair and body care products, and also food. At present many of these are manufactured at home or in space that becomes available on an ad hoc basis. Having access to shared facilities for these kinds of businesses would have a number of benefits, including:
  - providing additional business training that could assist the businesses to grow to a larger scale,
  - ensuring that the products meet all relevant regulatory standards,
  - providing certainty to allow scheduling of production batches.
- Access to shared retail space could also assist entrepreneurs in the early stages of establishing a business.

The observation was also made the many entrepreneurs from underserved communities face challenges accessing child-care and it would be very valuable to facilitate the use of incubators and coworking spaces if they provided child-care.

The question of resources for artisans and other creatives was also raised (there are examples of maker spaces that include elements of business incubation, and some which also serve as locations for skills training, including OpenWorks in Baltimore).

The idea was also put forward of creating a center for facilitating international trade between immigrant entrepreneurs and their home countries. This could also serve to help the wider entrepreneurial and business community to access these markets. This was highlighted in particular in the context of trade with central and south American countries which are seen as growth opportunities by some established non-immigrant businesses. The idea of programs that facilitate these kinds of trade connections is not new but to create an incubator or accelerator with this focus could potentially create additional added value.

Nationally, immigrants create significantly more businesses than native born people - 57% more in 2019 (Source: Kauffman Foundation)

A further point raised was that it would be beneficial for there to be greater diversity among the support staff that are available in the existing incubators.

A further group that should be considered in the context of underserved populations is military veterans. From 1998 to 2008, a higher percentage of military veterans created businesses than non-veterans but since 2009, the reverse has been true, and the gap continues to widen (source: Kauffman Foundation, 2020). Programs such as Bunker Labs have a presence within Maryland but do not have a focus on Montgomery County. The Federal Government also operates programs such as Boots to Business, and a network of Veteran Business Outreach Centers but these kinds of programs need to be integrated into the wider ecosystem and promoted in order to get traction at the local level.

4 The Entrepreneurial Ecosystem

This section of the report presents an analysis of the entrepreneurial ecosystem as it currently exists in Montgomery County and calls on a body of data collected from a wide range of sources including a comprehensive interview program involving past and present clients of the BIN. A summary of the analysis is presented here, with the full body of data being provided separately in Appendix 1.

4.1 The Montgomery County Industry Base

There is a diverse population of companies active in markets and technology domains with massive growth potential, including but by no means limited to bioscience and information technology.

Key traded industry sectors that are vital to the health of the county economy have, however, lost businesses since the recession, including Manufacturing; Information; Finance and Insurance; and Professional, Scientific, and Technical Services. Businesses employing fewer than 20 people have been particularly hard-hit.

Advanced Manufacturing one of the County's target sectors. Manufacturing underpins many other industries, and also creates more indirect jobs than any other traded sector, but the number of manufacturing establishments has declined by 20% since the recession. Computer Systems Design and Related Services is the largest single subsector within Professional, Scientific, and Technical Services, but the number of establishments in the sector has barely returned to its 2007 level.

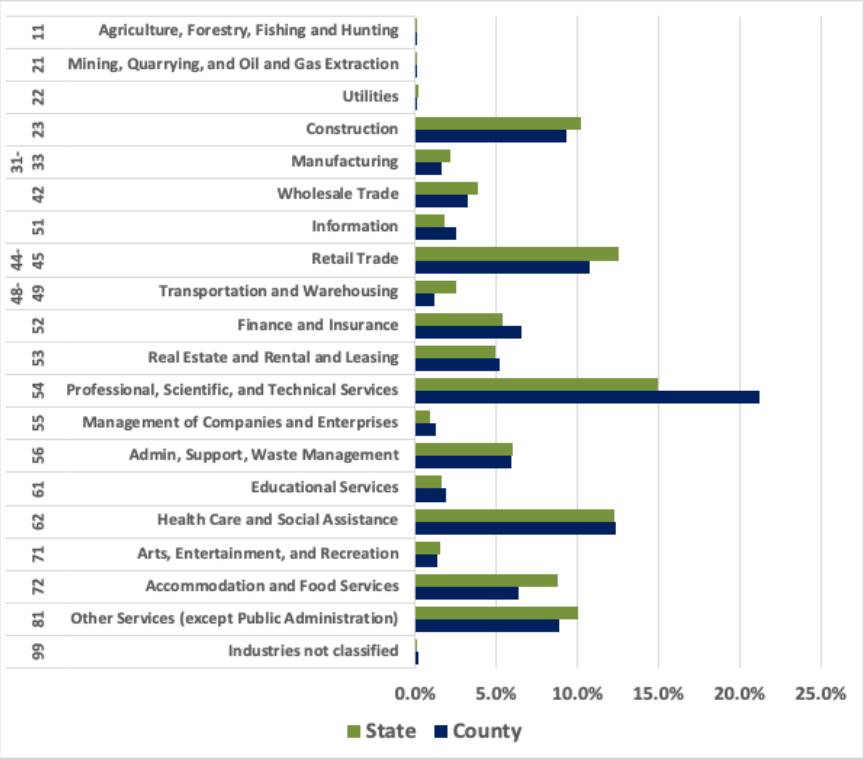
The creation of new businesses in these vital sectors will be necessary to sustain and grow them but there is limited support for them at the county level other than for bioscience.

Note: *The US Census Bureau, which is the primary source of data on businesses in the US, tracks the number of 'business establishments' rather than companies per se. A 'business establishment' is essentially a distinct business location. Consequently, the number of 'establishments' exceeds the number of businesses, but this only becomes relevant for larger companies that may have a large number of locations. For most for practical purposes, the number of establishments can be treated to be broadly equivalent to the number of businesses*

When looking at the population of companies in any location, it is important to bear in mind that almost all companies are what would generally be considered small. Nationally, more than half (54%) of all business establishments have 5 or fewer employees and 85% have 20 or fewer employees. Out of a total of 7,912,405 business establishments in the US in 2018, only 2.5% employ more than 100 people.

The population of business establishments in Montgomery County is shown in the chart below, expressed as the percentage of the total industry population represented by each primary NAICS code group. The chart also shows the equivalent data for the state as a whole.

The largest sector for both the county and the state in terms of the number of establishments is Professional, Scientific, and Technical Services. This sector is proportionately much larger for the county than for the state. The Information, Finance and Insurance, Real Estate Rental and Leasing, Management of Companies and Enterprises, Educational Services sectors are also proportionately larger but to a lesser extent. The Information sector includes producing and distributing information, processing data and providing the means to transmit or distribute these products electronically. Management of Companies and Enterprises includes holding companies, corporate offices, and headquarters offices.



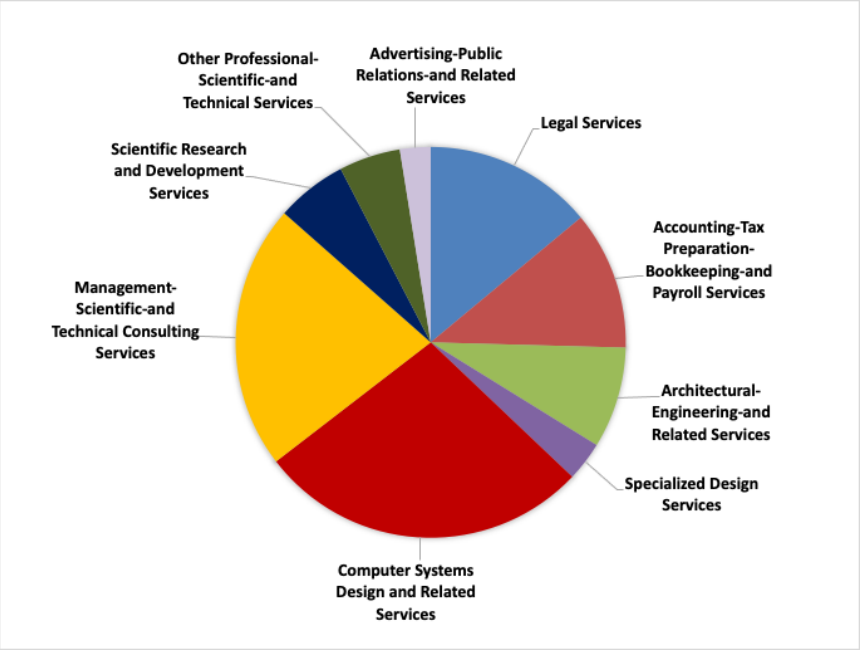
Industries are considered to comprise activities that are either 'traded' or 'local'. Local industries are those in which a majority of the activity undertaken takes place at a local level, essentially recycling money within the local economy. Traded industries are those in which the majority of activity undertaken extends beyond the immediate locality, bringing wealth into the location of interest.

Few, if any industries are 100% traded or 100% local, but the following list comprises those where at least 75% of the activity undertaken is considered 'traded'.

NAICS Code	Traded Sector Description
11	Agriculture, Forestry, Fishing and Hunting
21	Mining, Quarrying, and Oil and Gas Extraction
31-33	Manufacturing
42	Wholesale Trade
48-49	Transportation and Warehousing
51	Information
52	Finance and Insurance
54	Professional, Scientific, and Technical Services
55	Management of Companies and Enterprises
71	Arts, Entertainment, and Recreation

The Professional, Scientific, and Technical Services sector accounts for 21.2% of all establishments and 44% of all traded sector establishments in the county. Along with the Finance and Insurance and Information sectors, it accounts for 74% of all establishments in traded sectors and 30% of all establishments in the county, 43% of the total annual payroll, and 29% of employees. This contrasts with the data for the state as a whole for which the Professional, Scientific, and Technical Services sector represents only 15.0% of all establishments.

A further breakdown of the Professional, Scientific, and Technical Services sector (shown below) shows that its largest constituent is Computer Design and Related Services; followed by Management, Scientific, and Technical Consulting Services; and Scientific Research and Development Services. Together, these account for 55% of all establishments, 73% of the annual payroll, and 69% of employment in the sector.



It is clear from this data that a key foundation of the County's traded sectors comprises organizations undertaking work in scientific and technical disciplines, and that a significant proportion of that activity relates to businesses working with computer systems and information.

Manufacturing

Companies manufacturing durable goods produce the highest level of indirect employment per direct job, among all of the traded sectors and 43% more than the Professional, Scientific, and Technical Services sector, as illustrated in the table below.

Manufacturing also makes the second largest contribution to MD State GDP of the traded sectors, after Professional, Scientific, and Technical Services (*2016 data*).

Indirect Employment Per One Hundred Direct Jobs

		Indirect Jobs		
NAICS	Major Industry Group	Supplier	Induced	Total
22	Utilities	515.4	442.2	957.7
53	Real Estate and Rental Leasing	396.6	483.1	879.7
31-33	Durable Manufacturing	289.1	454.9	744.1
51	Information	252.0	321.1	573.1
31-33	Nondurable Manufacturing	184.8	329.5	514.3
54	Professional, Scientific, and Technical Services	142.1	276.2	418.3
55	Management of Companies	144.4	255.4	399.9
21	Mining	224.0	166.0	390.0
71	Arts, Entertainment, and Recreation	123.3	255.2	378.5
52	Finance and Insurance	149.7	214.7	364.4
48-49	Transportation and Warehousing	112.8	163.3	276.0
42	Wholesale Trade	107.3	128.0	235.3
11	Agriculture, Forestry, Fishing, and Hunting	93.6	134.8	228.5
23	Contstruction	88.0	138.1	226.1
81	Other Services (except public administration)	70.1	139.6	210.3
62	Health Care and Social Assistance	69.4	136.2	205.6
61	Educational Services	63.8	129.9	193.7
71	Accommodation and Food Services	53.8	107.4	161.2
56	Admin and Support Services and Waste Management	45.5	89.1	134.5
44-45	Retail Trade	46.7	75.4	122.1

Source: Economics Policy Institute, 2019 (utilizing data from the US Bureau of Labor Statistics)

Notes

1 *Supplier Jobs includes materials and capital services supplier jobs*

2 *Induced Jobs includes jobs supported by respending of income from direct jobs and supplier jobs, as well as public-sector jobs supported by tax revenue*

It is a notable characteristic of the county that it has comparatively few manufacturing companies. A comparison across all US counties shows that Montgomery County ranks 2,792 out of the 3,141 counties in the US for the number of manufacturing establishments per capita. Within Maryland, Montgomery County ranks 21st out of 24 on the same basis (neighboring Prince George's County ranks 23rd).

There are doubtless many factors that have led to this situation, but it is notable that out of 44 counties that have a population of more than 1,000,000, Montgomery County ranks 42nd and Fairfax County, VA ranks 43rd. The breakdown of industry sectors in Fairfax County is also broadly similar to that for Montgomery County.

The size or urban nature of the county do not appear to be determining factors of the presence of manufacturing companies, nor does the predominance of technology-focused companies – **Santa Clara County in the center of Silicon Valley, for example, has more than three times the number of manufacturing establishments per capita that Montgomery County has, 26 of which have more than 500 employees (and 11 with over 1,000 employees). Similarly, Middlesex County, MA which includes Cambridge and many Boston suburbs, has 2.8 times the number of manufacturing establishments per capita.**

The manufacturing sector is the only one in the county to have lost establishments across all sizes of company since the beginning of the recession in 2007 and has 20% fewer establishments overall. By comparison, the number of establishments in Professional, Scientific, and Technical Services has almost exactly the same number of establishments in 2018 as it did in 2007.

The loss of large manufacturing companies is notable, with eight establishments employing 250 or more people present in 2007 and none of that size in 2018. There were also 69 fewer manufacturing companies employing fewer than 20 people in 2018 than in 2007.

This loss undoubtedly reflects in part the overall contraction of manufacturing that occurred in the US during and following the recession (the data for the Maryland as a whole show a similar impact on manufacturing industry) but nonetheless represents a loss of local manufacturing capacity accessible to entrepreneurs seeking to develop manufactured products, and a less robust ecosystem for those seeking to create new manufacturing companies.

The historical factors that have led to the comparatively small population of manufacturing companies should not, however, be taken as determinative of the future. The emergence of new manufacturing technologies, increasing automation, and the deployment of Agile Manufacturing methodologies are likely to make the county more viable as a location for the creation of new manufacturing companies – particularly those that are at the cutting edge of new technologies. This could also be of broader value by ensuring that key elements of the value chain for other technology-intensive industry sectors in the county are available locally. Without local availability, companies will have to go elsewhere to access the supply chain capability and capacity they need.

Trends in the Industry Population

All economies experience an ongoing 'turnover' of companies – with some being lost to closures, acquisitions, and relocations, and new ones being formed on an ongoing basis. Similarly, in any given period of time, some companies will expand, and some will contract. The net result of these processes is an economy that either grows or contracts over time as a whole.

The data for Montgomery County shows that prior to the recession that began in 2007, more businesses were being created than lost but more businesses were contracting than expanding. During and immediately after the recession, the number of new businesses fell below the number being lost and at the same time, the gap between the number contracting and those expanding got much wider. By 2011, however, a more sustainable pattern emerged with business expansions exceeding business contractions, and new businesses being created in larger numbers than those being lost, although only by a small margin. A more complex picture exists within this overall pattern however, with three distinct groups of industry sectors being evident:

1) **Sectors in which the number of establishments have increased** even when using the year in which the recession started as the baseline. In all of these sectors, the number of establishments has increased by at least 10%. These are all sectors that are predominantly 'local' in nature.

2) **Sectors in which there was an initial decline in the number of establishments during the recession, but have subsequently experienced growth, exceeding the pre-recession level**. The Professional, Scientific, and Technical Services sector which represents a major component of the county economy is in this group but has only exceeds its pre-recession level in one year and in 2018 (the most recent year for which data is available), had fallen back to its pre-recession level.

3) **Sectors where the number of establishments has not returned to pre-recession levels**. By 2012, these sectors had lost from 8% to 12% of their establishments. Since 2012, some have recovered to an extent, but are still below pre-recession levels. **This group includes key 'traded' sectors including Manufacturing, Information, Finance and Insurance, Transportation and Warehousing, and Wholesale Trade.**

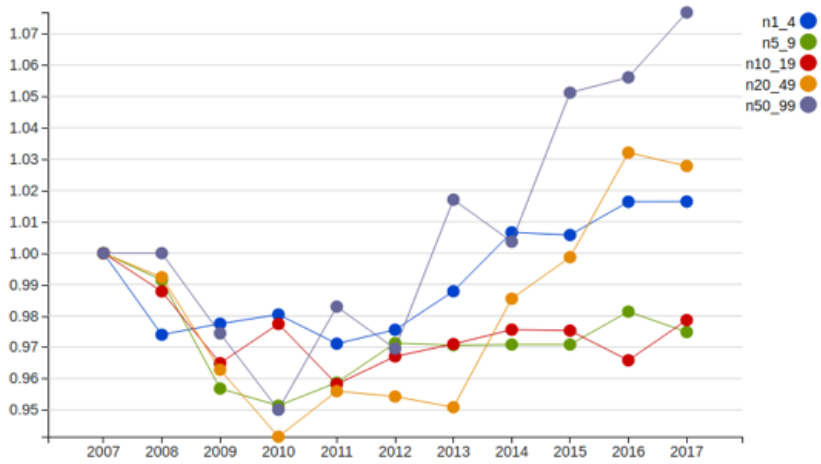
In addition to these differences between industry sectors, there are also differences in how the population of companies of different sizes changed since the beginning of the recession as shown in the chart below. Each line shows the data for a specific company size range from companies with 1 to 4 employees up to those with 50 – 99 employees.

The data show that there was a loss of establishments for all size ranges below 100 employees compared to their 2007 levels. For establishments with 20 or more employees, this decline continued until 2010 with the largest loss (6%) being for companies in the 20-49 employee range.

Although the 20-49 and 50-99 employee size ranges showed the largest declines, they also showed the largest subsequent increases, with the population in the 50-99 size range being 7.5% higher in 2017 than in 2007, and the 20-49 size range being 3% higher than in 2007.

The loss of establishments was not as severe for the employment size ranges below 20 employees, but the subsequent increases seen after the low point were also smaller, and **neither the 10-19 nor 5-9 employee size ranges had returned to their 2007 levels by 2017**.

While the 1-4 employee size range did recover to a level higher than in 2007, the size of this recovery was smaller than for the larger size ranges.



This pattern may be in part due to companies in larger size ranges downsizing and being counted in the smaller size ranges as much as the smaller companies actually being more resilient. Equally, the less marked recovery could be due to those establishments moving into a larger size range as the economy recovered.

Overall, it would appear that **smaller establishments have not recovered as effectively as the larger ones following the recession**.

Nonemployer Businesses

Per the US Census Bureau, "*A nonemployer business is one that has no paid employees, has annual business receipts of $1,000 or more ($1 or more in the construction industries), and is subject to federal income taxes.*".

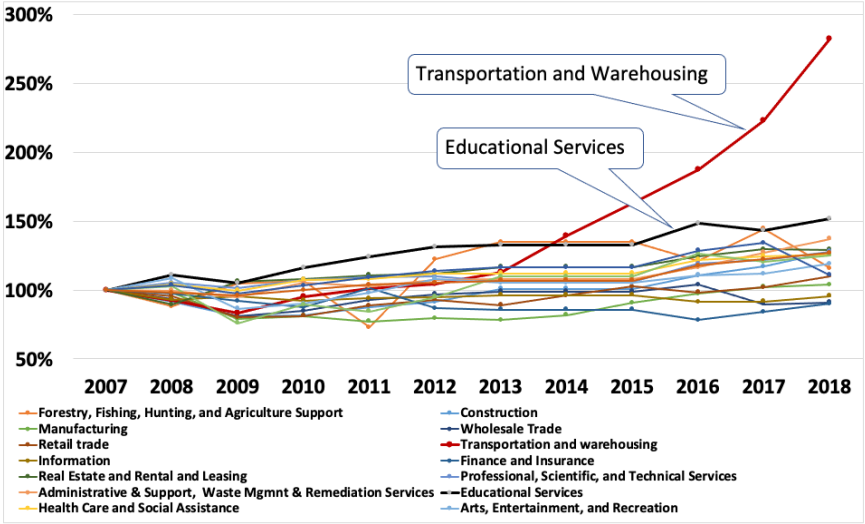
Most nonemployers are self-employed individuals operating very small unincorporated businesses, which may or may not be the owner's principal source of income.

In 2018, there were 118,612 nonemployer businesses in Montgomery County, contributing $6,239,072,000 to the county economy as shown below, broken out by industry:

Sector	Establish-ments	Receipts ($000s)
Forestry, Fishing, Hunting, and Agriculture Support	133	4,543
Mining	18	$1,870
Utilities	51	$5,363
Construction	9,192	$671,675
Manufacturing	726	$37,592
Wholesale Trade	1,028	$102,659
Retail trade	5,169	$257,170
Transportation and warehousing	15,020	$420,656
Information	1,892	$89,027
Finance and Insurance	2,916	$303,957
Real Estate and Rental and Leasing	11,491	$1,424,418
Professional, Scientific, and Technical Services	25,672	$1,519,833
Administrative & Support, Waste Mgmnt & Remediation Servic	9,459	$258,919
Educational Services	5,217	$94,568
Health Care and Social Assistance	12,799	$519,949
Arts, Entertainment, and Recreation	6,540	$159,312
Accommodation and Food Services	1,884	$64,468
Other Services (except Public Administration)	9,405	$303,093
	118,612	**$6,239,072**

Professional, Scientific, and Technical Services was by far the largest sector by number of nonemployer businesses with more than 25,000 businesses, generating over $1.5 billion (a quarter of all nonemployer revenue). This sector also has 70% more businesses than the next largest contributor (Transportation and Warehousing), although Real Estate Rental and Leasing, with fewer than half the number of businesses, generates almost as much revenue.

The most notable characteristic of the nonemployer businesses is evident when the number of businesses in each sector is plotted over time as shown in the following chart.



The chart shows that since 2012 there has been a 255% increase in the number of nonemployer businesses in Transportation and Warehousing This dwarfs increases in other sectors that would otherwise be notable – 26% in Accommodation and Food Services, 20% in Utilities, and 19% in Educational Services. **The increase in Transportation and Warehousing accounts for 45% of the total increase in the number of nonemployer establishments across all sectors** with Professional, Scientific, and Technical Services accounting for only 13%.

In terms of revenue, however, Transportation and Warehousing accounts for only 21% off the total, with Professional, Scientific, and Technical Services and Real Estate and Rental and Leasing accounting for 24% and 25% respectively.

Although the available data does not provide a more detailed breakdown, it would appear logical to assume that the massive increase in the Transportation and Warehousing sector is due in part to the growth of 'ride hailing' businesses, which has been one of the most notable factors in the emergence of the so-called 'gig' economy. This may also reflect an increase in online shopping generally, with more warehousing and increased volume for shipping companies.

It is also probable that some of the increases seen in other sectors are also attributable to the trend for companies to make use of independent contractors rather than employees. These contract workers are entrepreneurs in the sense that their work is considered a business for tax purposes, but their circumstances differ from what might be called 'Growth Entrepreneurs' who aspire to creating businesses with the potential for growth and job creation. This is not to denigrate those who are contractors in the gig economy, but to make a distinction that is relevant in an economic development context.

Transitioning from employment to being a contract worker does not in itself represent a net economic impact per se. The extent to which ride sharing, for example, has created new economic activity as opposed to taking work away from traditional taxi companies is not clear at this point, although some data is available that suggest that this is the case. The expense management company, Emburse, has reported that there was an increase in the use of ride-hailing businesses between 2014 and 2018 from 8% of journeys to 71%, accompanied by a decline in the use of rental cars from 55% to 23%, and from 37% to 6% for taxis.

4.2 Market Access

The population of established companies is a vital component in the entrepreneurial ecosystem, supporting local and regional value chain elements that can benefit entrepreneurs, assisting entrepreneurs with market access. The Department of Defense is also a highly accessible market for Montgomery County entrepreneurs with $3 billion of procurement contracts and $192 million of R&D funding going to county companies in 2019. There is, however, limited evidence of intentional activity at the county level to create or build connections between entrepreneurs and established companies.

Access to their intended market is critical for entrepreneurs from an early stage of the process for customer discovery, to understand the structure of the market, and to build key partner relationships. Market access can take place through advisors / consultants, large companies (who may, for example be potential partners, suppliers, or analysts).

Leveraging the available sources for market access requires proactive effort on the part of the entrepreneur. It can also be facilitated by strong personal networks and by organizations that provide relevant networking opportunities such as professional bodies, trade groups, industry-focused entrepreneur support initiatives, as well as participation in informal networking activities such as meetups. Facilitating these relationships is an important part of entrepreneur support organizations' role.

Montgomery County has a large population of established companies active in a wide range of different industries, many of which are headquartered in the county as illustrated in the chart below which shows sectors in which Montgomery County companies have been identified as being active:

Software
- Database Management
- Information Services
- Data Science / Data Analytics
- Data Mining
- Data Visualization
- Artificial Intelligence / Machine Learning
- Cloud Services / SaaS
- Mobile applications
- Augmented Reality
- Developer Tools
- Document Management
- E-Commerce

Education
- E-Learning
- Education Management Tools

Advanced Materials
- Fibers

Finance
- Cryptocurrencies
- Blockchain
- Payment Processing
- Investment
- Capital Management

BioHealth
- Therapeutics
- Vaccines
- Bioinformatics
- Clinical Trials
- Medical Devices
- Medical Diagnostics
- Nutraceuticals

Aerospace
- Defense systems
- Unmanned Aircraft
- Coatings

Robotics
- Autonomous Vehicles
- Telepresence Robots

Energy
- Clean Energy
- Energy Efficiency
- Energy Management
- Energy Transmission

Hospitality
- Hotels
- Restaurants
- Food and Beverages

Electronics
- Telecommunications
- Sensors
- Scientific Instruments
- Optoelectronics
- Remote Sensing
- Virtual Reality
- Consumer electronics

Communications
- Infrastructure

Insurance
- Health
- General

Industrial Equipment
- Additive Manufacturing
- Supply Chain Management

In some cases, the structure of the market is such that it is extremely difficult for a new company to get access to the customer. This may, for example, be because acquisition of new products and services is centralized (generally the case with supermarket chains), or because access to the end user requires an infrastructure of sales staff that is beyond the reach of early-stage companies. It might also be because established business practices create barriers to new entrants - such as selling necessary hardware to users at low cost as a means of generating revenue on consumables. In these cases, partnerships with established companies are vital.

The relationships that exist between county companies and Federal agencies also provide an excellent infrastructure which entrepreneurs can leverage to access the Federal market, whether this be for R&D funding or for the wider spectrum of products and services that the agencies procure to support their operations.

The Department of Defense (DoD) awarded procurement contracts with a value of $15.9 billion in Maryland in 2019, of which $3 billion was for contracts where the place of performance was in Montgomery County. A further $192 million was awarded to companies in the county for R&D projects. The National Institutes of Health also awarded contracts worth $2.4 billion to Montgomery County based companies, with an additional $296 million for R&D contracts.

4.3 Intellectual Property

The county is a powerhouse of IP generation, outstripping all other Maryland counties in absolute terms and on a per capita basis, with patents being granted across a wide range of technical sectors, with the largest number being granted in information technology fields.

Montgomery county has many companies operating markets where competitive advantage is dependent on the development of intellectual property (IP). Intellectual property can take many forms relating not only to technical inventions but also new business models and processes that may provide a competitive advantage. A variety of ways exist in which intellectual property can be legally protected including patents, copyright, and trademarks.

In some cases, companies also rely simply on keeping essential knowledge about their operation of their business secret. All of these can be relevant to entrepreneurs regardless of their chosen industry or market and may be a component in many different business models.

Insight into the base of intellectual property that is owned by individuals and organizations in the county can be gained through examination of data available through the US Patent and Trademark Office (USPTO). This shows that of all the counties in Maryland, Montgomery County has the highest number of patents granted to resident inventors, and this remains the case even when calculated on a per-capita basis (patents are granted to the inventors - even if their terms of employment require them to assign the rights to the patent to their employer, they remain the inventor).

There is also considerable breadth to the technical focus of the patents granted - an analysis of all patents granted to inventors resident in the county in 2017 shows that the technical domains covered spanned Information Technology (408); BioHealth (388); Chemicals (81); Measurement, Control, and Instrumentation (79); and Materials Science (60). A further 163 patents relate to other fields including optics, engines, textiles, and machine tools, reflecting the diversity of the county's business population.

The University of Maryland campus at College Park is also an excellent asset for the county with regard to intellectual property. In 2017, the College Park campus received $548 million in R&D funding and more than 100 patents were granted to College Park based inventors in 2018 and 2019. Many of the inventors on these patents will be residents of Montgomery County and may consider founding a business to turn their IP into commercial products and services in the county.

Maryland is also home to 74 Federal research laboratories (more than twice as many as any other state). In addition to undertaking cutting edge research and development programs that generate intellectual property, can provide access to facilities, equipment, and expertise relevant to a vast array of science and engineering disciplines that can be accessed by Montgomery County companies through collaborative research and development agreements (CRADAs) and other types of contractual arrangements.

4.4 Finance Infrastructure

There are many Venture Capital firms in the region and firms from other locations have made investments in the County. The availability of other forms of finance for the vast majority of entrepreneurs and early-stage companies, which do not fit the profile for equity investment, is limited.

Entrepreneurs face two primary challenges with respect to finance:

1) Generating the personal income necessary to commit the time to create, develop, and grow a business.

2) Accessing financing that will allow them to acquire the resources for the business to function.

Equity Finance

Contrary to general perception, and the high profile that such investments have, only 0.5% of entrepreneurs surveyed by the Kauffman Foundation received any kind of venture capital (from angel investors or venture capital firms).

It is also important to recognize that a large proportion of such capital is not invested in startup and early-stage companies. Data from the National Venture Capital Association shows that in 2019 less than half (42%) of all deals and only 7.4% of the total funds invested were with companies at this early stage of development.

Aside from the very small percentage of businesses that receive venture capital, VC firms tend to invest predominantly in a relatively small set of specific sectors. In 2019 61% of all venture capital went to companies in the following sectors: Software, Pharma and Biotech, Media, IT Hardware, Semiconductors, and Energy.

Geography is also important when considering access to equity funding - 49% of all VC deals, and 62% of the financial value of the investments, went to deals in West Coast or New England states. Maryland attracted only 1.3% of all deals and 0.7% of funds deployed.

Nonetheless, a significant number of angel and venture funds do exist in the Maryland, Virginia, and Washington DC. More than 800 firms have been identified that have made at least one investment in Maryland, and Crunchbase lists 101 venture funds and angel groups that are based in Maryland, plus more than 200 others located in Washington DC or Virginia. Maryland also ranks 12th out of all states for the number of deals per capita in 2019 (source: NVCA).

Since the passage of the Jumpstart Our Business Startups Act in 2012, a plethora of online equity funding platforms have been established such as FundersClub (fundersclub.com), SeedInvest (seedinvest.com), StartEngine (startengine.com), and AngelList (angel.co) that connect investors with investment opportunities. Many other platforms also facilitate project level funding, of which KickStarter (kickstarter.com) is probably the most well-known.

Other Forms of Finance

Data from the Kauffman Foundation, a leading foundation that conducts research into entrepreneurship, shows that personal savings are the largest single source of finance, with 64% of entrepreneurs relying on savings when starting their business. The next largest sources include business loans from banks or other financial institutions (16.5% of entrepreneurs), money from other individuals – generally referred to as 'Friends and Family' (13.2% of entrepreneurs), and personal credit cards (9.1% of entrepreneurs). A further 6.3% of respondents indicated that they used home equity loans or other personal loans. Grants were used by only 0.2% of the survey population. A separate study showed that 40% of initial startup capital was provided in the forms of bank loans and other credit. Small banks in particular are important in this context, as they may have more flexibility in loan decisions than larger banks and may have more of a reputational stake in the local community.

Montgomery County offers several financial assistance programs for county companies including targeted loan programs, such as for those businesses affected by certain redevelopment efforts but these would not be relevant to most companies.

The County's Economic Development Grant and Loan Program offers grants and loans to private employers who retain jobs or stimulate new job creation in the county, of up to $100,000 (higher for large scale projects). Given the trend towards companies being smaller, more geographically distributed, and making extensive use of outsourced services, financial assistance that is linked primarily to job creation is not necessarily of great benefit to many entrepreneurs.

Financial incentives are also offered to support businesses moving into the county through the MOVE program, which is based on the amount of business space leased by the company. This will not benefit entrepreneurs who are already based in the county, and again the link to the amount of physical space leased rather than any other factors is not necessarily of significant value to many entrepreneurs.

A matching grant is also is available for recipients of NIH SBIR/STTR awards, which will be of value to a small population of entrepreneurs but might have much greater impact if it applied to all federal agencies and

not just the NIH, particularly as the DoD is a much larger source of SBIR and STTR funding than the NIH.

Tax incentives are available for companies in the biotechnology and cybersecurity industries, although greater impact might again be achieved if this were broadened to include other technology domains or sectors such as advanced manufacturing, robotics, and autonomous systems. With the exception of tradable tax credits, tax incentives also tend to be of less value to early-stage companies than other forms of support.

The county also offers a microloan program with links to two county-contracted microloan providers, and three community banks have received funding from the county for loans to small businesses.

4.5 Management Expertise

A large pool of management expertise in the county with *Management, Business, and Financial* being the largest occupational employment category. There are also state-level programs that provide access to mentors. UMD has excellent management training resources and is the regional hub for the National Science Foundation I-Corps program. There is, however, limited evidence of activity leverage these resources or to create local programs to develop the management capability of county entrepreneurs at the county level.

Acquiring the necessary management resources to effectively start, develop, and grow a company is one of the biggest challenges for entrepreneurs. The range of necessary roles that must typically be addressed in order for their business to succeed include: Strategy Development, Operational Planning, Financial Planning and Management, Investment, Supply Chain Management, Management of Distribution Networks, Legal Affairs including intellectual property management, and Human Resources. There are also likely to be additional requirements for expertise in on both generic and industry-specific fields, including managing product development projects, quality control and quality assurance, managing production of physical products, and / or managing the delivery of services. Some of these required skills are generic and some are industry specific.

While many entrepreneurs may have experience in one functional area, few are likely to have the senior executive management experience to be able to coordinate activity across all necessary fields and to judge when and how to seek additional resources with limited funds. Few companies are founded with a team of more than two or three entrepreneurs, and many are founded by a single individual. **These challenges are a significant contributor to the failure of many early-stage companies**, resulting, for example in products being developed for which market demand has not been established, crises due to inadequate planning and / or management of financial resources, or inability to transition products from prototype to production effectively, to name but a few.

There are three broad solutions to these challenges:

- Bringing in partners with key essential management skills
- Accessing mentoring support and establishing flexible relationships with sources of essential management expertise that provide access without having the cost of hiring full-time staff
- Focused management education programs with a short duration that can provide essential skills and insights

Management expertise will be resident in existing companies (particularly those that are seen as leaders in their sectors), in business schools, and in other organizations such as trade and industry associations. Montgomery County is second only to Howard County for the percentage of employment in Management, Science, and Arts Occupations (more than 50% in both counties) and the breadth of the county's industry base suggests that there is a pool of management expertise relevant

to most startups and early-stage companies. Beyond the county itself, neighboring jurisdictions in Maryland, DC, and Virginia provide access to an even larger pool of resources, within workable distances and travel times – as evidenced by the fact that, at present, more people commute into the county for work than both live and work there.

There are also existing programs accessible to entrepreneurs within the County that operate at the state level including the Maryland Technology Council (MTC) Venture Mentoring Service, SCORE, and informal networks.

While there is often skepticism about whether entrepreneurship can be taught, it is certainly the case that tools, and methods can be taught that assist entrepreneurs with the planning and management of companies. The University of Maryland at College Park is the lead organization in the delivery of the National Science Foundation (NSF) I-Corps accelerator program, which has led to the creation of a number of similar programs within the region. Considerable expertise in the management of entrepreneurial ventures also exists within the Smith School of Business Dingman Center. Not only does the College Park campus offer facilities and programs specifically targeted at supporting entrepreneurship, but it also provides a supply of highly qualified students across a wide range of disciplines, including the Dingman Center for Entrepreneurship.

At present however, the mechanisms to identify appropriate educational options and make connections with these kinds of resources for entrepreneurs in the county are largely informal and do not appear to be addressed in any systematic way within the BIN network or elsewhere within the county.

There is no evident accelerator, management training / development, peer-mentoring, or other programs associated with the BIN. While some clients have received mentoring from the MTC program, this did not appear to be widely promoted (or necessarily available).

4.6 Workforce

The county has a high-quality education system, and ready access to the resources and graduates of UMD College Park. The Universities at Shady Grove has established a new Laboratory for Entrepreneurship and Transformative Leadership which will assist students in gaining entrepreneurial experience, as well as providing expertise to local companies.

Assistance for companies to identify, manage, and train their workforce is also available through Worksource Montgomery.

Computer, Engineering, and Science represents the second largest occupational employment category in the county, although these occupations are among those in highest demand across the state and competition for those workers is likely to increase, and in some cases, Federal agencies are competing for highly qualified workers, creating additional challenges for entrepreneurs and early-stage companies.

Access to a workforce with skills appropriate a company's needs is critical to its success. The skills present in the workforce are dependent in part on the local educational infrastructure and on the extent to which companies themselves provide training.

Workforce availability also depends on factors such as the unemployment rate and the labor force participation rate. The most recent data from the US Census Bureau shows (for 2018) the unemployment rate for Montgomery County as 4.9% - higher than for Howard County (3.8%) but lower than Prince George's County (6.7%) and Baltimore County (5.2%).

The labor participation rates for the equivalent period were closely similar at 71.5% (Montgomery), 71.5% (Prince George's), 71.9% (Howard County), and 66.2% (Baltimore County).

Neither the unemployment rates nor labor market participation rates would indicate that Montgomery County would be subject to pressure at a local level from workforce availability.

The cost of living (*Source: Economic Policy Institute*) in Montgomery County is closely similar to that of neighboring Howard County, and approximately 10% lower than nearby Loudoun, Fairfax, and Arlington Counties in Virginia. Frederick County has a lower cost of living but salaries in Montgomery County are proportionately higher than in Frederick and would compensate for the difference, suggesting that the cost of living would not directly impact on worker's choice of location among Montgomery County and its Maryland neighbors.

The Universities at Shady Grove campus in Rockville, and the presence of UMD College Park are significant assets for the county in workforce context, providing a supply of well-qualified graduates across a wide range of disciplines. The newly established USG Lab for Entrepreneurship and Transformative Leadership at the Universities at Shady Grove will also support the development of an understanding of entrepreneurship within the student population and will more broadly seek to work with Montgomery County entrepreneurs and companies to help them define key problem areas and challenges and provide teams drawn from USG to assist with addressing them.

The Maryland Governor's Workforce Development Board (GWDB) has developed a list of six proposed target industry sectors for workforce development in Maryland based on research conducted by the Division's Labor Market Information Team. The target sectors include Healthcare, Information Technology/Cybersecurity, Manufacturing, and Life Science, all of which are relevant to the Montgomery County economy.

GWDB also identified nine categories of occupation in which growth is anticipated, and of which seven are also relevant in the present context: Management; Business and Financial Operations; Computer and Mathematical; Architecture and Engineering; and Life, Physical, and Social Science Occupations.

Those professions in highest demand at the state level (based on 2017 data) were:

- Healthcare Practitioners and Technical Occupations
- Computer and Mathematical Occupations
- Management Occupations
- Sales and Related Occupations
- Office and Administrative Support Occupations
- Architecture and Engineering Occupations
- Transportation and Material Moving Occupations
- Business and Financial Operations Occupations
- Food Preparation and Serving Related Occupations
- Installation, Maintenance, and Repair Occupations

Worksource Montgomery exists to link local and regional economic development and workforce development activity within the County. It provides a wide range of services to assist employers with developing and retaining their workforce, planning their workforce needs, and recruiting, and screening job applicants.

While Federal Laboratories provide a population of scientists and engineers, their roles are mission-driven, and do not provide the same scope for blue-sky research as does a university. Nor do they have the scope to create broadly-based training and infrastructure for entrepreneurship and lack the wide range of research relationships that exist between universities and colleges that can lead to new economic activity.

Many of the companies interviewed also said that they faced challenges competing with the NIH for high caliber scientists and technicians.

Montgomery County has the largest public-school system in the state, and the 14th largest in the US, with 165,267 students in 208 schools (*2019 data*). It is home to four of the top five ranked public schools in Maryland (*US News*). The student population reflects the diversity of the county population,

Although 2018 data from the US Census Bureau places the county second behind Howard County, and also behind the national average for several minority groups (although not for Black / African American, Asian, or Hispanic minorities), levels of educational attainment in Montgomery County are generally high, with a graduation rate of 88.4%. The school system has also received 41 National Blue Ribbon Schools awards.

4.7 Culture of Innovation

The extent to which technical innovation and openness to innovation in a business context are embedded within the community will influence levels of entrepreneurial activity and the competitiveness of new companies. The high levels of patent activity and SBIR / STTR awards suggest a strong culture of technical innovation, and the county is home to some new high growth innovative companies as well as many established ones.

The County has a population of highly innovative residents as evidenced by the high number of patents granted per capita to county residents. and by the number of Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) awards.

A further indicator of the scale and scope of the level of innovation within the county is provided by examining SBIR and STTR awards to county companies. These are awarded by Federal agencies to "*strengthen the role of innovative small business concerns in Federally-funded research and development (R&D)*" and have been a vital source of funding for many startups and early-stage companies. In 2017, 57 Montgomery County companies received a total of 137 SBIR or STTR awards, with an aggregate value of over $49 million. The funding was awarded by eight different federal agencies of which the Department of Defense ranked first in the total value of the grants awarded, followed by the Department of Health and Human Services.

Montgomery County is home to NIST, NIH, the Uniformed Services University (USU), the Henry M Jackson Foundation for the Advancement of Military Medicine, a campus of the Walter Reed Army Medical Center, and the Naval Surface Warfare Center, Carderock Division. The missions of these organizations are founded in innovation, and also contribute to a culture of innovation in the county.

While the UMD College Park Campus is not located in the county, it lies only two miles beyond the county line, and with more than $500 million of research funding being expended each year, the university undoubtedly contributes to a culture of innovation within the county, not only in the context of technical innovation but also in the exploration of new management practices and business models.

Neither the county nor the region have had the same success in generating large numbers of high growth, innovative companies as some other US locations. The county does nonetheless have a population of such companies including Homesnap (Real Estate), Talex (Human Resources), DecisionPoint (IT Services), Vigene Biosciences (Gene and Cell Therapy), and Xometry (Industrial Equipment).

Many established innovative companies also have a presence in the county including Gilead Sciences, GSK, AstraZeneca (all bioscience), Honest Tea (Beverages), Lockheed Martin (Aerospace), Broadsoft (Telecomms), GSX (Information Management), Hughes Network Systems (Telecomms), Bethesda Game Studios (Computer Games), Hyperoffice (Software), Choice Hotels International (Hotels), and CuriosityStream (Entertainment).

4.8 Entrepreneurial Culture

The county has more than 145,000 registered businesses of which approximately 19% have employee. While most of these businesses are very small (with average revenues of $43,000) they do allow more than one in seven adults in the county to be economically active outside of being an employee and indicate a high level of entrepreneurship in the county, although the county ranks 4th in the state for companies per capita.

From an economic development perspective, the challenge for the county is to ensure that pathways exist for all new entrepreneurs to become active, and that those with the highest sustainable growth potential are supported effectively. To achieve these goals a much more comprehensive approach to supporting entrepreneurship is required.

The presence of an entrepreneurial culture can be inferred by the number of people in the county who create businesses each year. Data from the US Census Bureau shows that Montgomery County is the source of 21% of all new businesses in Maryland (2016 data). When viewed on a per capita basis, however, the county ranks 4th.

At the level of individual industry sectors, the county only has the highest per capita rate for two sectors: Management of Companies and Enterprises, and Educational Services.

Of 36 business events identified in the region in October 2020, many of which included entrepreneurship or entrepreneur in their title, and two were in Montgomery County. The count for Baltimore and Montgomery County's adjacent neighbors was as follows: Baltimore (8 events), Washington DC (17 events), Fairfax County, VA (8 events), and Frederick County (1 event).

Montgomery College runs a number of programs for small businesses and entrepreneurs, and the Universities at Shady Grove has a new entrepreneurship center (mentioned elsewhere in this report). Montgomery County Public Schools offer a high school course in Entrepreneurship and Business Management and in 2019 ran a Business Pitch Challenge for students.

There is media coverage of significant events involving large companies such as business expansions, real estate transactions, or investments but these are not necessarily focused on elements of entrepreneurship but there do not appear to be any awards or programs recognizing the achievements of entrepreneurs in the county.

Overall, while there is clearly an ongoing level of entrepreneurial activity, from an economic development perspective, the challenge for the county is to ensure that pathways exist for all new entrepreneurs to become active, and that those with the highest sustainable growth potential are supported effectively, and to create a brand for the county as a center for entrepreneurial activity and an engine for the creation of high growth companies. To achieve these goals will require a much more comprehensive infrastructure to support entrepreneurship.

4.9 Physical Infrastructure

The regional transport infrastructure provides excellent access to other locations nationally and internationally. There is also a supply of office space and light manufacturing, although rental rates are high. More than 40 coworking centers exist within the county providing a valuable resource for entrepreneurs, but resources for entrepreneurs working in technical fields are limited other than wet labs for bioscience companies.

The potential should be explored for providing dedicated resources relevant to other technical domains such as computational biology, advanced manufacturing, robotics, and autonomous systems as a means to bring entrepreneurs in these fields together and provide appropriate support to them.

There is also scope to provide broader support for small-scale manufacturing and other resources relevant to currently under-served populations.

Physical infrastructure, in the form of power, telecommunications, water and sewerage, transport infrastructure, and buildings that meet the needs of the business, is as important for entrepreneurs as it is for other businesses. High quality internet connectivity in particular is now essential for most types of business given the widespread use of outsourced services that are provided via the internet. Outsourced services include basic functions such as supply chain management, product distribution, order processing, payment processing, and business accounting.

Broadband internet connectivity is widely available within the county. Data from BroadbandNow (broadbandnow.com) shows that 98.8% of county residents have access to a connection with bandwidth of at least 100 mbps, with multiple competing providers.

The transportation infrastructure available to county residents is also very good, with direct access via I-270 to the i-95 corridor that provides road access to the entire East coast, and westward via I-81 which connects to the major I-40 and I-70 east-west routes. Washington Dulles, Reagan National, and Baltimore-Washington International airports provide domestic connectivity across the US and international flights to most other countries. The main East coast rail line also runs through Washington DC and Baltimore, providing high speed passenger service north to New England. The Port of Baltimore is also a major hub for domestic and international shipping providing access to global transportation networks. The county also has access to the Washington DC metro which provides both local transportation and connectivity to other rail and air transportation hubs.

There is a large supply of office/warehouse space in the county and year-end 2019 data shows vacancy rates at 8.6%, although this is lower than in neighboring Frederick and Howard counties, and rental rates are comparatively high ($13.97 for office / warehouse space compared to $6.74 in Frederick County, and $6.47 in Howard County).

The same data shows the vacancy rate for Class A office space in the county at 12.0% compared to 5.4% in Frederick, and 8.6% in Howard County, although average rental rates were again high – $32.41 in Montgomery vs. $27.53 in Howard, and $21.95 in Frederick. More concerning from the perspective of entrepreneurs is that there is very little office space available for sublet (which may be on more flexible terms than a regular lease), although the same is true in Frederick and Howard Counties.

The Montgomery County Economic Development Corporation (MCEDC) web site shows 39 locations in the county offering coworking space and / or small office space, which the BIN innovation centers also offer. The wet lab space available at the Germantown Innovation Center is unique – while there are other wet lab spaces available on a regular

commercial basis (most notably from Alexandria Real Estate), this is generally on a scale larger than necessary for startups and early-stage companies.

There is a lack of other kinds of specialized resources such as prototyping facilities for electronics and machined products, cybersecurity test facilities such as those available at Dreamport in Howard County, or any kind of incubator for food and beverage companies (although the web site Kitchen Door does show commercial kitchen space available within the county).

4.10 Support Infrastructure

The infrastructure to support entrepreneurship in the county is limited beyond the physical facilities provide by the BIN Centers, and the Silver Spring and Rockville Centers offer little that is not available in coworking centers.

There are few coordinated support services for entrepreneurs at the county level in the form of curated or managed networking, training, education, access to shared equipment, and other specialized resources.

At the **national level**, the Federal Small Business Administration (SBA) funds a network of Small Business Development Centers, which in Maryland is operate by the University of Maryland. The MD SBDC program operates through five regional offices, the closest of which to Montgomery County is located at the UMD College Park campus.

Other Federal programs focused on small businesses are also available across the state, including the DoD Procurement Technical Assistance Centers (PTACs) that assist companies wishing to sell to the Federal government, and is also operated out of the College Park campus.

The National Heart, Lung, and Blood Institute (NHBLI) which his part of the NIH runs a program through its Office of Translational Alliances and to coach entrepreneurs seeking to commercialize technologies relevant to its mission. The National Cancer Institute also participates in this program.

At the **state level**, Maryland offers a wide range of tax credits, grant program, loans, loan guarantees, and training grants, some of which are industry-specific rather than being targeted at early stage and growth stage companies, but most are available to them. The state also offers investment funds and a range of other support and advisory services through TEDCO.

The Maryland Department of Commerce has staff focused on specific industry sectors including bioscience, aerospace, cybersecurity, and defense, and also recently created the post of Entrepreneurship Director to focus specifically on attracting and retaining early-stage companies in Maryland and facilitating connections between them and available resources within the state. The Department of Commerce also operates the Maryland Defense Technology Commercialization Center (DefTech) that assists companies in partnering with DoD research laboratories in Maryland to commercialize new technologies for both defense and civilian markets. The state also offers a program through the MD Department of Human Services called Public Assistance to Entrepreneurship (PA2E) which "provides entrepreneurship training for customers with ideas and talent, who are in pursuit of their entrepreneurial dreams of starting a small business while supporting their families".

The University of Maryland also offers programs and other resources focused on entrepreneurship and technology transfer, including the NSF I-Corps program for which the university is the central node for the mid-Atlantic region. There is also a spin-off program from I-Corps called FedTech which is focused on technologies available from the Department of Defense.

There is **limited evidence of support that is distinctive to Montgomery County** as opposed to that which it generally available throughout the state, **or of any broadly-based approach to leveraging other resources available with the county, region, or state in a systematic way to benefit county entrepreneurs.**

The County does offer a range of assistance to companies through the county Economic Development Corporation (MCEDC) and also operates the BIN centers. The focus of much of this support, however, is on physical infrastructure, business licensing, and related subjects rather than on the development of entrepreneurial skills, management expertise, or access to other specialist resources.

BioHealth Innovation (BHI) which is located in Montgomery County provides a range of services for entrepreneurs seeking to develop new bioscience companies focused on the healthcare market, leveraging a range of resources including the BIN network, Alexandria Real Estate's Launch Labs program, and its own incubation program. BHI also operates an investment fund.

Bethesda Green, located in Bethesda, works to address environmental challenges locally by creating a sustainable, green community, built collaboratively through citizen engagement, environmental education, government partnership and innovative business development. Bethesda Green also offers an innovation lab and an accelerator.

The Montgomery County entrepreneurial ecosystem exists within a wider regional ecosystem that includes neighboring counties in Maryland and Virginia and across the mid-Atlantic region. While some of these locations are to a degree competing with the county in an economic context, in practice, experience has shown that most entrepreneurs will choose to locate their business relatively close to home and will not do so further afield unless there is a specific resource in another location that is considered to be of significant value to the business and no alternative is available close to where they live. They may nonetheless leverage resources and partners in other parts of the regional ecosystem for specific purposes. In this sense, these regional resources become force multipliers for those that are available in Montgomery County.

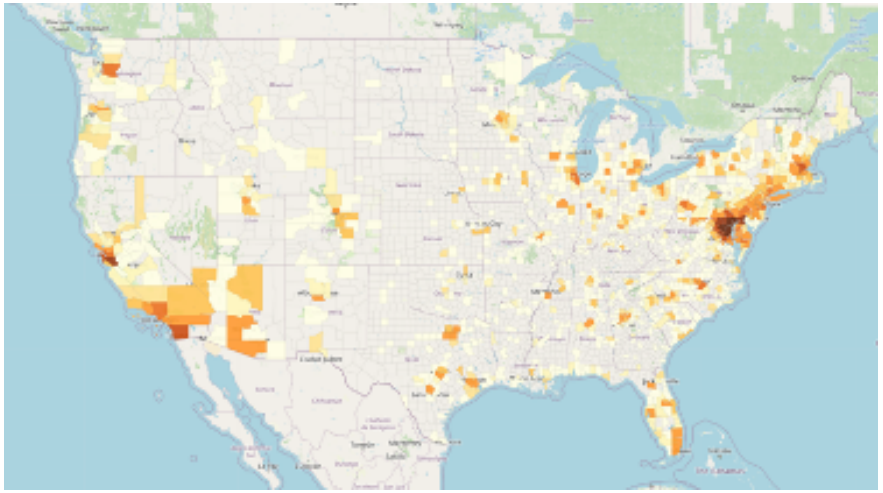
There is a plethora of resources available within Baltimore that could be of value to Montgomery County entrepreneurs in this context, with a total of 17 identifiable initiatives the purpose of which is specifically to provide support for entrepreneurs in some form.

Similar counts for other Maryland counties are as follows:

- Ann Arundel County (1)
- Frederick County (3)
- Baltimore County (including BWTech the UMBC tech park)
- Howard County (3, including specialist initiatives focused on information technology cybersecurity and)
- Prince George's County – 2, including an incubator
- Charles County – 2 including a collaborative development center for companies engaged with DoD, and two program programs focused on commercializing DoD technologies
- St. Mary's County – 2 including two programs focused on commercializing DoD technologies
- Talbot County – 2 including an accelerator and tech commercialization support focused on agriculture, clean energy, and environment
- Washington DC – 17 including culinary incubators, a fashion incubator, makerspaces, and various accelerator programs

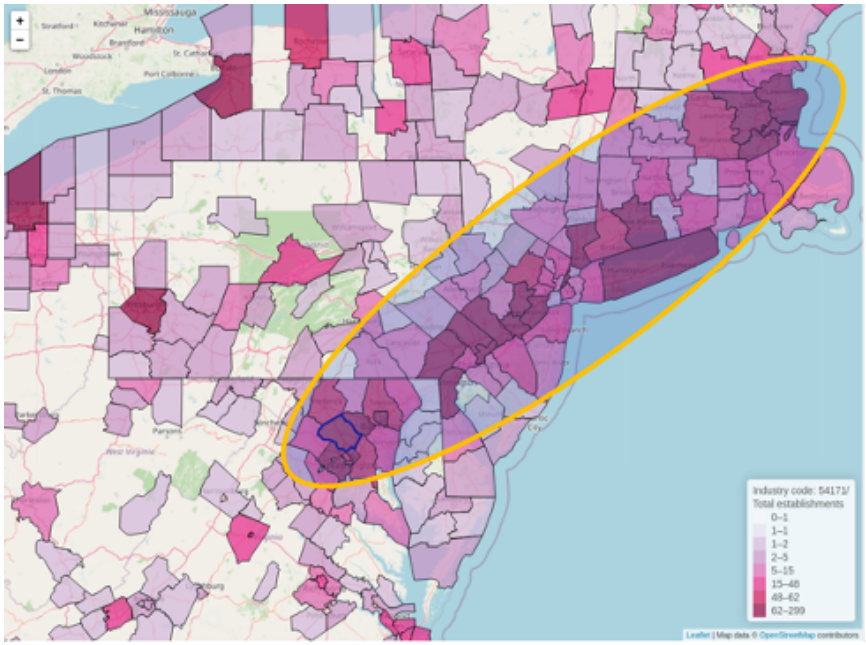
4.11 Leadership and Networks

It is the connectivity that exists within ecosystems that make them more than just a collection of resources or assets. There is evidence of extensive networks in a technical context, which also link to other regions of the country, but there appears to be very little formal or informal networking activity focused on entrepreneurs within the county driven either by the public or private sectors. Also, no online portal exists to serve as a conduit for information and connectivity between entrepreneurs in the county



Given their role as sources of funding with a national focus, many connections will exist between the Federal agencies in Montgomery County and other locations, and at the individual level there is clear evidence of connections with other locations. The chart below shows the locations of co-inventors on patents for which a Montgomery County resident is an inventor.

Some of these links also extend internationally. One point of note evident in the map is that there is a corridor that runs from the county to New England in which there is a concentration of co-inventors. This is not incidental – the second map, below, shows the geographical distribution of employers in NAICS Code 54171 (Research and Development in Physical, Engineering, and Life Sciences) in which the same pattern can be seen.



Mapping the connections between individual companies is possible but is beyond the scope of the current study. It is reasonable to assume, however, that many such links do exist given the extent of connections at the individual level. Many of these connections also include some of the country's leading academic institutions.

At the local level within the Montgomery County ecosystem, the evidence of strong networks is less compelling – there is limited evidence of networking groups focused on entrepreneurship within the county and many of the companies interviewed for the study appeared to be unfamiliar with other organizations that might be relevant to them. Several specifically expressed the view that they needed help to network with such organizations.

4.12 Government and Regulatory Environment

There is little in the county that distinguishes the environment for entrepreneurship from other jurisdictions in a regulatory context or with respect to specific forms of assistance, beyond some specific incentives exist in relation to bioscience companies.

Through the Small Business Administration, the Federal government defines what is considered to be a small business at the level of individual 6-digit NAICS codes using revenue and / or number of employees as the criteria. In some industries, a company can have as many as 1,500 employees and still qualify as a small businesses and in practice, almost all businesses qualify. This provides access to a wide range of funding programs operated through various Federal agencies including the SBIR / STTR program, and loan guarantee programs operated directly through the SBA.

Although the Jumpstart Our Business Startups Act of2012 took a long time to be translated into practice by the Securities and Exchange Commission (SEC), there are now many online platforms that are available to entrepreneurs and early-stage companies through which they can pursue investment and loan funding, and a much broader range of investors can access them, including individuals who would not previously have qualified as accredited investors.

Of the billions of dollars, the federal government awards each year, the government's goal is to award at least 23% of those to small business, which, despite the comments above, can in some industry sectors provide a concrete benefit to early-stage companies.

Many federal, programs also exist that give minority entrepreneurs and those from other disadvantaged groups additional status over and above the small business designation, and many federal agencies have requirements for participation in contracts by these groups beyond any general small business participation requirements.

It is beyond the scope of the present study to undertake a detailed analysis of all relevant factors of "business friendly" rankings, in which, depending on the particular perspective being focused on, states may score high or low. For example, the Tax Foundation ranks Maryland #41, while a ranking produced by CNBC that claims to evaluate 60 different measures, puts the state at #31, and Forbes magazine places it at #34, whereas the US Chamber Foundation has created a ranking of 'Enterprising States' that places Maryland anywhere from #1 to #25 against specific metrics.

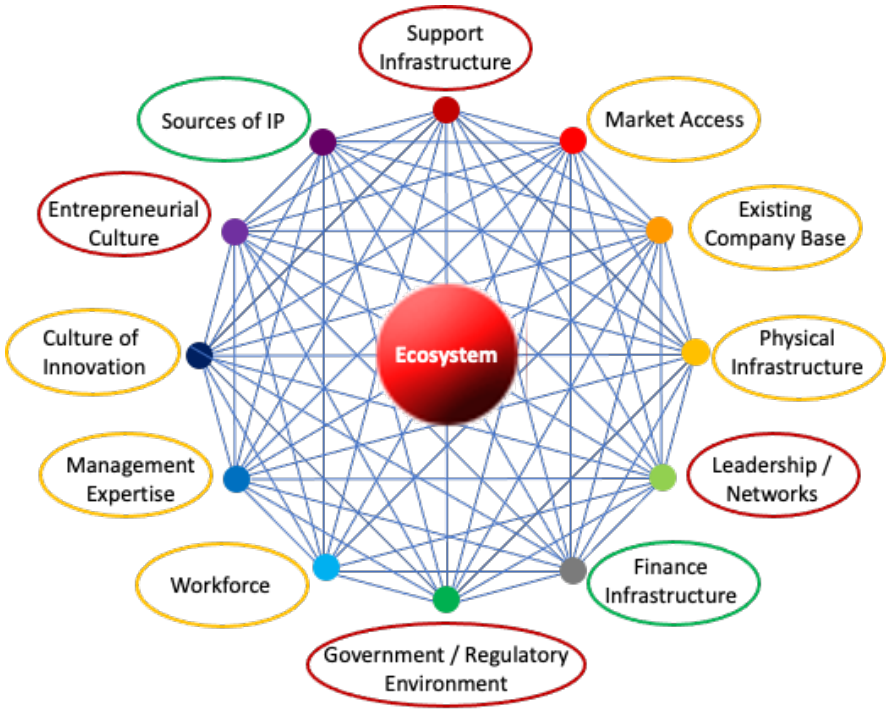
A detailed comparison of county tax rates has not been undertaken, but data from the Maryland Open Data Portal (opendata.maryland.gov) shows that Montgomery County has the lowest business personal property tax rate of the 17 Maryland counties that levy such a tax (out of 23 counties plus Baltimore City).

Many of the sources of technical innovation in the county are Federal agencies, and there are restrictions on Federal Agency staff making use of intellectual property developed through their employment. This has been noted by many organizations, including the Federal Laboratory Consortium as a barrier to entrepreneurship. Similar constraints do not generally exist in universities (although there may be procedures that have to be followed to avoid the perception of a conflict of interest).

4.13 Summary

There are strengths in many of the components of the entrepreneurial ecosystem in Montgomery County. In some cases, these are offset by evident weaknesses and those areas are marked with a yellow ellipse in the chart below.

There are also three areas in particular where the strengths outweigh the weaknesses to a significant extent, and these are marked by a green ellipse. Areas where the weaknesses outweigh the strengths are identified by a red ellipse.



These assessments are necessarily subjective but are based on the information provided in each subsection of the text. As noted in the introduction, they provide a basis for considering where action could be taken to further develop the ecosystem.

The primary areas that the analysis suggests warrant attention are those that relate to the presence and strength of connections within the ecosystem and the extent to which the County provides a broadly-based framework of support for entrepreneurs across multiple industry sectors that have the potential to generate significant economic impact for the county.

Other locations in the state also have a focus on entrepreneurship, including Frederick, Howard, and Baltimore counties, and also Baltimore City. The city is possibly the most distinctive of these as there are multiple organizations and individuals in both the public and private sectors actively developing and supporting the development of the entrepreneurial ecosystem, as is the case in most thriving ecosystems. Baltimore also has a strong emphasis on bioscience which in some senses can be considered to be changing the locus of activity within the state in that sector.

The decline in the number of establishments in key traded sectors in the county should be a cause for concern, but there is considerable scope to act to stimulate and support entrepreneurial activity that has the potential to generate new companies with growth potential across a wide range of technology domains and markets, many of which are represented by existing companies, but are more likely to generate economic development impacts on a larger scale if there is a broadly-based coordinated effort to develop and strengthen the ecosystem.

5 Conclusions

The conclusions drawn in relation to each of the following topics are discussed in this section:

- Effectiveness and necessity of the County's incubators to meet County goals.
- Ability of innovation centers to respond to current and future market needs and gaps.
- Management options for existing facilities
- The positioning of the program
- The focus of the program
- Target clients
- The Environment / services to be provided
- Policies and programs
- Resources

Each topic is subsequently addressed from the perspective of the proposed strategy in the Recommendations section of the report.

5.1 Effectiveness to meet County goals

IN 2019, the county formally adopted an Economic Development Platform document comprises four pillars:

- Business development.
- Housing.
- Transportation
- Workforce Developemnt

There are also four desired outcomes:

- A thriving and diversified economy,
- Racial equity and social justice,
- Greater Innovation,
- Environmental sustainability

It is in the areas of Business Development and Workforce Development that there is greatest scope for the development of the entrepreneurial ecosystem to have a direct impact.

The Business Development outcome area specifically identifies the following priorities for investment:

1) Decreasing the cost of doing business in the County.
2) Promoting the County's businesses and business climate.
3) Facilitating the attraction and retention of strategic industries.
4) Expanding entrepreneurial programs and services to create new businesses.

The County's incubators have undoubtedly had a positive impact on the creation of new businesses, supporting more than 300 companies over a 25-year period, during which time the number and form of the incubators has changed. The BIN currently comprises three incubators two of which (Rockville and Silver Spring) offer office space while the Germantown facility includes wet labs.

Since 1995 when the first incubator was created, the nature of entrepreneurship and the nature of support for entrepreneurship have changed, not least due to the emergence of the internet as a medium for commercial activity and the rapid pace of development of telecommunications infrastructure that have enabled new kinds of business models, made many businesses less location dependent, and led to the creation of new kinds of working environments including coworking space.

Although serviced offices have been available for many decades, coworking spaces generally offer a lower cost, more informal environment, with a high degree of flexibility with respect to when and how often a client can use them. In many practical contexts, coworking space has effectively satisfied the need for low-cost flexible office space than at one time formed the foundation of the incubator model. The also frequently provide a working environment that encourages and fosters the kinds of interaction between users, which distinguished incubators from other kinds of environments.

Given these considerations, and the availability of more than thirty coworking spaces in Montgomery County, the Rockville and Silver Spring incubators may not represent the most effective deployment of the County's resources. Wet lab space such as that provided by the Germantown incubator, is not, however, widely available in the County and represents a highly valuable and distinctive resource for companies in the biological and chemical sciences.

Coworking space does not typically fulfil all of the roles that an incubator would typically fulfil however – particularly with respect to the provision of connecting entrepreneurs to specialist external resources, providing management development programs, and building wider networks for entrepreneurs. These roles remain vital to the creation and growth of companies by County entrepreneurs but need not be linked to specific physical facilities. Decoupling these roles from the physical space provides scope for a much larger number of entrepreneurs to be supported.

With respect to the Economic Development Platform, The BIN has clearly played a role in supporting greater innovation and business development. Although it is difficult to be definitive given the long history of business incubation in the county, it would appear that its role in creating a diversified economy has been limited, and that racial equity and social justice have not been embedded as priorities. These though are undoubtedly areas in which more targeted support for entrepreneurship could be implemented.

5.2 Ability to Respond to Market Needs and Gaps

At present, the BIN incubators do not address the current market needs in full and are unlikely to be able to adequately address those of the future. The BIN provides specialist facilities relevant to bioscience companies which would also suit many more companies working in other areas of the chemical sciences but offer nothing that is relevant to other technology-intensive industry sectors and markets in which County companies are active.

This applies particularly to companies that would be considered to be developing advanced manufacturing technologies, or those that are more generally undertaking development of robotics and automation technologies, electronics and instrumentation, advanced materials, or autonomous vehicles. Equally, the BIN does not offer resources and facilities for prototyping – which would provide access to equipment and expertise that it is not cost-effective (or even viable) for early-stage companies to access on their own.

This is not to say that the County should necessarily develop specific facilities relevant to these activities, but the County's support for entrepreneurship should include understanding and tracking these

kinds of needs as they develop, establishing the extent to which they are being met by the private sector or other public or non-profit organizations, and developing appropriate action plans to address those that are not being met. In the absence of this kind of proactive approach, it is likely that the County will at best be slow to respond, and at worst may lose entrepreneurs to other locations.

The Germantown center stands out as the exception to this situation as it provides a combination of office and wet lab facilities that are highly valued by entrepreneurs and other organizations that support them within the ecosystem. It appears from the interview program however that the facility is in need of some equipment upgrades, more systematic maintenance of shared equipment, and more active management of the client population.

A further consideration in this context is the extent to which the BIN is ensuring that there are growth pathways for client companies with respect to physical facilities, equipment, and management support. At present, for example, it appears that the jump from the lab space available at Germantown to that which is available within the private sector is too large for many of the tenants. In some cases, this may be leading to companies remaining in the Germantown facility beyond the point where they should be graduating and freeing up space for new companies. This is again something that should be a part of the County's broader support for entrepreneurship.

At present, the level of programmatic and management support for BIN tenants is limited. While it is undoubtedly in part a consequence of the Covid-19 pandemic, this situation clearly predates it. The support that is provided to clients beyond the physical space is often the highest value component in what incubators and other entrepreneur support organizations offer to their clients. In the absence of carefully planned programs and ongoing management support, the BIN centers simply represent real estate, which, as noted above, is readily available elsewhere in the County (except for wet lab space).

More generally, the BIN model which is structured around tenants in a specific set of buildings, does not offer support to the much larger population of entrepreneurs and early-stage companies that exist within the County. What is required is an approach that is focused on the development of the ecosystem as a whole, rather than on a small selected population. Given a sufficiently proactive and closely managed selection of tenants, it could be argued that those in the BIN centers represent companies with significant growth potential, but the capacity of the BIN Centers is limited and is unlikely to be sufficient to accommodate a significant percentage of such companies. It is also notoriously difficult to accurately predict which companies will succeed in their endeavors and which will not.

Examples of organizations that take a broader approach to ecosystem development include the following:

Virtual Ecosystem Development Organizations

- Lakeshore Advantage / SURGE, Holland, MI

  Web: www.lakeshoreadvantage.com/surge

- Maryland Defense Technology Commercialization Center

  Web: deftechmd.com

Broad-based Entrepreneurship Center:

- Nashville Entrepreneur Center, Nashville, TN

  Web: https://www.ec.co/membership

Maker Space

- Non-Profit: NOVA Labs, Reston, VA

  Web: www.nova-labs.org

- Non-profit: Idea Foundry, Columbus, OH

  Web: www.ideafoundry.com

- Private Sector Makerspace / Incubator: NextFab, Philadelphia, PA, Wilmington, DE

  Web: nextfab.com

Prototyping Center

- Manufacturing Prototyping Center: First Flight Venture Center / Hangar6, Raleigh, NC

  Web: hangarsix.org

- Broad-based Prototyping Center: LACI / Advanced Prototyping Center, Los Angeles, CA

  Web: prototype.la

Skills Training / Entrepreneurship Center

- OpenWorks, Baltimore, MD

  Web: www.openworksbmore.org

Venture Development Organization

- JumpStart, Northeast Ohio

  Web: www.jumpstartinc.org

Community-Focused Initiatives

- Forward Cities, Durham, NC

  Web: forwardcities.org

- Accelerate Baltimore, Baltimore, MD

  Web: www.acceleratebaltimore.com

5.3 Management options for existing facilities

The Centers in Silver Spring and Rockville do not appear to offer anything beyond what is available in the various coworking spaces within the County. As such these two facilities may be better utilized by providing specialist resources for specific types of entrepreneurs as the Germantown facility does for life science entrepreneurs, although the specialist nature need not necessarily be focused on technology. One or both of the Rockville and Silver Spring centers could be leased to private sector companies or non-profits to operate as coworking facilities, with for example, a specific focus on meeting the needs of minority entrepreneurs that are not addressed by the current population of coworking spaces in the County. Another option would be simply to sell these facilities and reinvest the money in other ecosystem initiatives, but this would only be the optimum solution if no higher purpose withing the ecosystem could be identified.

The Germantown center requires more specialized management with experience in the bioscience industry. In the first instance this might best be provided by retaining an in-house resource, with a charge to develop a longer-term plan for the Center, taking into account the comments earlier in this report regarding the development of growth pathways for companies.

5.4 Positioning of the program

The program should be positioned as an entrepreneurial ecosystem development initiative rather than as being specific to business incubation. This is in part because of the association of incubators with physical facilities but primarily due to the need to communicate that there will be a focus on entrepreneurs throughout the county, and not just on those that would qualify as clients of an incubator.

5.5 Focus

The question of focus leads to consideration of the broader approach to provision of support for entrepreneurs within the County. As described elsewhere in this report, there has been a clear trend to move away from individual projects such as incubators to much broader ecosystem development initiatives (within which individual incubators would be a part) as the most effective way to support entrepreneurship within localities and regions. Given this, and the preceding comments in this section, the focus should be on providing appropriate support to all entrepreneurs within the County. This has a number of implications and these are discussed in Section 6 of this report.

5.6 Target clients, Environment, and Services

As for the question of focus, the County's approach to support for entrepreneurship should address all entrepreneurs within the County. There are, however, clearly a number of challenges inherent in this statement.

As described in Section 3 of this report, more than 100,000 businesses exist within the county, and for the county to provide support directly to all of these, or the many thousands of entrepreneurs who start new businesses in the county each year is unrealistic. It is however feasible for the County to adopt a role in which its role is to act as a catalyst, enabling and supporting a wide range of other organizations as partners in the development of the entrepreneurial ecosystem, rather than providing services directly.

Direct provision of support may nonetheless be the logical solution in specific cases such as the Germantown Innovation Center or other similar highly specialized resources. This is discussed further in Section 6 of this report.

5.7 Policies

The adoption of an ecosystem-based approach to support for entrepreneurs within the County as discussed in Section 5.6 above, has a number of significant implications. The question of policy has a much broader meaning than that which applies in the context of an individual incubator, or collection of incubators.

Policies within incubators are generally (and appropriately) focused on operational considerations such as the selection of tenants, their graduation, and the provision of resources and services to them. There many examples available for such policies, including from the InBIA which has a book that specifically addresses these and other related topics.

In the context of a broader ecosystem-focused approach, the question of policy relates to questions such as:

- When it would be considered appropriate for the County to undertake the provision of resources or services to entrepreneurs directly as opposed to working through partners.
- Ensuring that decisions are made on an equitable basis with regard to meeting the needs of minority entrepreneurs or other target populations.

- The role of private sector partners in the provision of resources for entrepreneurs.
- The collection of data by which the needs of the entrepreneurial ecosystem can be identified and by which the development of the ecosystem can be tracked.
- The prioritization of areas of need and the development of solutions to address them.
- The use of consistent and rigorous methodologies for the evaluation of different solutions to identified problems, including the use of a range of metrics that are allow different kinds of projects, with different types of impacts to be evaluated on an equal basis.

5.8 Programs

At present there is limited programmatic support for BIN tenants although some companies may have had access to these in the past. There is a large body of relevant experience elsewhere in Maryland and the US, and internationally that can be called on to either develop new programs or leverage existing ones to benefit BIN tenants. This need not necessarily require the BIN to develop and deliver such programs directly, although there may be cases where this could be the most logical solution. The role of the BIN would generally be to host such programs, promoting them to tenants, assisting tenants to register or enroll, and monitoring the outcomes to ensure that they were of value to the tenants.

5.9 Resources

At present, the resources committed to the BIN beyond the physical facilities and associated equipment appear to fall into three categories:

- Outsourced facilities management.
- Limited networking activities undertaken by Launch Workplaces. These do not appear to have been available consistently.
- General oversight and management of the client population, undertaken on a part-time basis by a member of County staff.

Generally, for a single incubator to be able to deliver what would currently be considered a full spectrum of services to its client population would require 2 -3 staff, one of whom would fulfil the role of Director or CEO. This team would typically include an administrator whose role would include responsibility for retention of records, bookkeeping, assisting with planning and management of events, and managing shared resources available to tenants. Depending on the size of the facility, the number of tenants, the possible inclusion of 'virtual tenants', and whether the facility included specialist space or equipment, other staff could be included.

It is also not uncommon for large incubators, and particularly those that support a population of 'virtual tenants' who do not rent space but are entitled to access other resources such as training programs and networking events, to include the position of Client Manager, with responsibility for managing the support for client companies.

In a situation where there is more than one physical facility, the team would be larger, with some staff located at the individual facilities and some spanning all of them. A big challenge in such situations is for the Director / CEO to be able to operate a cohesive team with effective communication and sharing of information. The present level of resources does not appear adequate to achieve that.

The level of resources required to operate an ecosystem development focused team is discussed in Section 6 of this report.

6 Recommendations

This section of the report proposes a strategy for the provision of support to entrepreneurs in Montgomery County, and for the development of the County's entrepreneurial ecosystem as a vital component in enhancing and sustaining its economic vitality.

6.1 Strategy

The primary recommendation is that the County moves from its current approach to supporting entrepreneurship, which is essentially location-based, to a strategy in which the provision of programmatic support is decoupled from the provision of specific physical facilities, and the focus is on the development of the ecosystem as a whole. This may include the county providing some key resources within the ecosystem, but it focuses primarily on building and strengthening the network of resources and actors that collectively comprise the ecosystem. This will also include many other partners, both organizational and individual, and **does not imply that the County should or could serve as a central controller but as a catalyst,** developing information resources, identifying needs, working with other ecosystem participants to develop appropriate solutions to address them, ensuring that there is a clear statement of purpose for any solution, and developing a comprehensive analysis of the expected costs and impacts in the short, medium, and long term. This strategy can be summarized as being:

"to catalyze the development of a thriving entrepreneurial ecosystem interconnected with others at the regional, national, and international levels, driving economic vitality through the creation of new businesses in sectors that create individual economic independence, jobs, and wealth in the county economy"

This will be achieved by increasing:

- The number of entrepreneurs active in the ecosystem, supporting them from idea generation to long-term growth, removing barriers, and creating pathways for success.
- The number and effectiveness of relevant resources that meet the needs of entrepreneurs within the ecosystem, directly and through partnerships.
- The number and strength of connections between entrepreneurs, and between entrepreneurs and the resources available to them.
- The number of connections between the county ecosystem and those in other locations, recognizing that any local ecosystem sits within a wider regional one, which may in turn be part of successively larger ecosystems up to the national level and beyond.

and by:

- Promoting and supporting entrepreneurship as a pathway to economic independence.
- Enabling, convening, and supporting champions who will promote the ecosystem and contribute to its development.
- Developing, curating, and sharing information about the ecosystem, as a resource for participants and to track its development over time.

6.2 Focus

The focus of the ecosystem development team will be on catalyzing the development of the ecosystem as a whole and ensuring access to resources relevant to the needs of all county entrepreneurs.

This will include a **focus on technology-intensive industries** that can contribute to the regional, national, and global competitiveness of the county, such as bioscience, finance, robotics and automation, electronics and instrumentation, and advanced materials.

It would **also include ensuring that entrepreneurs that have less technology-intensive business ideas can nonetheless access support and achieve success**. It is extremely important in this context to recognize and acknowledge that highly successful companies can emerge from any source. For example:

- Teachers Pay Teachers, which has attracted investment of more than $64 million, was founded by a New York schoolteacher.
- Spanx, the apparel company, with more than $400 million in annual sales was started by a person working as a sales trainer for an office supplies company.
- O2E brands, with revenues in excess of $300 million was founded by a college student who decided he could make money by hauling unwanted furniture and other household items to recycling centers and charity stores.
- The 'Famous Dave's' restaurant chain with more than 125 locations was started by a person working as a salesman.

6.3 Operational Model

The implementation of this strategy is not linked to specific physical assets, but should take the form of a team of experienced individuals dedicated to supporting county entrepreneurs from idea generation to long-term growth, connecting them to resources and tracking progress through:

- **Outreach, promotion, and education** – promoting and supporting entrepreneurship as a pathway to economic independence from K-12 onward, and enabling, convening, and supporting champions who will promote the ecosystem and contribute to its development and building a brand for entrepreneurship in the county.
- **Entrepreneur engagement and support**, coordinating access to resources for individual entrepreneurs.
- **Creating and curating a knowledge / information base** (including best practices in ecosystem development).
- **Proactively creating connections, communities of interest, and public and private sector partnerships**.
- Undertaking ongoing **proactive analysis of the ecosystem** and identification of gaps / opportunities.
- **Building consensus on priorities and areas for action** and **developing appropriate action plans with partners,** and only managing / providing resources directly where it is the most logical solution.
- **Developing, curating, and sharing information** about the ecosystem, as a resource for participants and to track its development over time.

Implicit in this approach is ensuring that all entrepreneurs have access to the resources that they need. This includes those who are economically disadvantaged and minorities who face unique challenges in accessing appropriate support. Also implicit in this approach is support for technology transfer as a source of new companies and competitive advantage for existing companies, involving Federal laboratories, UMD College Park, and other companies.

6.4 Implementation

The **implementation of this approach requires a highly capable team dedicated full-time to the task of developing the entrepreneurial ecosystem**. The team should be led by an individual with extensive experience in the field, with a title that emphasizes the team's mission, such as **Chief Entrepreneurship Officer**, and an advisory board comprising entrepreneurs from the private sector should be constituted and meet on a regular schedule.

The team must have credibility with entrepreneurs and with other public and private ecosystem participants. Their collective experience should span multiple industry sectors, include experience as entrepreneurs, and with planning and delivering entrepreneur support programs and initiatives, such as, but by no means limited to, incubators, accelerators, seed funds, and mentoring programs.

The objective is for the team to serve as a catalyst and it should only take direct management responsibility for projects and initiatives where a rigorous analysis suggests that it is the most appropriate solution, and a periodic review of this is undertaken. An example of this would be the existing Germantown Innovation Center where there is a need to refocus the Center and ensure that it is operating in a manner that maximizes its economic impact.

The ecosystem development team will need office space from which to operate, and while the team may not necessarily have responsibility for managing any of the County's incubators on a long-term basis, this would not preclude them being based in one.

Based on the experience of the Axcel team and knowledge of a wide range of economic development organizations and ecosystem development initiatives in particular, it is recommended that the team comprises:

- The CEO.
- Two senior executive staff with extensive relevant skills and experience.
- Two additional executive staff with relevant skills and experience.
- A team member providing administrative support.

Initial operational priorities for the first year of operations will include:

1) Proactive outreach to key ecosystem participants, followed by wider outreach and engagement.
2) Undertaking initial value chain analysis, action plan development and implementation for an initial set of potential areas of opportunity:
   - Computational biology
   - Advanced manufacturing
   - Autonomous vehicles

   Identification of second round targets within 6 months.
3) Undertaking analysis of industry sectors to:
   - Determine the extent to which pathways exist for entrepreneurs to receive necessary support and to support the ongoing growth of their companies.
   - Develop action plans to address gaps, including appropriate grow-on space for companies graduating from incubators, coworking space, accelerator programs, etc.

4) Facilities

It is recommended that for other the Silver Spring and Rockville Centers, a 12-month window is proposed to develop detailed plans for their use as specialist centers (such as for underserved populations), for approval by the County. The alternative is simply to lease these facilities as commercial real estate in which case there would be no need for involvement by the Ecosystem Development team. The question of the availability of appropriate physical space for companies to expand into as they grow should also be considered.

A 12-month window is suggested to develop a detailed plan for revitalizing the Germantown Innovation Center as a vital resource for the county's bioscience industry. In the interim, existing facility management arrangements should remain in place for the Innovation Centers.

6.5 Metrics

Metrics also need to be structured to reflect the reality that the ultimate desired impact of most economic development strategies is likely to occur in the long term. This creates a need for interim measures that can be used to track whether the implementation of the strategy is proceeding as intended, at points in time before the ultimate impacts of the associated activity are apparent as illustrated below:

- Short term **input** measures can be valuable to track the commitment of resources to a project or activity and demonstrate that implementation is being progressed
- Measures of ongoing **activity** allow the delivery of a project or individual activity to be demonstrated and tracked
- The **outputs** from an activity or project represent those **results** that can be demonstrated either at the end of a project or periodically during its execution.
- The long-term **impacts** from a project should directly reflect the original objectives of the project and demonstrate its success.

Inputs, activities, outputs, and impacts should all be demonstrably linked so that any input or activity can be shown to be tied to a specific impact and consequently to the original objectives of the project.

Running an educational program aimed at improving the understanding of product management methods for entrepreneurs, (something most lack that can cripple a business from the outset) can be used as an example:

The **input** in this case would be the resources required to develop the materials and to run the training sessions. If the necessary resources to do this are acquired, then the input metric has been achieved.

The **activity** metric could then be the participation in the program by a certain number of entrepreneurs, with the **output** metric being the number of entrepreneurs who completed the program and are then able to demonstrate a satisfactory grasp of the material through a final assessment.

The longer-term **impact** of the program could be measured as a result of the cohort of entrepreneurs successfully launching their products into the market, or simply by the number of participants who rated the course above a certain level in a subsequent survey designed to gauge their view of its value to them after they had had an opportunity to implement what they had learned.

Applying this approach allows the implementation of an agreed upon plan to be tracked. In the absence of interim metrics being defined, there would be no formalized way of tracking its success other than waiting until it had been completed, which could easily be as much as a year or more later. The value of being able to demonstrate progress to the board and to external stakeholders through pre-determined interim metrics in this way can be substantial.

An example of potential metrics is shown at the end of this section. These reflect the scope of the ecosystem development process and should be tracked in detail, on a monthly basis. While this may seem onerous, given appropriate software tools, it is easy to build into the operational activity of the team, and is far less difficult than trying to generate relevant data retrospectively covering a longer period such as quarterly or annually.

In addition to those metrics that relate directly to the activities of the ecosystem development team itself, each initiative created by, or as a result of the team's activities should have its own metrics and these should also be included.

Metrics may also be tracked that relate to other county goals which could be impacted by the growth of the entrepreneurial ecosystem, such as under-utilized real estate, and bolstering neighborhood economies, although these might be considered to be 'second order' metrics – i.e., ones which may be impacted by many other external factors in addition to the vitality of the entrepreneurial ecosystem.

6.6 Costs

Based on the most recent information provided (for 2018), at present the BIN is operating with a deficit of approximately $1.2 million across the three Centers. The objective will be for the Silver Spring and Rockville Centers to be either:

a) Leased commercially at zero net cost to the County, or

b) Repurposed to meet specific needs within the ecosystem such as the provision of resources targeted at underserved communities. This would be based a fully costed plan developed by the Ecosystem Development team and should be considered as a free-standing project in its own right.

As is the case for specialist facilities such as the Germantown Innovation Center, it is unlikely that it can be run without some deficit funding being provided by the County. It will, however, be an objective of the Ecosystem Development team to develop a plan that enables the Center to fulfil its economic development purpose while minimizing the deficit.

The cost of the proposed staff team is estimated to be $800,000 for base salaries (benefits should be provided on top of the base salaries at a level consistent with those provided for staff of the County or EDC as appropriate). An additional annual budget of $125,000 is also proposed to cover costs for outreach activities (including travel), events, information resources, and a web site including an ecosystem information portal.

Office space for the Ecosystem Development team should be made available at one or more of the BIN locations pending the outcome of the evaluation and planning process for each facility.

6.7 Summary

The recommendations above represent a significant departure for from the approach to supporting entrepreneurship that has previously been pursued by the County.

Moving from a location-based approach focused on the individual innovation centers to an ecosystem development approach delivered by a team that operates across the county, which may not run individual facilities or projects on a long-term basis, is not a trivial change, but it has the potential to build an infrastructure of partnerships and initiatives focused on the development of entrepreneurial ventures in the county that can generate impacts on a far larger scale, and become self-sustaining over time.

There are of course alternative options. One would be simply to continue with the BIN as it is, albeit with an investment in on-site management and necessary upgrades and technician support for the Germantown facility. The conclusion from the ecosystem analysis suggests, however, that this would be unlikely to address most of the areas in which the ecosystem needs to be strengthened and would do little to contribute more broadly to the County's documented goals and would fail to acknowledge what has been learned about entrepreneurial ecosystems over the last two decades.

Another option would be to adopt a hybrid model in which the ecosystem development team would also have responsibility for managing one or more of the BIN incubators in the longer term. This would provide a direct mechanism to ensure continued alignment with the needs of the ecosystem, but it would still be necessary for each facility to be justified and managed as a specialist resource targeting specific gaps in the ecosystem with the appropriate staff on site at each location deliver the mission of each individual facility.

The hybrid model might be appropriate during the period in which appropriate plans were being developed for each center but would require additional staff resources to avoid the core purpose of the Ecosystem Development team being diluted by operational matters at the BIN centers.

While more incremental changes could be made to improve the effectiveness of the BIN, a more fundamental move to an ecosystem-focused approach presents an opportunity for Montgomery County not only to significantly increase the impact of entrepreneurship on the County's economic development goals and more broadly on the county economy, but to position itself alongside those locations that are considered to be leaders in this field.

Recommendations

Input	Activity	Outcome	Impact
Core Funding	Events Hosted ①	Needs identified	Jobs Created
Project Funding	Events Attended	Solutions Developed	Real Estate Utilized
Partner Funding	Entrepreneur Interactions	Solutions Implemented	
Partner In-Kind Support	Company Interactions		Other ③
	Partner Interactions	New companies created	
	Onlne Community Members ②	Funding Obtained	
	Online Community Activity ②	Product Launches	
	Connections Established		
	Activity from Solutions Created	Ecosystem Members Connected	
	Social Media Presence	Joint Projects Created	
		Private Sector Leadership ④	
		Underserved participation	
		Outcomes from Solutions Created	

① Assumes an appropriate online presence for the team
② Assumes an online platform for hosting communities of interest
③ Additional impact metrics should be defined to address specific county priorities such as minitory participation
④ Participation in the leadership of ecosystem development initiatives / projects

Notes

a) One or more online tools will be required to track metrics data
b) Demographic data will be recorded with permisison
c) Contacts and companies will be assigned to industry, market, and technology focus

Montgomery County, MD
Business Incubator Network Study

Appendix: Additional Data and Analysis

- This appendix contains slides providing additional data relevant to the report.
- The slides are not intended to be read as a continuous narrative, but to provide specific items of data and analysis that primarily expand or provide more detail on topics covered in the different sections of the report.
- Some charts, maps, and tables appear in the body of the report but are also included here along with other slides addressing related content

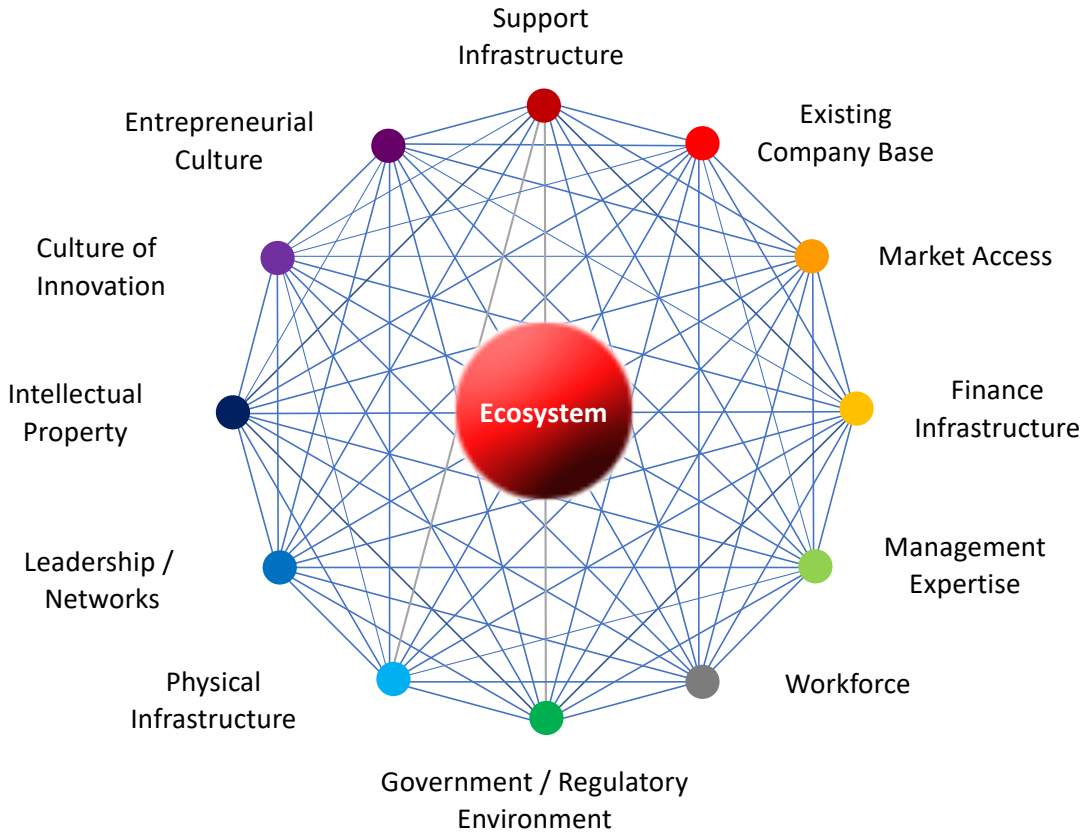
Section 1. Introduction

Ecosystems

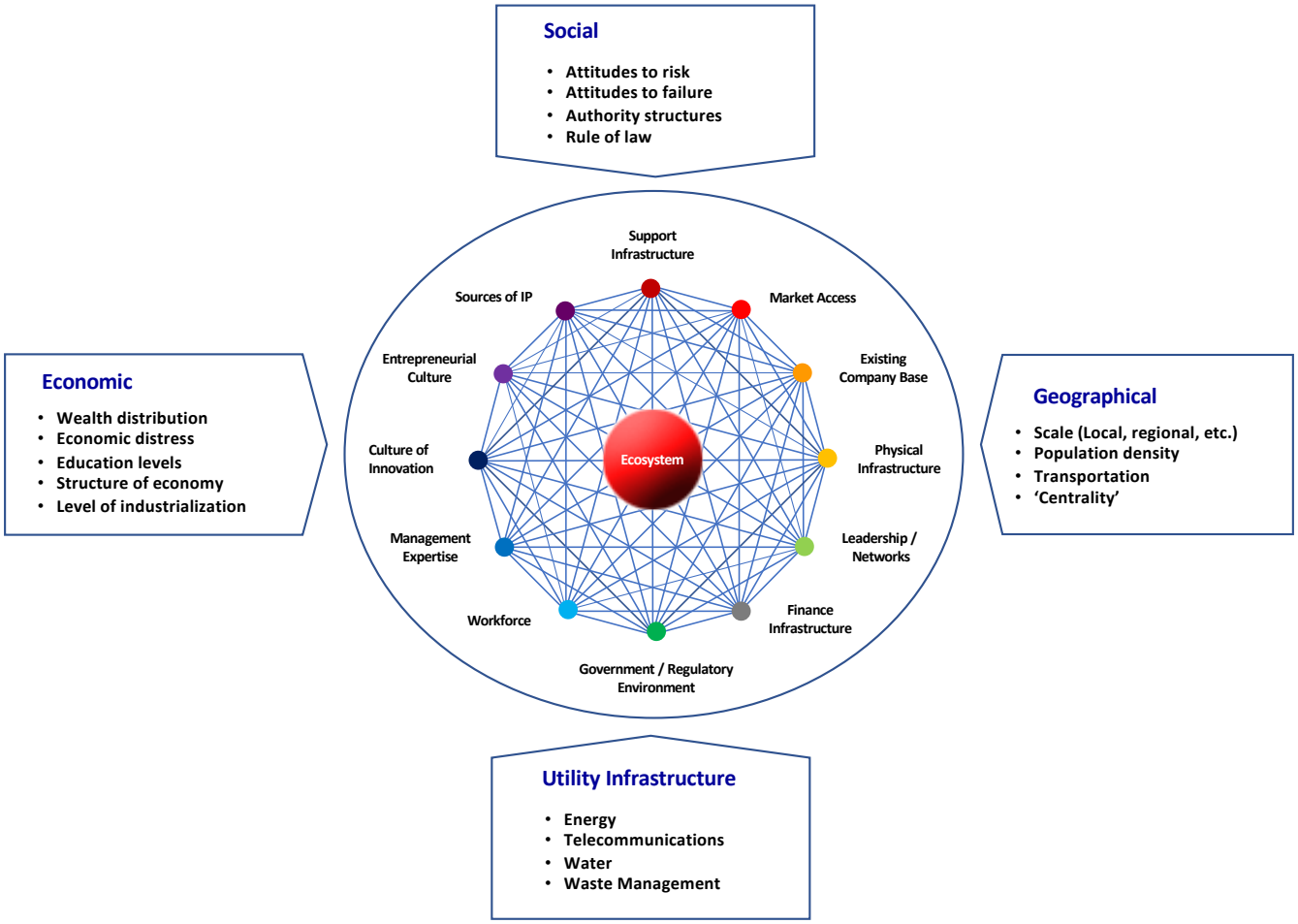
- The application of the ecosystem concept to entrepreneurship led to an increased awareness that a single initiatives such as incubators are most likely to succeed if they are part of a wider network of resources for entrepreneurs and serves as a key node in the larger network.
- Increasingly support for entrepreneurship is seen as an exercise in ecosystem building and development as much as investment in facilities although the creation of appropriate physical space is still important, especially for companies developing and deploying new technologies.
- Many different ecosystem models have been put forward, but there is no definitive model, and ultimately these models are just another tool for understanding what resources are required for entrepreneurs to succeed in creating companies.
- Most ecosystem models are essentially network models, with interconnected nodes (people, physical assets, intellectual assets, etc.), often with high-level categorization of nodes into different types - workforce, finance, etc. including some intangible ones – 'policy', 'support'
- Some are relatively high-level or simple. Some (those that more accurately reflect reality) are more complex. The emergence of data science tools and methods is facilitating the use of more complex models, although these may be more difficult to understand for the non-specialist.
- Like any model, ecosystem models are only tools that allow people to understand a problem at a deeper level and make more informed decisions. They can nonetheless be valuable in the creation, implementation, and management of economic development strategies, particularly if used in combination with other kinds of tools and models such as value chains.
- An ecosystem perspective can also be valuable as different areas of science and technology increasingly overlap (e.g. computational biology, tissue engineering, cybernetics)
- Ecosystems are nested – local, regional, supra-regional, national, global – and increasingly interconnected

1.3 Ecosystems, Networks, and Value Chains

Axcel Ecosystem Model

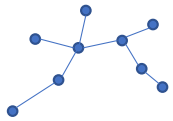


Forces Acting on the Ecosystem

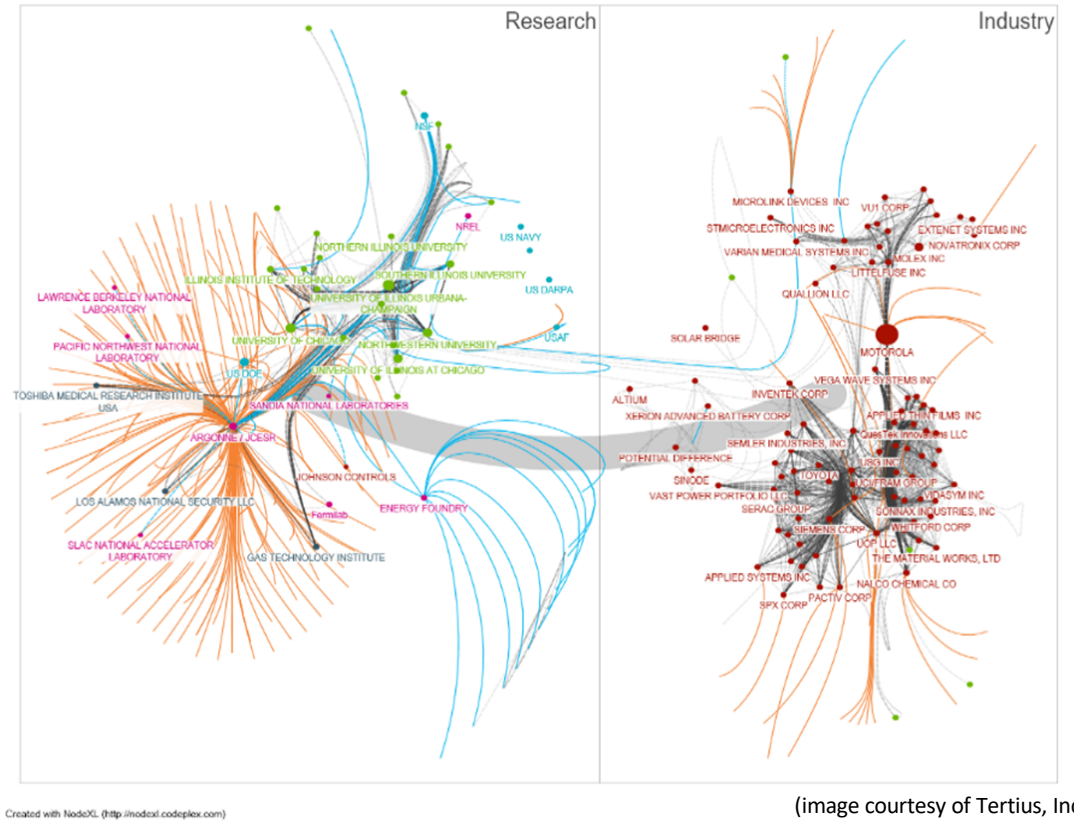


Aside from the internal dynamics of the ecosystem itself, other external factors impact on its development

Networks



Theoretical



(image courtesy of Tertius, Inc.)

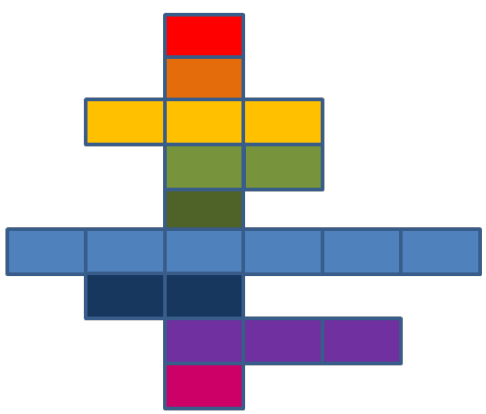
Real-world

Models are simplifications of reality, and as such should not be over interpreted but they can still provide useful insights.

More complex representations of ecosystems can be developed such as the one shown here, but even those cannot reflect the full complexity of the real world and can sometimes give a misleading sense of accuracy.

Value Chains

Service and Support
Distribution
Promotion and Sales
QA / QC
Regulatory Compliance
Manufacturing
Product Development
Fundamental Research
Market Analysis



Industry Value Chain
(High level activities necessary for the industry to function)

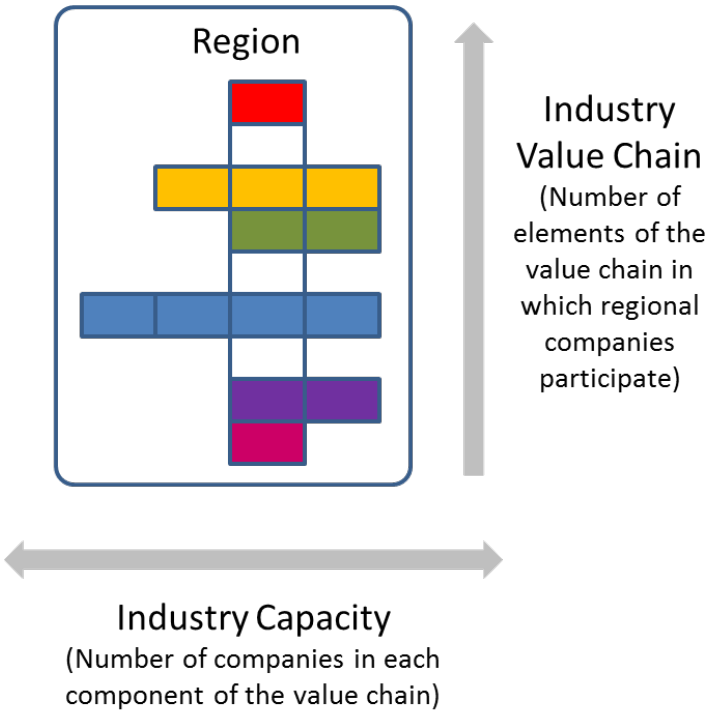
Industry Capacity
(Number of companies in each component of the value chain)

Value chain models can be very powerful, but they require a lot of resources and time to develop in detail.

The generic one shown here is very simple and does not address the multi-layered structure of real value chains, which are essentially network models.

- Each vertical element of the value chain can be broken down to expose more detail, with the overall chain encompassing a large number of component parts
- In practice the structure may also be more complex with multiple pathways.

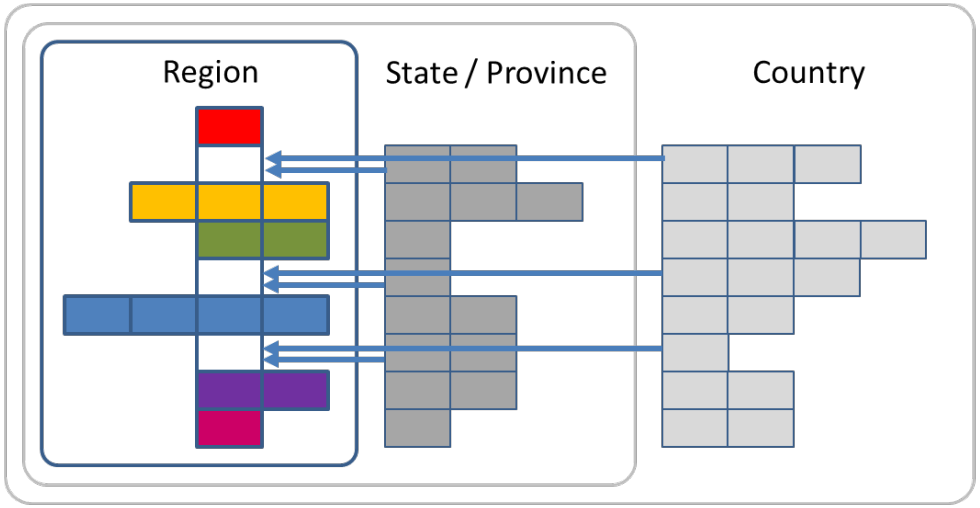
Gaps in the Value Chain



Simple value chain models can provide a basis for understanding the structure of an industry at the local or regional level and insights into potential strengths, weaknesses, etc. even if reality is more complex.

- There are generally gaps in the value chain for any industry at a local level

Completing the Value Chain

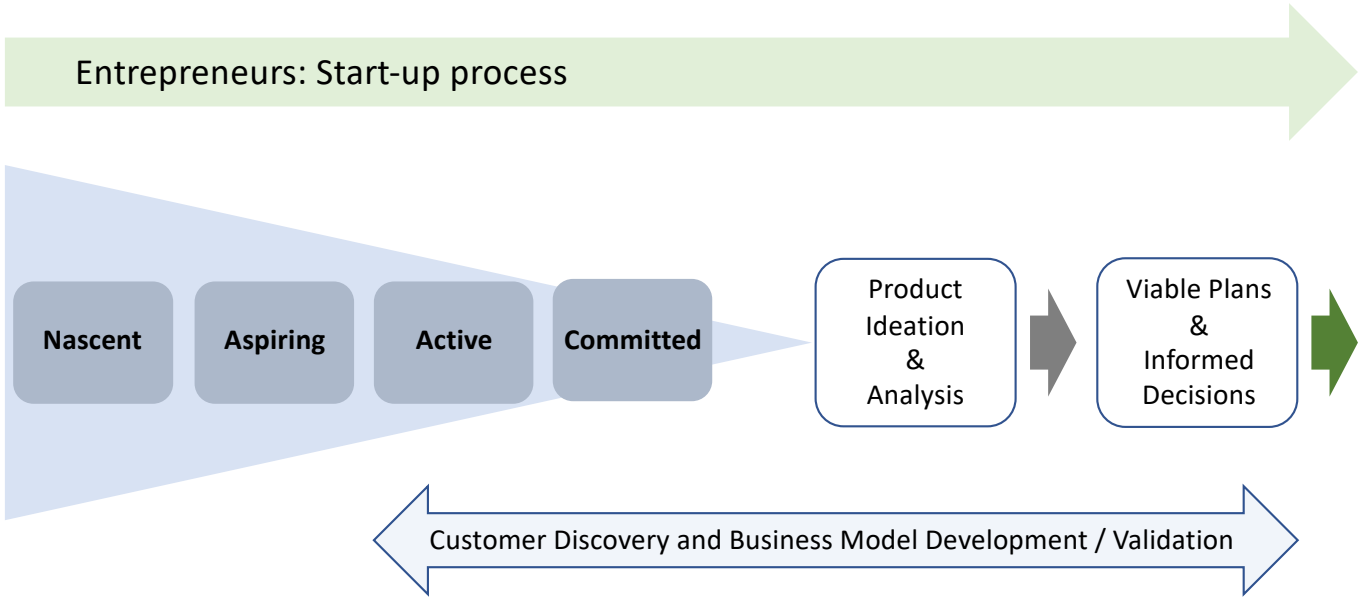


Strategies can be developed to address clear weaknesses in a value chain by targeting those areas where a location has gaps in the chain that represent significant value creation.

- Gaps in the value can be filled at the region / state level up to the national and in some cases, international level
- Developing the local value chain for key industries can be important - especially if the gaps are in high value stages of the chain

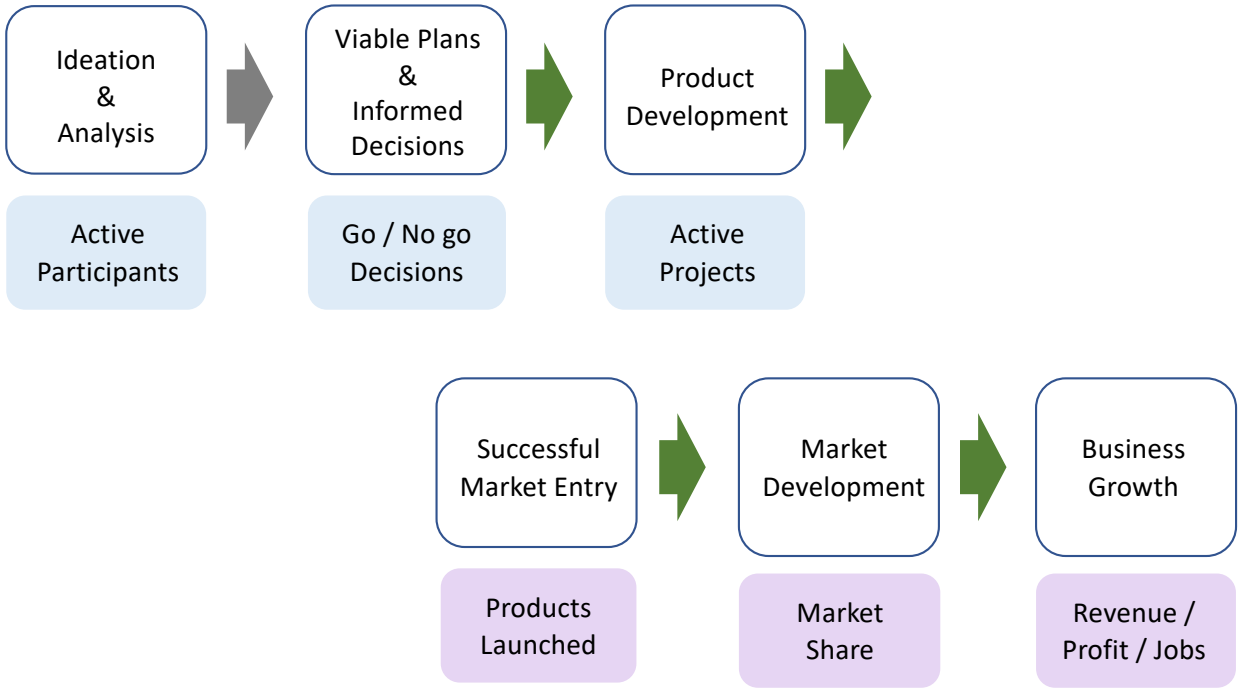
Sections 1.5 – 1.8 Entrepreneurship

Entrepreneurial Company Creation



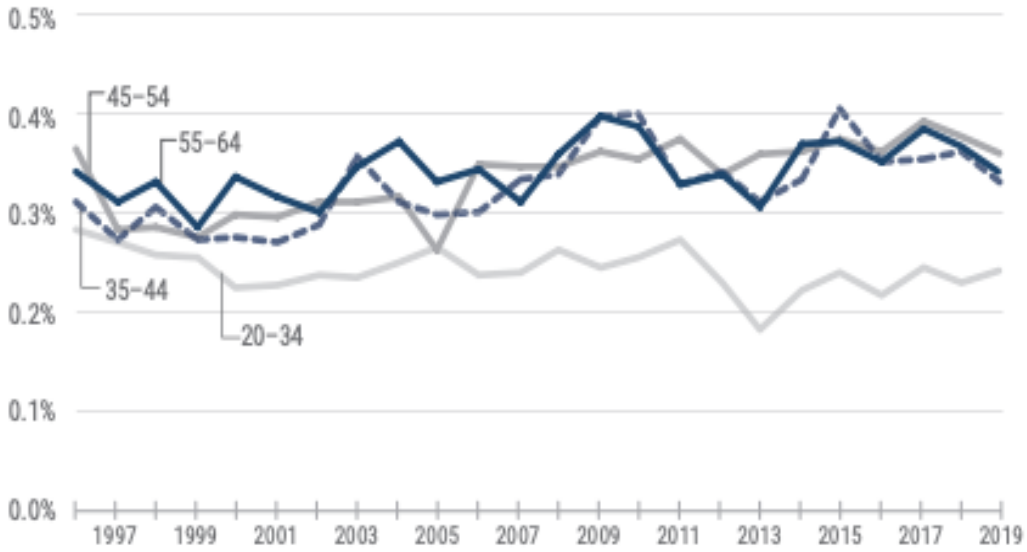
- Understanding of the core needs of entrepreneurs at each stage, and how they can best be addressed, has continued to develop over time
- Supporting the development of individual entrepreneurs in concert with development of the entrepreneurial ecosystem is extremely important

Entrepreneurial Company Growth Stages



- The ecosystem, but not necessarily any individual entrepreneur support program, must provide the resources to enable companies to complete this process from start to finish

Entrepreneur Age



% of US population owning a business by age group
(Source: Kauffman Foundation, 2020)

Contrary to common belief, there is little difference between levels of entrepreneurial activity among different age groups except for the 20 – 34 age group which now exhibits a significantly lower level than older age groups

The level of entrepreneurship for all age groups above 24 has been trending up, while that for the 20-34 age group has been trending down

Supporting Entrepreneurship

- Opportunities for Entrepreneurial activity often occur at the intersection between Technology Domains and Application Domains (markets) – examples include:

Technology domains

- Artificial Intelligence / Machine Learning
- Additive manufacturing
- Materials
- Molecular biology
- Robotics, Automation
- Data Science
- Rapid prototyping
- Sensors
- Cryptography
- Virtual / Augmented reality
- Food Technologies
- Energy Generation
- Energy Storage

Application domains (Markets)

- Pharmaceuticals
- Medical diagnostics
- Telemedicine
- Financial Services
- Satellites
- Agricultural production
- Transportation and Logistics
- (Autonomous vehicles)
- Cyber Security
- Environmental monitoring

- Points of intersection where local factor conditions relevant to both technologies and markets are strong can be good targets for focused support for entrepreneurship
- Social and socio-economic priorities can also shape the focus of entrepreneurship programs
- Addressing specific gaps in the ecosystem can maximize the effectiveness of entrepreneurship programs
- Ultimately it is the individual entrepreneurs who will determine success and addressing their specific needs, in appropriate ways, will also maximize effectiveness

1. Where are we now?

2. Interview Program

Interview Program – Selected Areas of Need

- The following is a selected list of areas of need expressed by the companies interviewed
  - Intellectual property strategy
  - Navigating the legal aspects of the startup process
  - Understanding the investment capital process
  - Managed networking (i.e. not just ad-hoc interactions)
  - Facilitated access to local companies providing services and resources to support the transition from research to product
  - Mentoring support
  - Accelerator / Startup programs
  - Connections to venture capital / angel networks

3. Underserved Entrepreneurs

Economically Disadvantaged Communities in Montgomery County

Median Income

	Median Income	
White alone, not Hispanic or Latino	128,728	100%
Asian	113,357	88%
Two or more races	94,961	74%
Native Hawaiian and Other Pacific Islander	87,500	68%
American Indian and Alaska Native	79,559	62%
Black or African American	76,056	59%
Hispanic or Latino origin (of any race)	74,621	58%
Some other race	65,992	51%

% Below the Poverty Line

	Percentage	Multiple
Native Hawaiian and Other Pacific Islander alone	16.0%	444%
Some other race alone	14.5%	403%
Hispanic or Latino origin (of any race)	11.4%	317%
Black or African American alone	10.6%	294%
Two or more races	8.1%	225%
Asian alone	6.1%	169%
American Indian and Alaska Native alone	4.8%	133%
White alone, not Hispanic or Latino	3.6%	100%

Unemployment

	Percent
Native Hawaiian and Other Pacific Islander alone	8.1%
Black or African American alone	7.9%
Some other race alone	7.4%
Two or more races	7.0%
Hispanic or Latino origin (of any race)	6.1%
American Indian and Alaska Native alone	5.6%
White alone	3.7%
Asian alone	3.7%
White alone, not Hispanic or Latino	3.5%

Source: US Census Bureau

Labor Force Participation Rate in Montgomery County

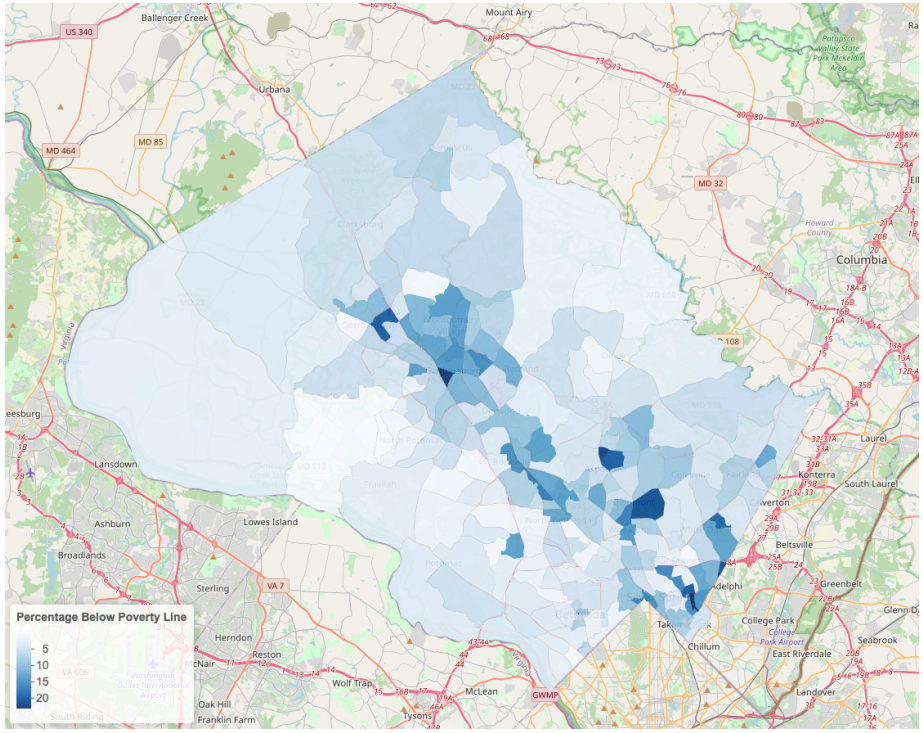
- The labor force participation rate indicates the percentage of all people of working age who are employed or are actively seeking work.
- Used in conjunction with the unemployment numbers, it offers some perspective into the state of the economy.
- In the U.S. as a whole, the labor force participation rate has held steady around 63% since 2013, but it varies over time based on social, demographic, and economic trends.
- Global labor force participation has shown a steady decline since 1990.

	Percent
Native Hawaiian and Other Pacific Islander alone	52.9%
White alone, not Hispanic or Latino	68.0%
Asian alone	70.0%
Two or more races	74.2%
American Indian and Alaska Native alone	74.4%
Black or African American alone	74.9%
Hispanic or Latino origin (of any race)	78.8%
Some other race alone	81.4%

Economic Distress

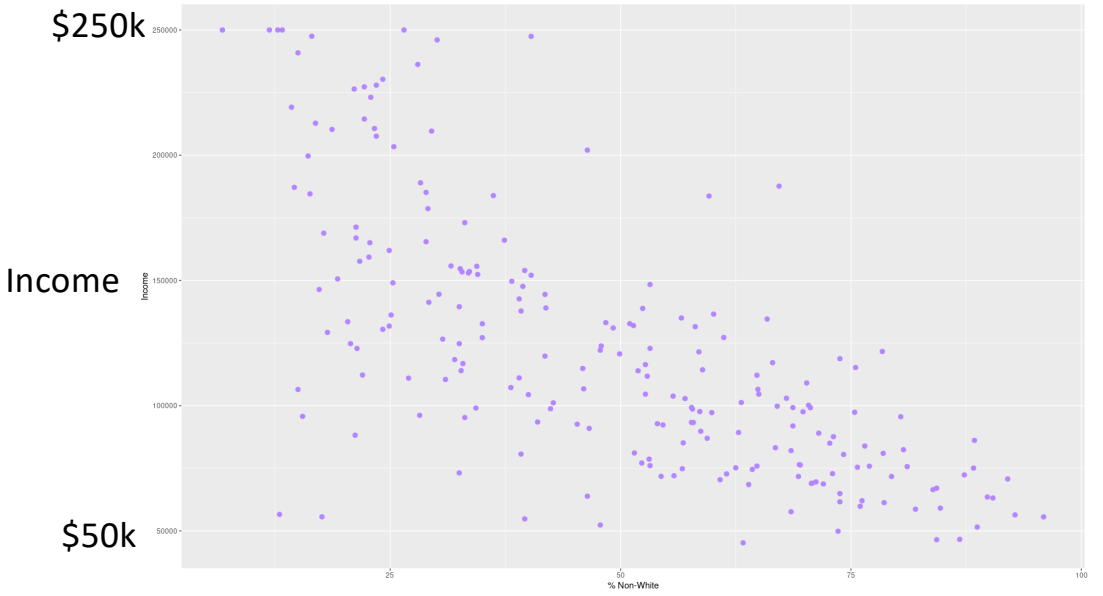
- People from families suffering economic distress often find it difficult to access assistance for entrepreneurial ventures.
- Relative to other locations within the MSA, Montgomery County as a whole does not exhibit severe economic distress but there are census tracts within the county where poverty rates are significantly above the average

- The highest percentage of the population living below the poverty line are in close proximity to the I-270 corridor, to the south of Route 29, and between Route 200 and Route 586



Percentage of Population Below the Poverty Line by Census Tract

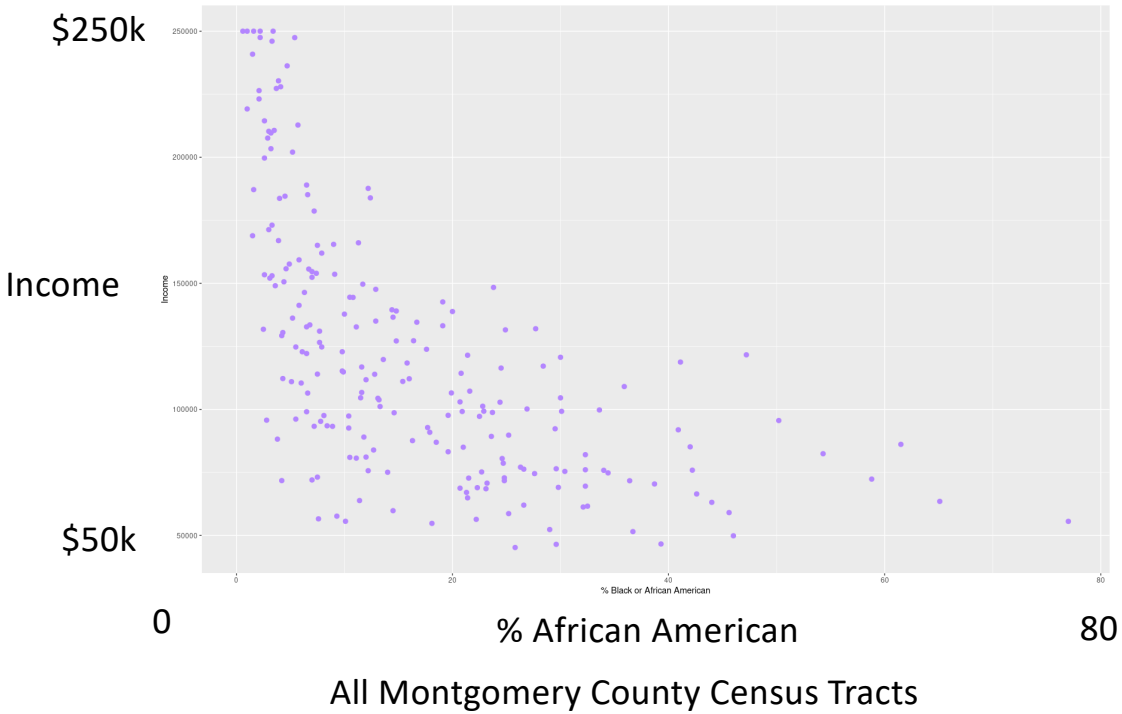
Context for Minority and Economically-Disadvantaged Entrepreneurs



- A challenge for all entrepreneurs is acquiring the necessary finance for their business, with personal resources being the single largest source for most startups. It is likely to be harder for people with low incomes start successful businesses

- While charts of this kind rarely show a perfect correlation, there is clearly a trend in income levels that correlates to the % of non-white residents

Context for Minority and Economically-Disadvantaged Entrepreneurs



- The trend in income is marked for the African American population

Minorities

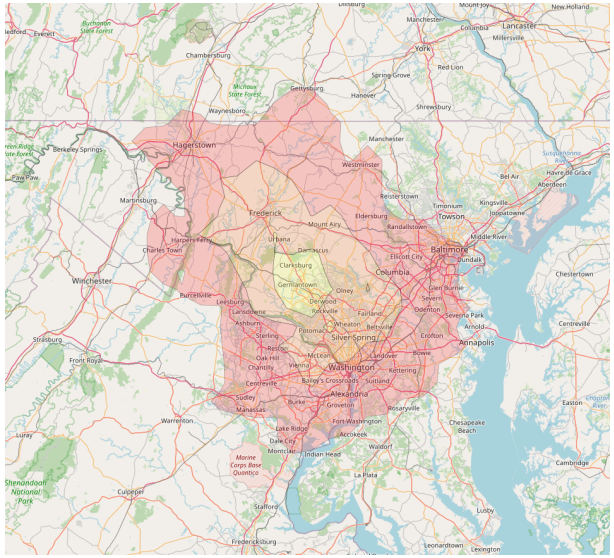
- A 2017 Report by the Urban Institute (based on data from the US Census Bureau American Community Survey 2011-2015), found that there were significant inequities between the District 1 and District 5 and that this was particularly the case for residents of color.
- Approximately one third of the county population were born outside the US.
- Across the county as a whole:
  - the average income of households headed by people identified as white, was 1.8 times that of households headed by people identified as black or Hispanic, and 1.2 times that of people identified as Asian or Pacific Islander.
  - 50% of black families had incomes below $75,000, while for Hispanic households the figure was 58%. For white households the corresponding figure was 17%.
  - The share of the working population working full time with earnings below $35,000 was 47% for Hispanic people, 29% for black people, and 10% for white people.

Minority Entrepreneurs

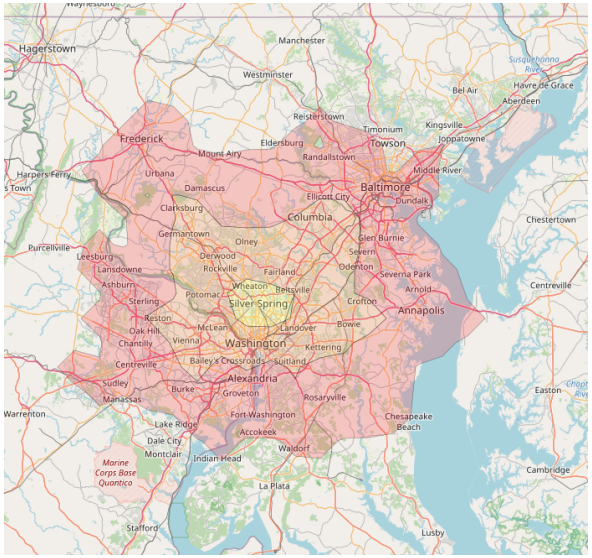
- Both the County and the Federal Government operate a variety of programs that are designed to assist existing minority-owned businesses
- Nationally, immigrants create significantly more businesses than native born people - 57% more in 2019 (Source: Kauffman Foundation)
- Out of 1,711 VC deals identified in Maryland, only three were identifiable as being companies founded by African-Americans and only one was identifiable as being Hispanic / Latinx founded *[This data is difficult to obtain and cannot be taken as definitive, but in broad terms the scale is notable]*

Accessibility

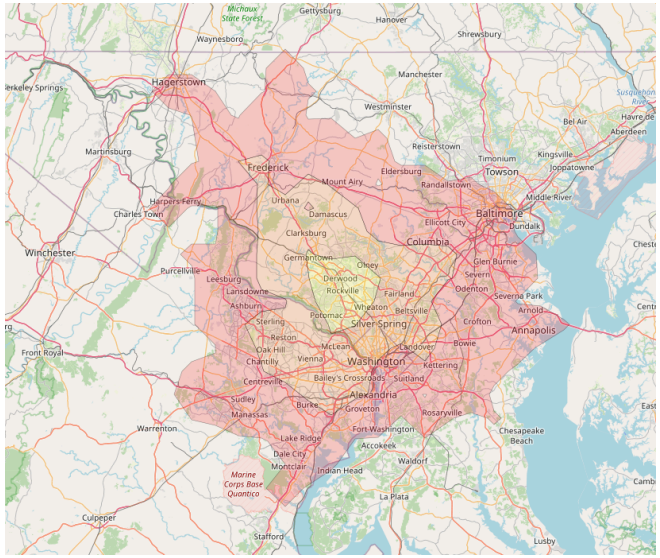
- Accessibility may be impacted by a number of factors, including geographical distance.
- The maps show the distance that can be traveled by car within 20, 40, and 60 minutes from each of the BIN locations, noting that the data is not representative of rush hour traffic.



Germantown

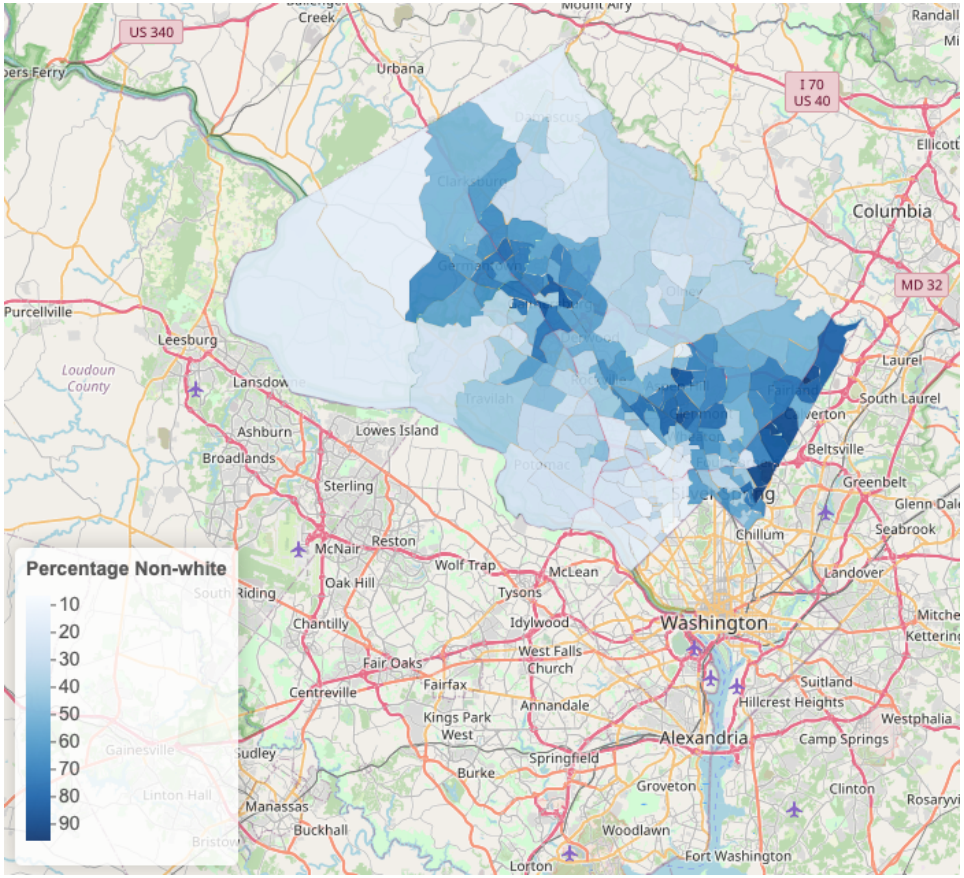


Silver Spring



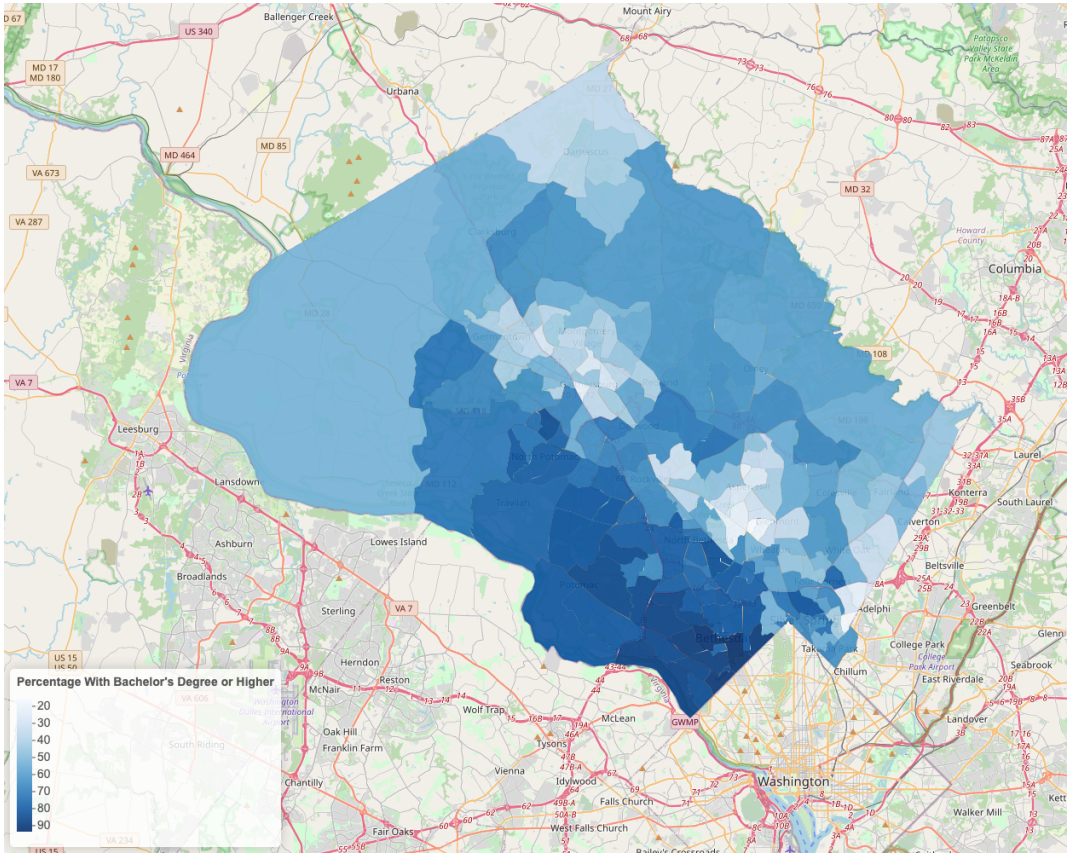
Rockville

Ethnicity



- At a broad level, those areas with the highest non-white population correspond to those with the highest poverty rates
- The correlation is not exact however and there are clearly areas with a significant non-white population that fall outside those areas with the highest poverty rates

Educational Attainment



- There is an apparent correlation between those areas with the lowest educational attainment an those with the highest levels of poverty

4. The Entrepreneurial Ecosystem

4.1 Montgomery County Industry

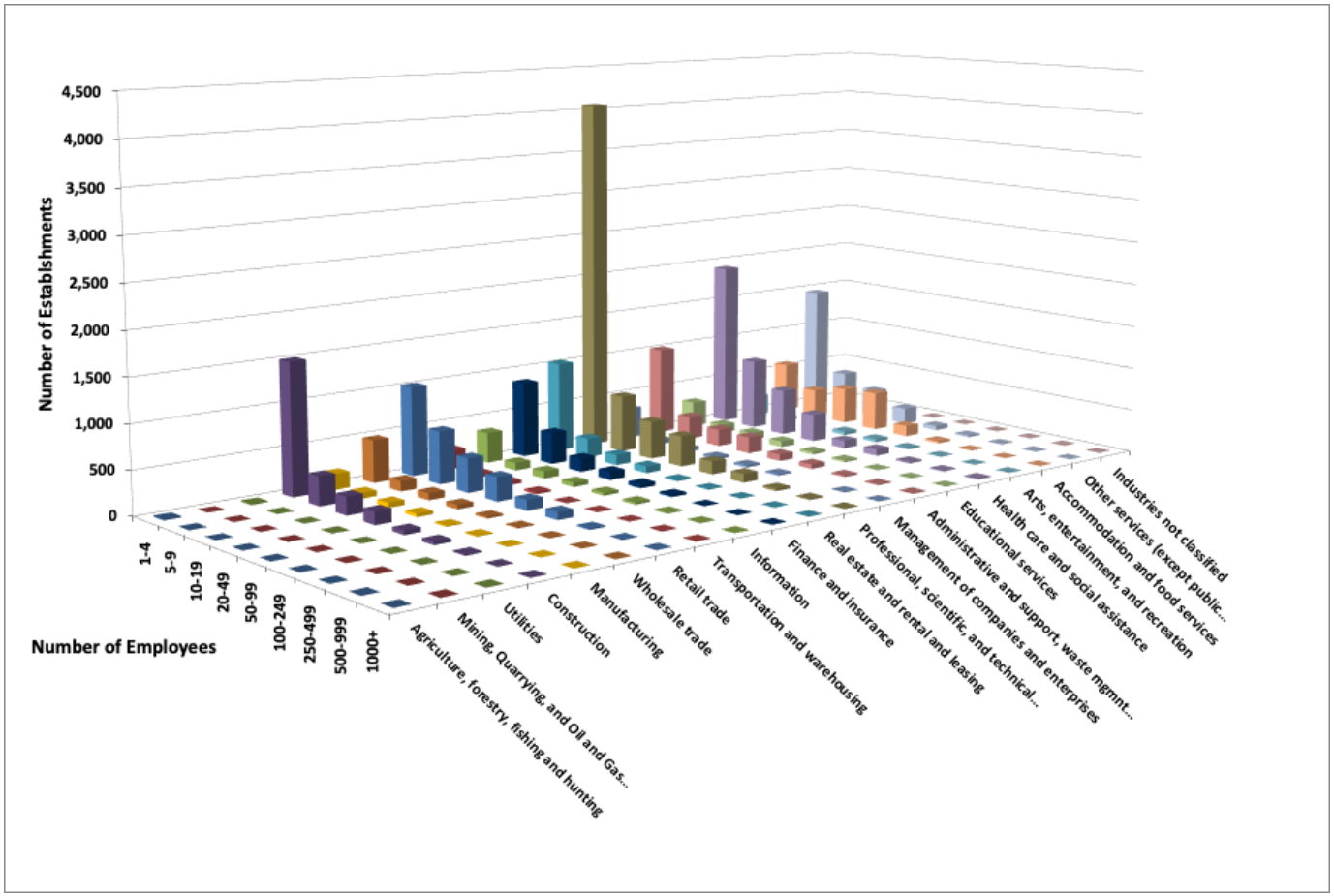
Montgomery County Company Population

Industry Code	Description	Employees		Total Annual Payroll		Estab.	
11	Agriculture, Forestry, Fishing and Hunting	69	0.0%	$2,246	0.0%	19	0.1%
21	Mining, Quarrying, and Oil and Gas Extraction	0	0.0%	$0	0.0%	0	0.0%
22	Utilities	0	0.0%	$0	0.0%	24	0.1%
23	Construction	32,958	7.5%	$1,743,073	7.3%	2,290	8.3%
31-33	Manufacturing	10,329	2.4%	$724,771	3.0%	355	1.3%
42	Wholesale Trade	13,462	3.1%	$1,040,564	4.3%	765	2.8%
44-45	Retail Trade	48,235	11.0%	$1,392,146	5.8%	2,513	9.2%
48-49	Transportation and Warehousing	3,951	0.9%	$137,493	0.6%	320	1.2%
51	Information	20,655	4.7%	$1,585,648	6.6%	641	2.3%
52	Finance and Insurance	24,379	5.6%	$2,296,620	9.6%	1,551	5.7%
53	Real Estate and Rental and Leasing	14,647	3.4%	$863,710	3.6%	1,474	5.4%
54	Professional, Scientific, and Technical Services	82,013	18.8%	$6,469,156	26.9%	5,796	21.1%
55	Management of Companies and Enterprises	15,603	3.6%	$1,879,074	7.8%	538	2.0%
56	Admin, Support, Waste Management	10,367	2.4%	$345,231	1.4%	1,828	6.7%
61	Educational Services	54,715	12.5%	$2,547,733	10.6%	597	2.2%
62	Health Care and Social Assistance	6,393	1.5%	$151,382	0.6%	3,796	13.8%
71	Arts, Entertainment, and Recreation	29,996	6.9%	$541,581	2.3%	415	1.5%
72	Accommodation and Food Services	24,017	5.5%	$898,750	3.7%	1,919	7.0%
81	Other Services (except Public Administration)	0	0.0%	$1,011	0.0%	2,528	9.2%
99	Industries not classified	45,130	10.3%	$1,392,774	5.8%	62	0.2%
		436,919	100.0%	**$24,059,654**	100.0%	**27,431**	100.0%

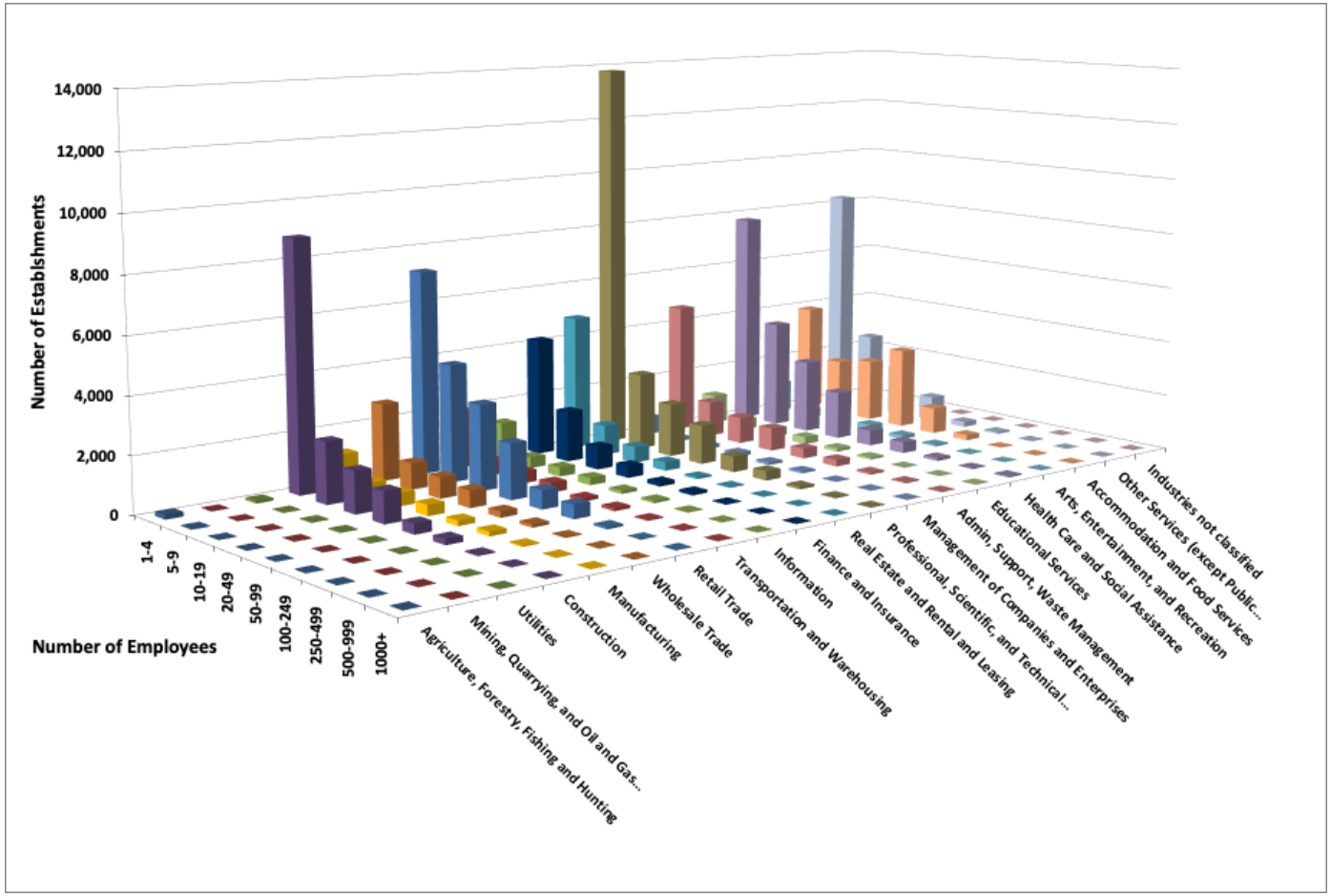
Green shading indicates sectors that are primarily traded

Source: US Census Bureau, 2018

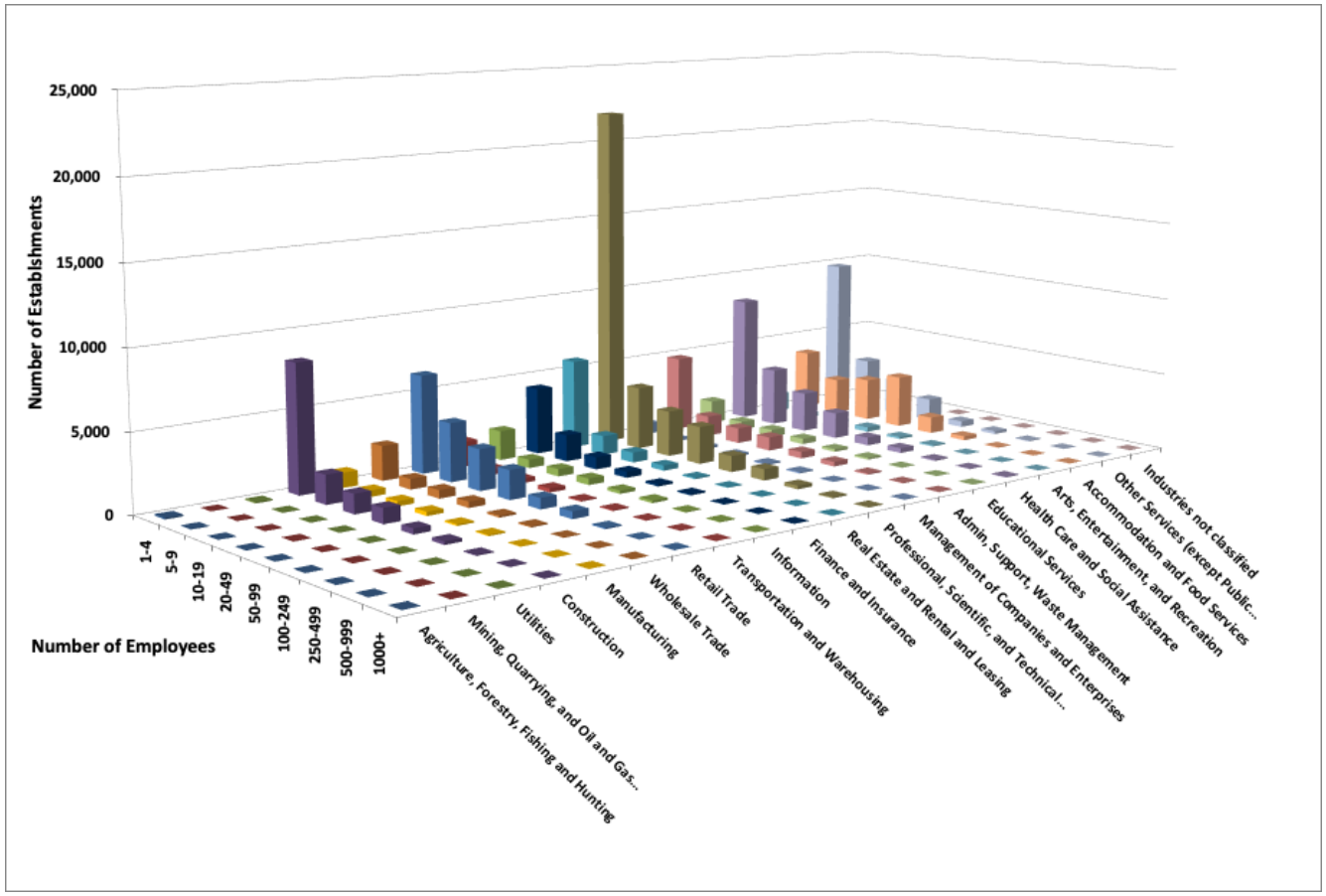
Montgomery County Employers



Maryland Employers



Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Statistical Area Employers



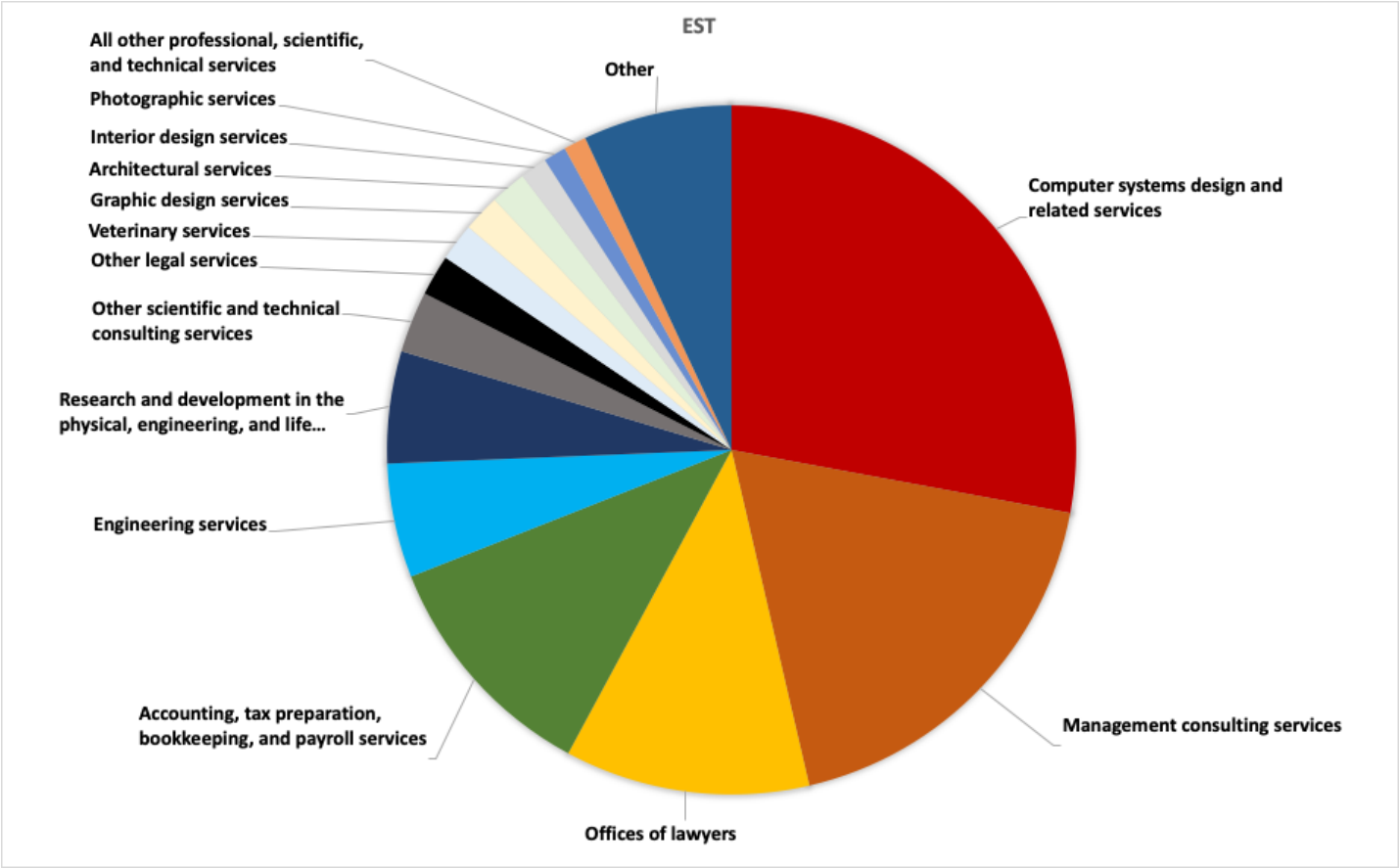
Industry Sector Comparison

NAICS		US	MSA	MoCo
11——	Agriculture-Forestry-Fishing and Hunting	0.30%	0.09%	0.08%
21——	Mining-Quarrying-and Oil and Gas Extraction	0.33%	0.02%	0.01%
22——	Utilities	0.24%	0.11%	0.06%
23——	Construction	9.10%	8.27%	8.34%
31——	Manufacturing	3.70%	1.36%	1.30%
42——	Wholesale Trade	5.21%	2.66%	3.10%
44——	Retail Trade	13.54%	10.45%	9.68%
48——	Transportation and Warehousing	3.02%	1.71%	1.16%
51——	Information	1.96%	2.41%	2.37%
52——	Finance and Insurance	6.08%	4.77%	5.69%
53——	Real Estate and Rental and Leasing	5.17%	5.13%	5.21%
54——	Professional-Scientific-and Technical Services	11.64%	21.77%	21.11%
55——	Management of Companies and Enterprises	0.72%	0.97%	1.89%
56——	Administrative and Support and Waste Management and Remediation Services	5.34%	5.86%	6.78%
61——	Educational Services	1.34%	2.02%	2.17%
62——	Health Care and Social Assistance	11.42%	10.83%	13.41%
71——	Arts-Entertainment-and Recreation	1.82%	1.47%	1.48%
72——	Accommodation and Food Services	9.24%	8.78%	6.93%
81——	Other Services (except Public Administration)	9.73%	11.20%	8.88%
99——	Industries not classified	0.10%	0.11%	0.34%
------	**Total for all sectors**	**100.00%**	**100.00%**	**100.00%**

- The existing industry base can provide:
  - Networks
  - Market access
  - Workforce
  - Management expertise
  - Financing sources with industry expertise

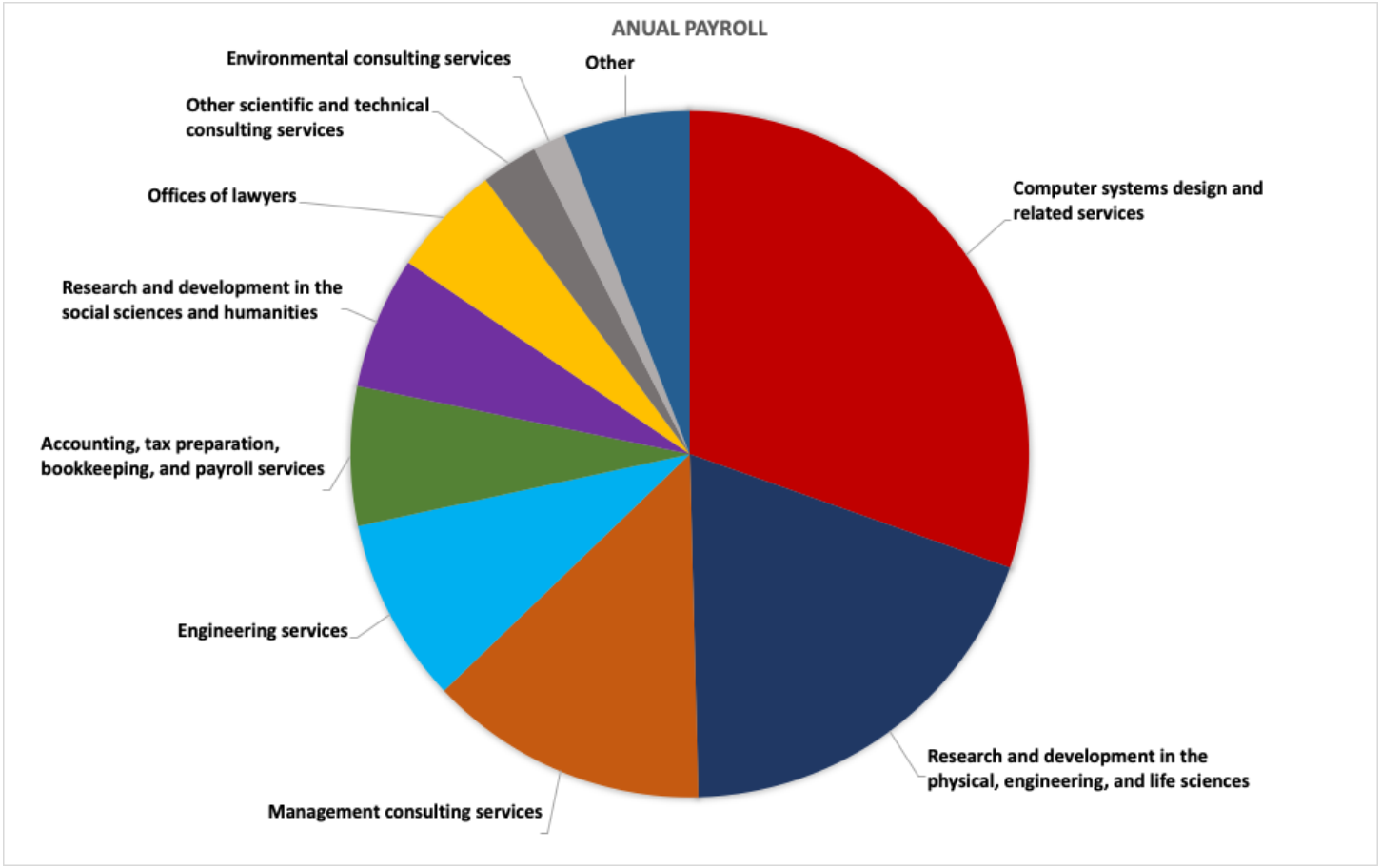
- The percentage of Manufacturing companies in Montgomery County is significantly below the figure for the US, and less than for the MSA
- The county has a higher percentage of companies than the US and the MSA for Educational Services; Management of Companies and Enterprises; and Information
- The county has a higher percentage of companies that the MSA as whole for Finance and Insurance, but less than the US as a whole

Professional, Scientific, and Technical Services - Establishments



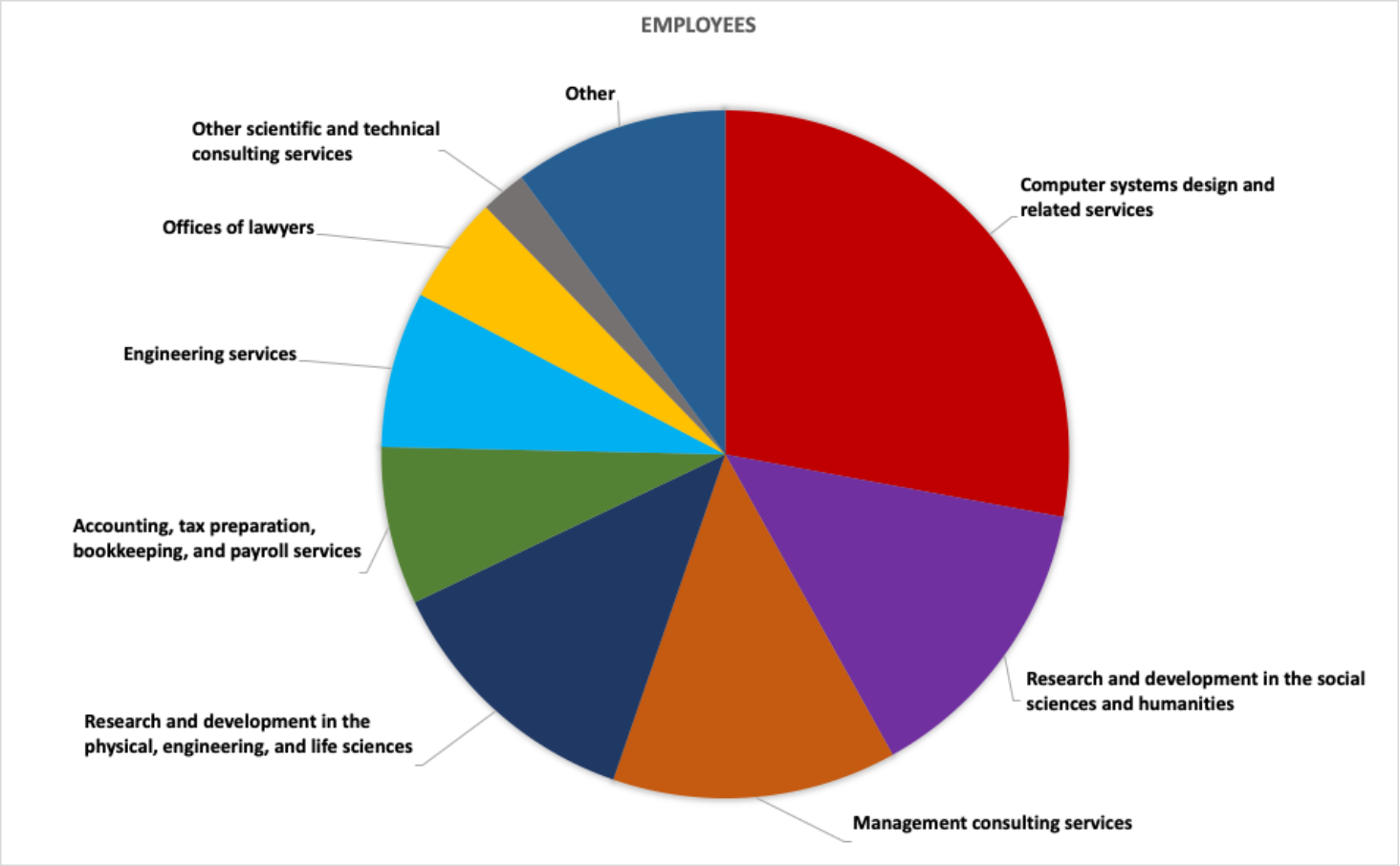
- Seven sub-sectors account for 83% of all establishments in the Professional, Scientific, and Technical Services Sector
- Computer Systems Design and Related Services is the largest with 28% of establishments

Professional, Scientific, and Technical Services – Annual Payroll



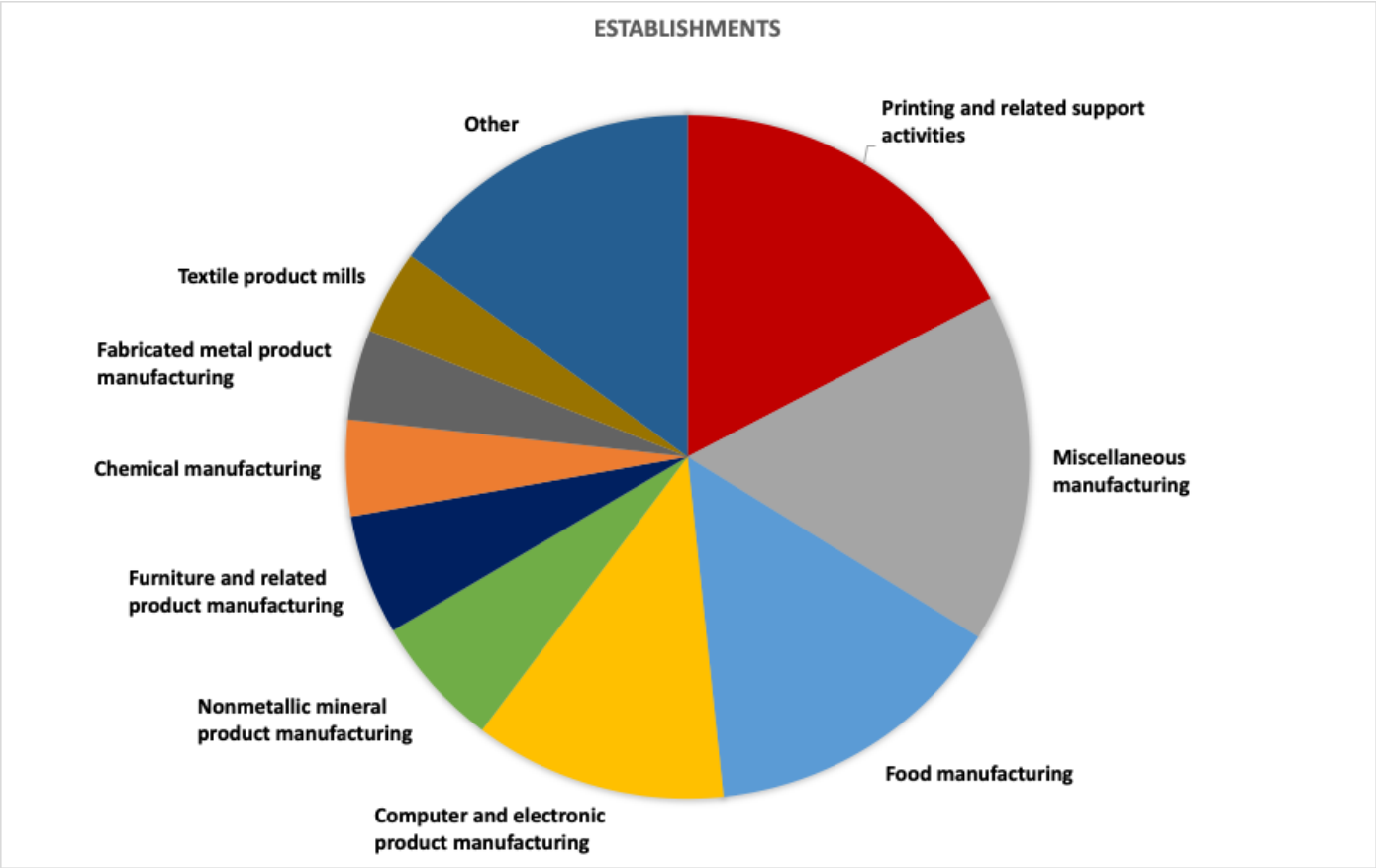
- Six sub-sectors account for 84% of all to total annual payroll in the Professional, Scientific, and Technical Services Sector
- Computer Systems Design and Related Services is the largest, representing with 30% of the total payroll
- Computer Systems Design and Related Services and Research and Development in the Physical and Life Sciences account for 49% of the total payroll in the sector

Professional, Scientific, and Technical Services - Employees



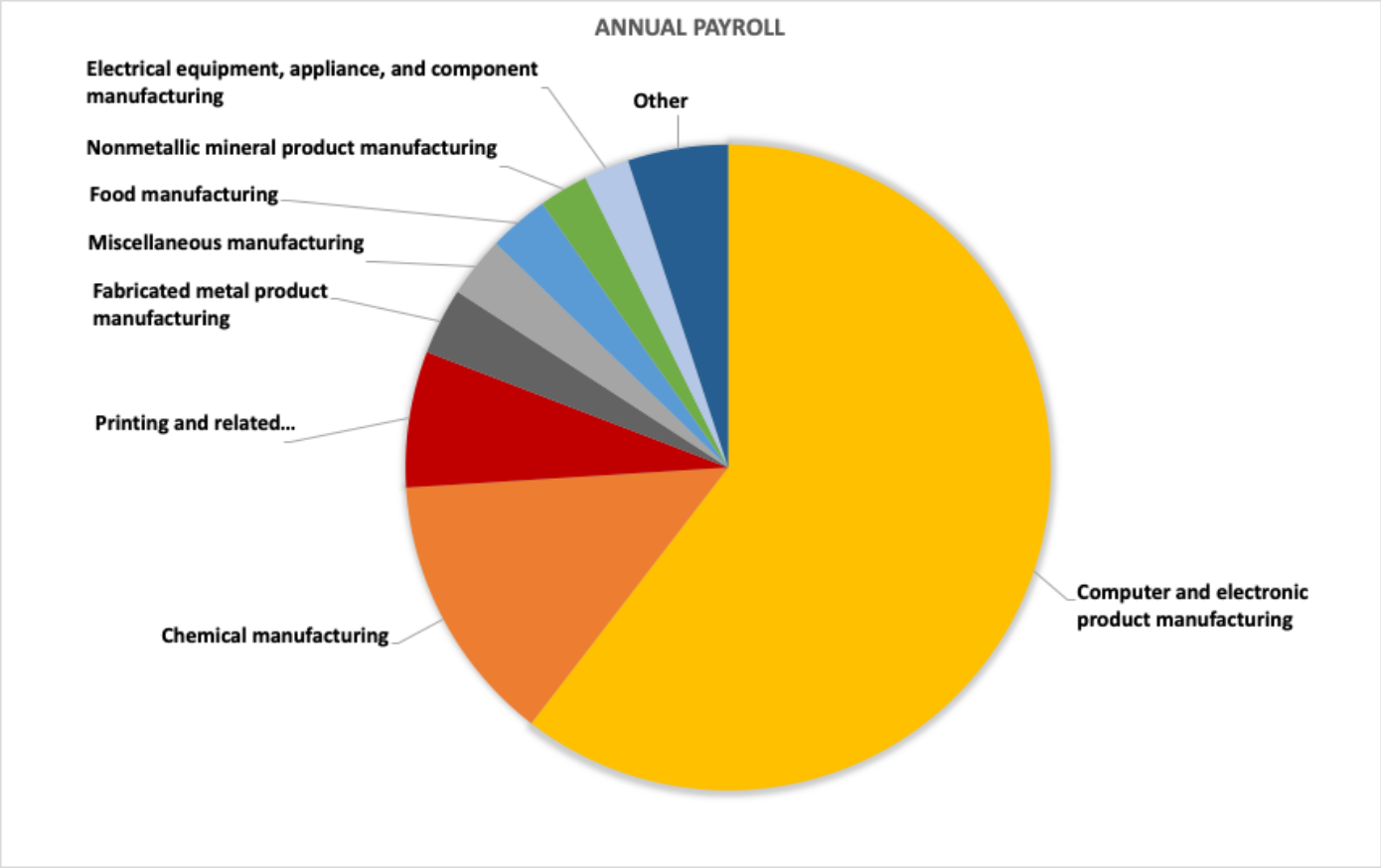
- Six sub-sectors account for 83% of all employment in the Professional, Scientific, and Technical Services Sector
- Computer Systems Design and Related Services is the largest, representing with 28% of the total employment

Manufacturing - Establishments



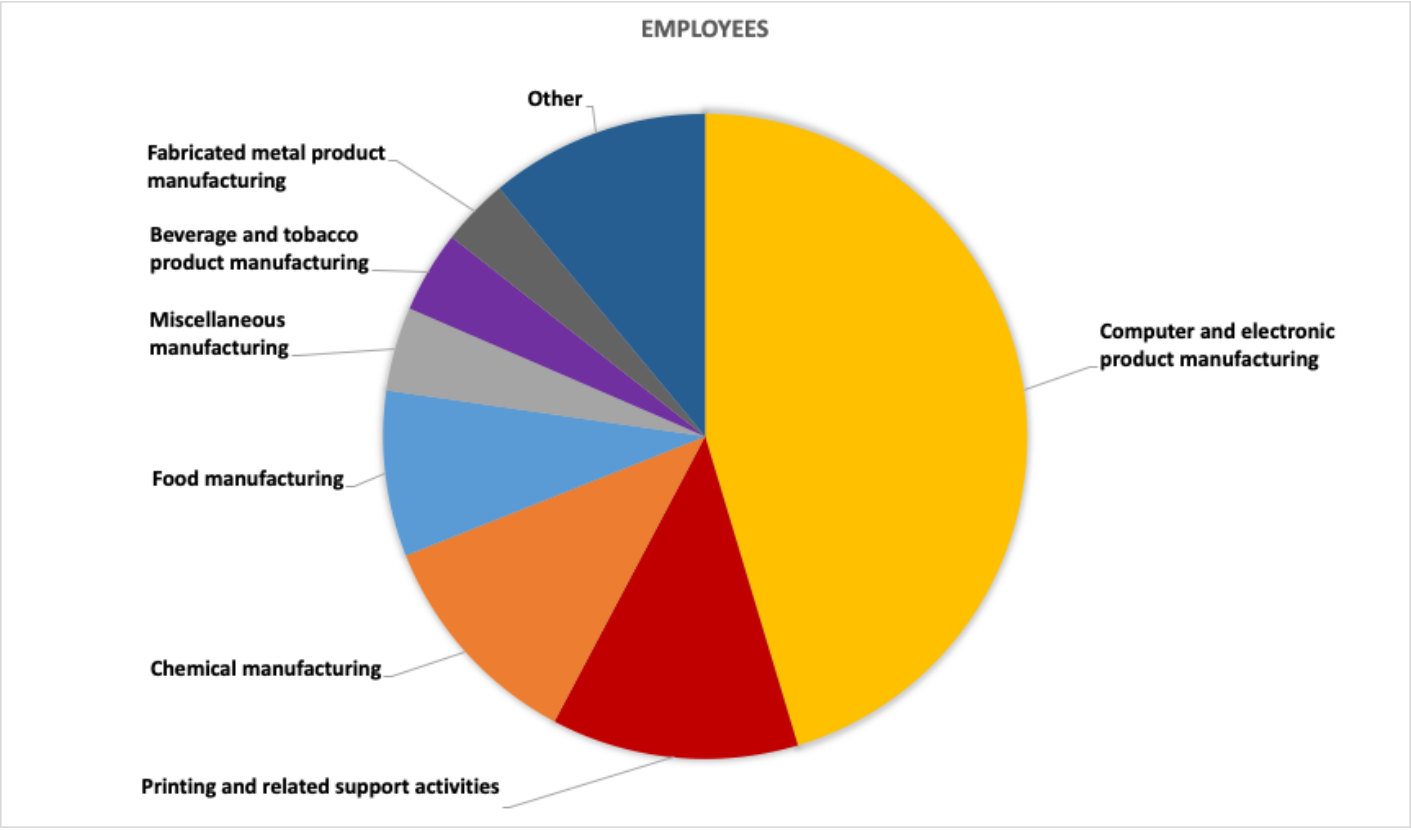
- Nine sub-sectors account for 85% of manufacturing establishments

Manufacturing – Annual Payroll



- Eight subsectors account for 95% of manufacturing payroll
- Computer and Electronic Manufacturing is the largest contributor to manufacturing payroll, representing 60% of the total
- Computer and Electronic Manufacturing and Chemical Manufacturing account for 74% of the total payroll

Manufacturing - Employees



- Together, seven sub-sectors account for 89% of manufacturing employment
- Computer and Electronic Manufacturing is the largest subsector, representing 45% of manufacturing employees

Professional, Scientific, and Technical Services

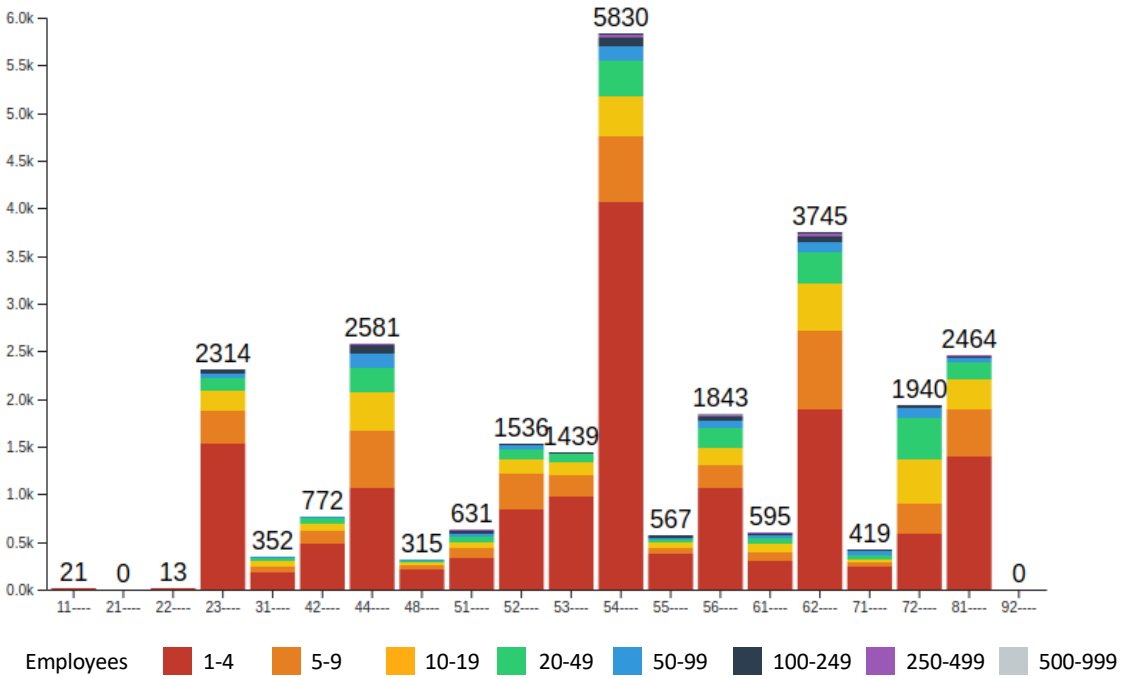
indcode	description	emp		ap		est	
5411//	Legal Services	4,666	7%	$397,820	6%	809	14%
5412//	Accounting-Tax Preparation-Bookkeeping-and Payroll Services	5,919	8%	$433,873	7%	663	11%
5413//	Architectural-Engineering-and Related Services	6,573	9%	$651,440	10%	485	8%
5414//	Specialized Design Services	838	1%	$51,052	1%	189	3%
5415//	Computer Systems Design and Related Services	19,937	28%	$1,991,379	30%	1,591	27%
5416//	Management-Scientific-and Technical Consulting Services	12,385	17%	$1,032,391	15%	1,269	22%
5417//	Scientific Research and Development Services	16,609	23%	$1,876,526	28%	340	6%
5418//	Advertising-Public Relations-and Related Services	1,277	2%	$82,591	1%	147	3%
5419//	Other Professional-Scientific-and Technical Services	2,884	4%	$157,438	2%	295	5%
		71,088	100%	$6,674,510	100%	5,788	100%
			69%		73%		55%

Three subsectors within Professional, Scientific, and Technical Services, highlighted in green, account for the majority of the establishments, annual payroll, and employees

Professional, Scientific, and Technical Services – Detailed Breakdown

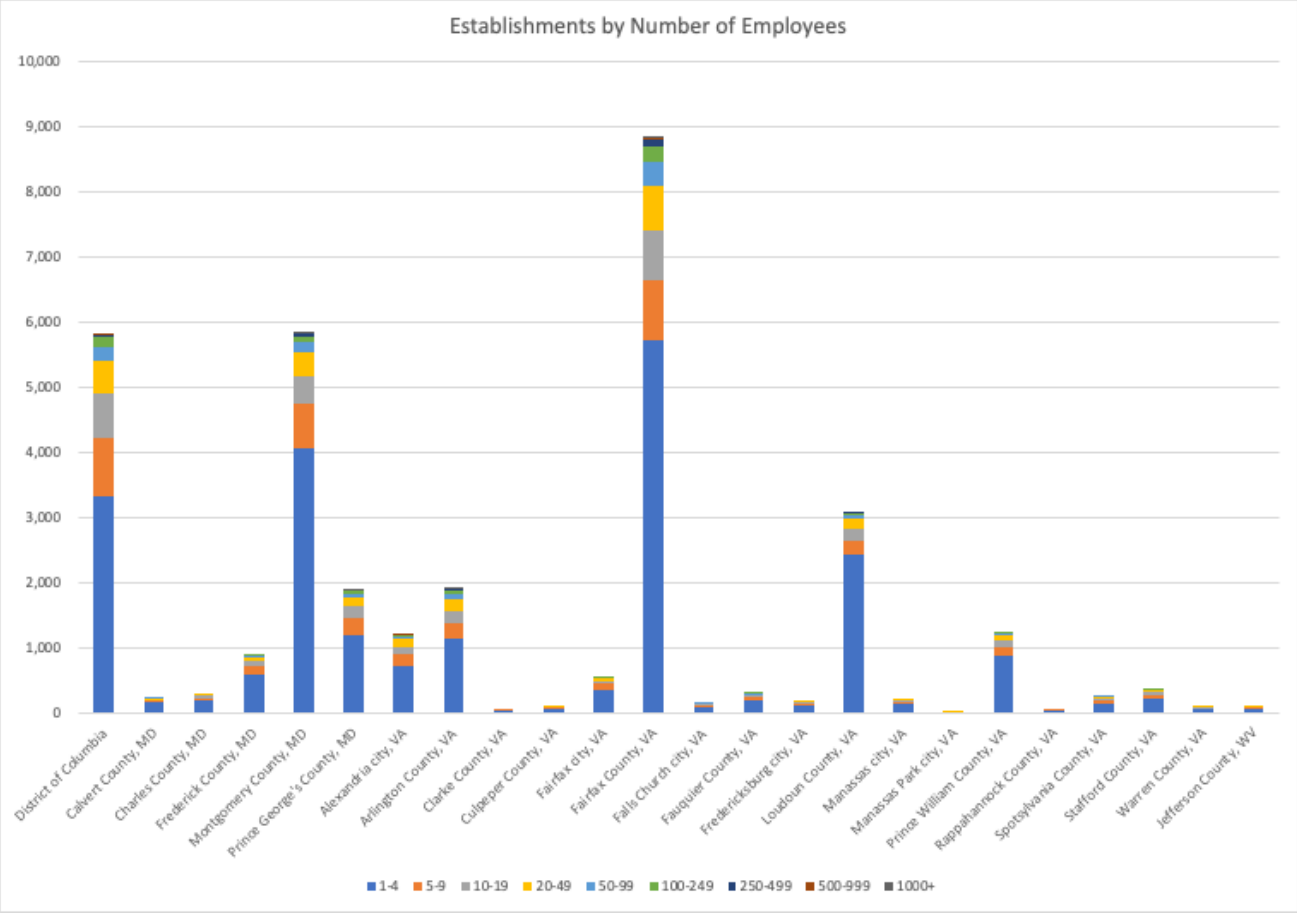
indcode	Description	emp	ap	est	n1 4	n5 9	n10 19	n20 49	n50 99	n100 249	n250 499	n500 999	n1000
541110	Offices of Lawyers	3,974	$348,485	688	496	118	39	28	2	4	1	0	0
541191	Title Abstract and Settlement Offices	536	$40,058	96	65	18	6	6	1	0	0	0	0
541199	All Other Legal Services	156	$9,277	25	18	5	0	1	1	0	0	0	0
541211	Offices of Certified Public Accountants	3,457	$298,725	354	232	60	31	14	12	4	1	0	0
541213	Tax Preparation Services	433	$9,083	88	60	13	12	3	0	0	0	0	0
541214	Payroll Services	1,037	$62,731	35	7	8	8	5	5	2	0	0	0
541219	Other Accounting Services	992	$63,334	186	153	17	10	4	0	2	0	0	0
541310	Architectural Services	708	$63,264	98	64	17	6	8	3	0	0	0	0
541320	Landscape Architectural Services	80	$5,206	23	16	5	2	0	0	0	0	0	0
541330	Engineering Services	5,081	$530,756	305	158	38	42	46	12	7	2	0	0
541340	Drafting Services	0	$0	3	3	0	0	0	0	0	0	0	0
541350	Building Inspection Services	131	$6,886	30	24	2	2	2	0	0	0	0	0
541360	Geophysical Surveying and Mapping Services	0	$0	1	1	0	0	0	0	0	0	0	0
541370	Surveying and Mapping (except Geophysical) Services	237	$19,378	11	3	3	4	0	0	1	0	0	0
541380	Testing Laboratories	328	$25,439	14	6	0	4	2	2	0	0	0	0
541410	Interior Design Services	302	$17,727	72	63	5	1	2	1	0	0	0	0
541420	Industrial Design Services	5	$352	5	5	0	0	0	0	0	0	0	0
541430	Graphic Design Services	466	$30,028	106	94	7	3	1	0	1	0	0	0
541490	Other Specialized Design Services	65	$2,945	6	4	1	0	0	1	0	0	0	0
541511	Custom Computer Programming Services	7,655	$750,584	643	469	68	40	34	15	12	3	2	0
541512	Computer Systems Design Services	5,085	$528,985	725	563	55	42	39	18	7	1	0	0
541513	Computer Facilities Management Services	3,892	$320,093	101	51	17	9	10	8	3	2	0	1
541519	Other Computer Related Services	3,305	$391,717	122	75	12	11	8	9	4	2	1	0
541611	Administrative Management and General Management Consulting Services	7,302	$687,950	819	631	72	44	44	15	7	6	0	0
541612	Human Resources Consulting Services	2,207	$79,448	48	29	8	5	4	1	0	0	0	1
541613	Marketing Consulting Services	472	$39,116	142	118	13	5	6	0	0	0	0	0
541614	Process-Physical Distribution-and Logistics Consulting Services	308	$29,044	35	27	2	0	5	1	0	0	0	0
541618	Other Management Consulting Services	126	$19,569	21	15	2	2	1	1	0	0	0	0
541620	Environmental Consulting Services	509	$38,860	52	33	6	7	3	3	0	0	0	0
541690	Other Scientific and Technical Consulting Services	1,461	$138,404	152	110	22	9	5	4	1	0	1	0
541711	Research and Development in Biotechnology	5,641	$969,137	107	46	26	9	10	8	3	3	1	1
541712	Research and Development in the Physical-Engineering-and Life Sciences (except Biotechnology)	5,667	$564,208	192	87	29	24	29	7	11	4	1	0
541720	Research and Development in the Social Sciences and Humanities	5,301	$343,181	41	17	8	2	6	3	3	1	0	1
541810	Advertising Agencies	517	$25,698	38	23	9	2	3	0	0	1	0	0
541820	Public Relations Agencies	324	$31,256	56	40	4	8	3	1	0	0	0	0
541830	Media Buying Agencies	26	$2,519	8	5	2	1	0	0	0	0	0	0
541840	Media Representatives	51	$5,181	5	3	1	0	1	0	0	0	0	0
541850	Outdoor Advertising	0	$0	2	2	0	0	0	0	0	0	0	0
541860	Direct Mail Advertising	110	$6,238	10	7	2	0	0	1	0	0	0	0
541870	Advertising Material Distribution Services	21	$1,350	4	2	2	0	0	0	0	0	0	0
541890	Other Services Related to Advertising	224	$10,091	24	17	2	1	4	0	0	0	0	0
541910	Marketing Research and Public Opinion Polling	249	$12,979	31	21	5	2	1	2	0	0	0	0
541921	Photography Studios-Portrait	120	$3,673	47	36	10	1	0	0	0	0	0	0
541922	Commercial Photography	17	$1,078	12	12	0	0	0	0	0	0	0	0
541930	Translation and Interpretation Services	956	$56,444	36	21	5	3	4	1	1	1	0	0
541940	Veterinary Services	1,254	$50,553	97	20	29	28	18	1	1	0	0	0
541990	All Other Professional-Scientific-and Technical Services	288	$32,711	72	63	3	2	3	1	0	0	0	0

Distribution of Establishments by number of employees and 2-Digit NAICS Code for Montgomery County



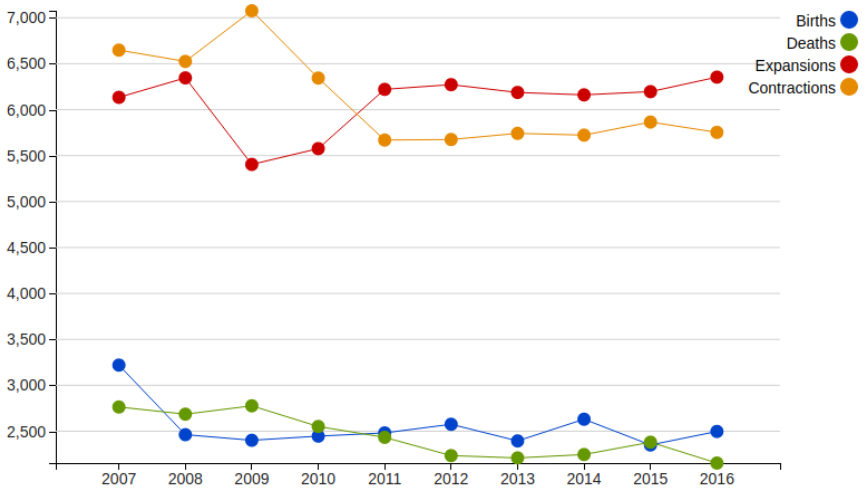
- Most businesses are small
- The red, orange, yellow, green, and pale blue segments represent those that employ fewer than 100 people
- Only the thin slice at the top of each bar represents those with 100 or more employees

Professional, Scientific, Technical Services: Establishments by Employment Size By County for MD, DC, and Northern VA



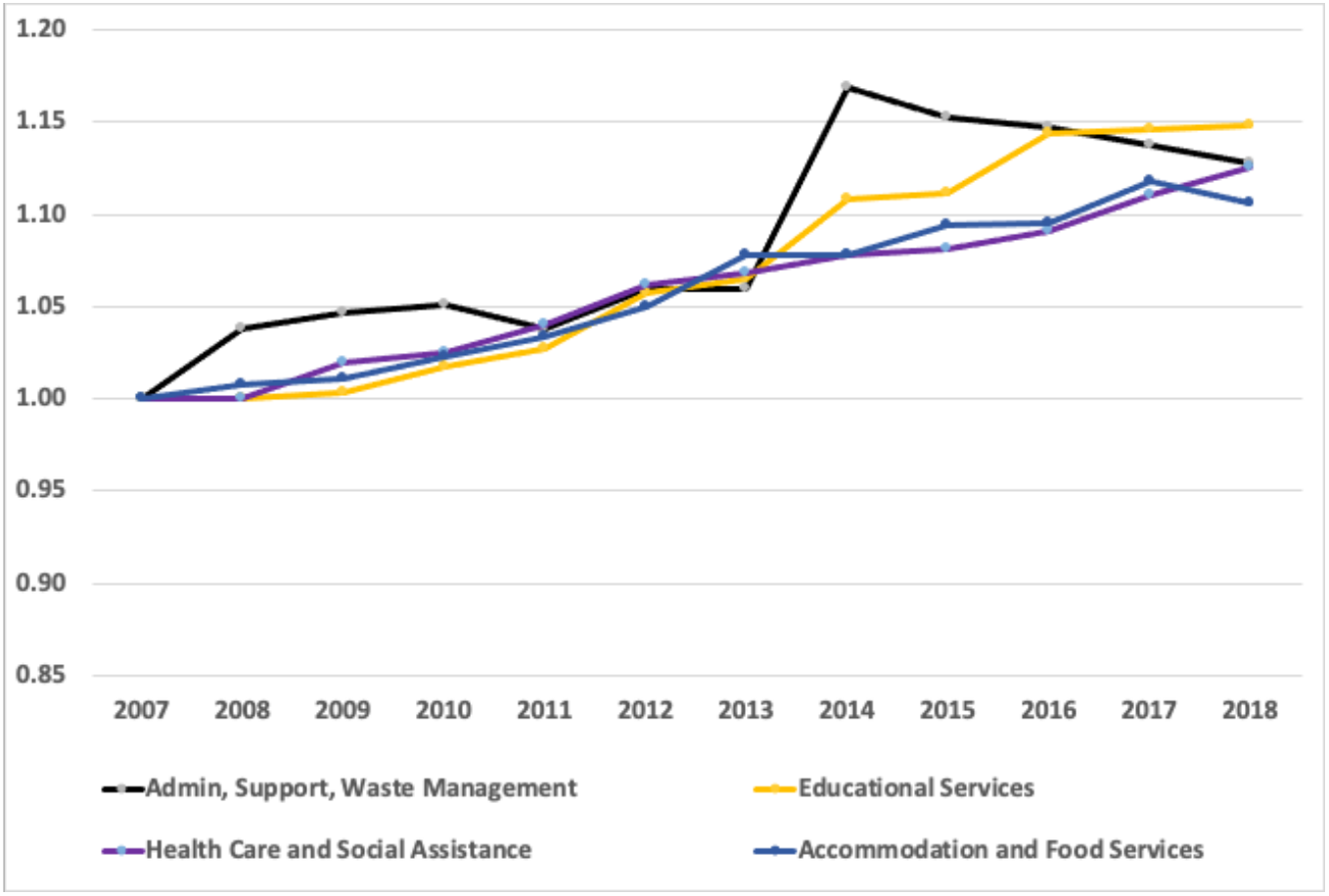
- Montgomery County, Fairfax County, and DC have significantly more establishments in this industry sector than any others in the MSA
- Fairfax County has a similar population to Montgomery County but has significantly more establishments in this industry sector, and proportionately more in the smallest size range (shaded blue)
- Fairfax City and Falls Church City are within Fairfax County, making the scale of the county's share even larger in reality.
- DC has a similar number of establishments to Montgomery County overall, but fewer in the 1-4 employee range

Churn in The Business Population - Montgomery County

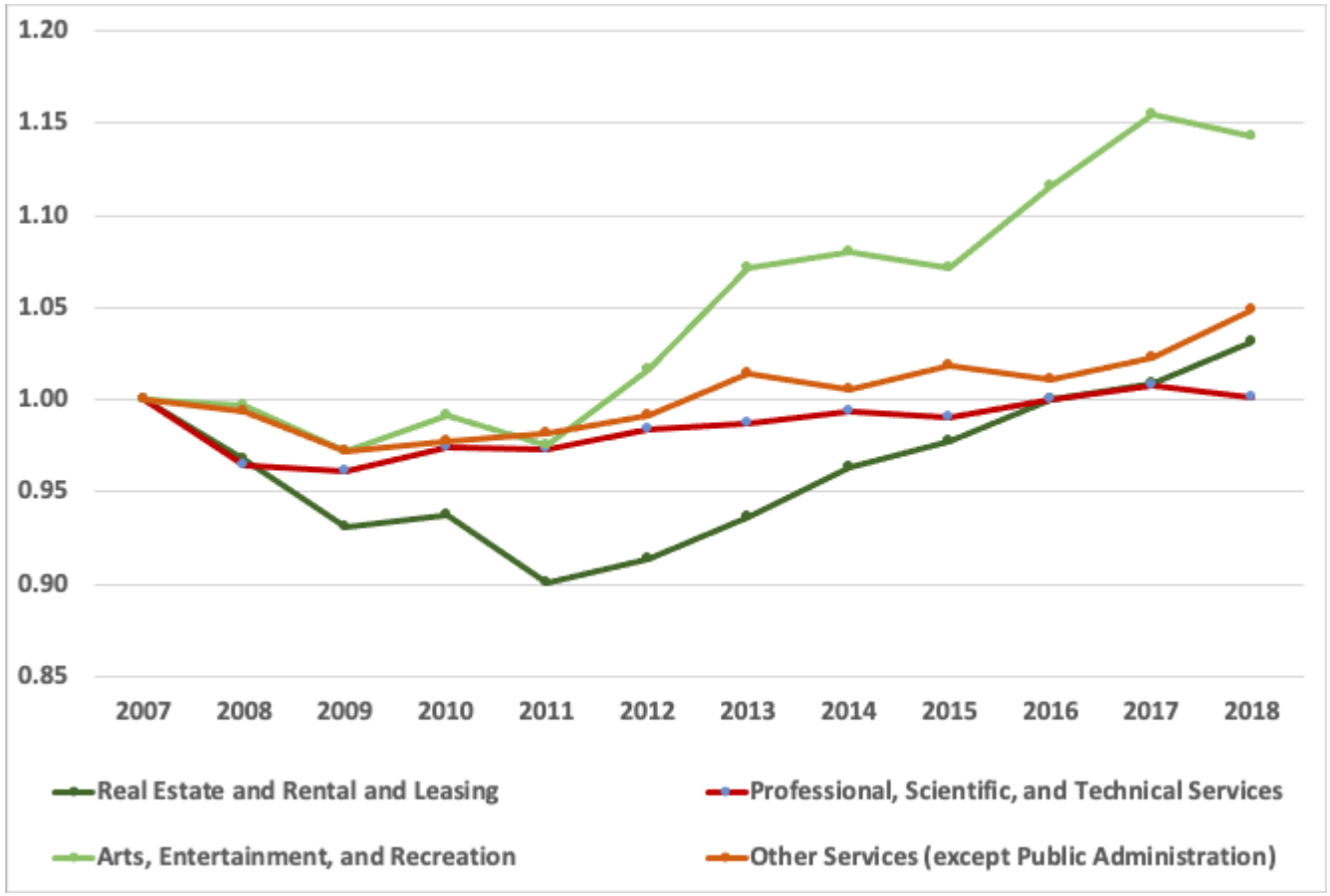


- New companies are created ('Births') on an ongoing basis, creating new economic activity
- In any year individual companies are also lost to the economy ('Deaths') through closures, acquisitions, mergers, and relocations
- At the same time some companies become smaller ('Contractions') and others grow ('Expansions)
- The overall trends are informative, but the scale of the changes is also important in the context of the total number of companies that exist within the county. The net effect of this ongoing 'Churn' is overall growth or contraction in the number companies, and the number of people they employ
- For an economy to remain vibrant and exhibit growth there must be an ongoing injection of new companies to offset those that are lost
- From 2008 to 2010, the number of deaths exceeded the number of births in Montgomery County, which is not surprising following the recession. The overall number of business births has remained relatively constant since 2008, at a level well below that which existed before the recession in 2007.

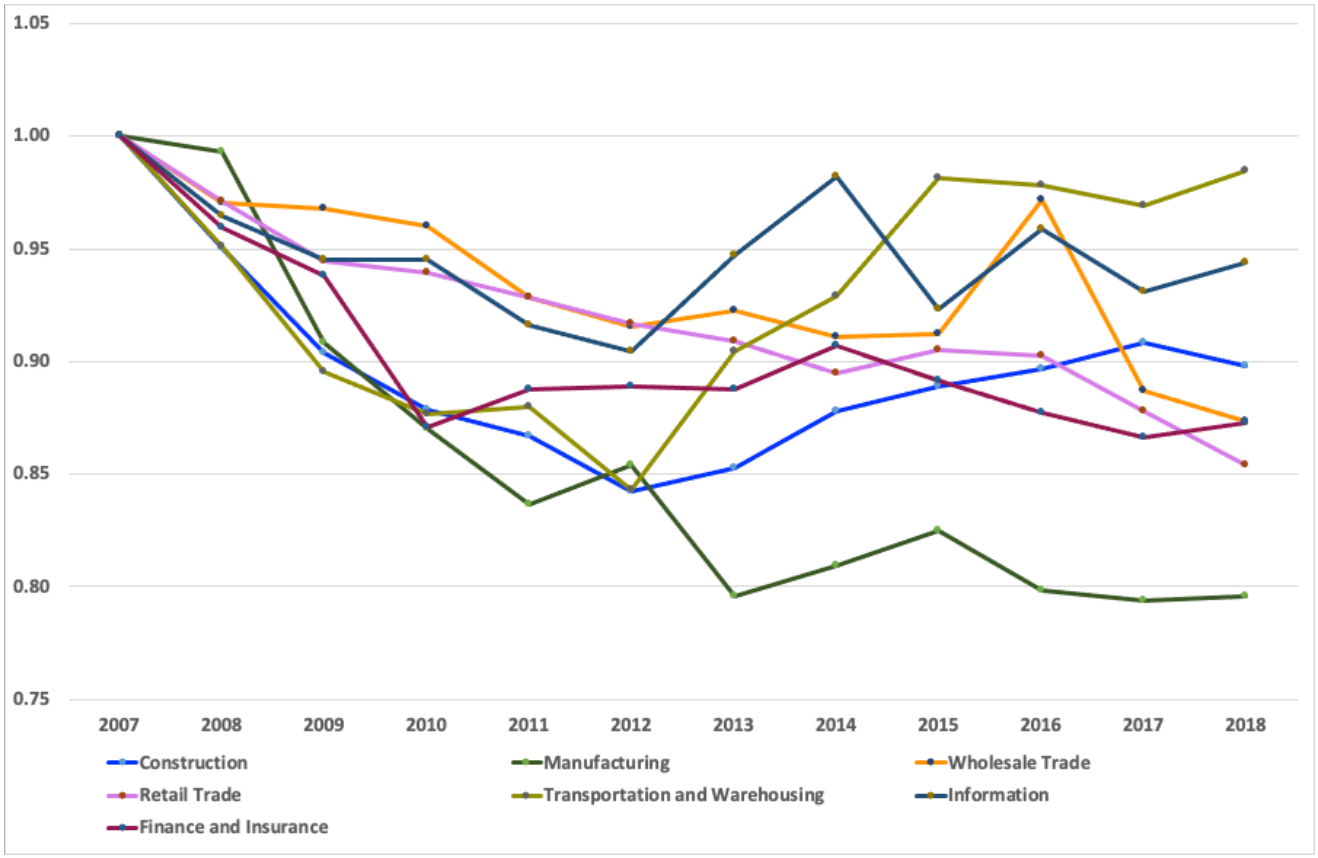
Montgomery County Industry Sectors Exhibiting Growth in the Number of Employers 2007 - 2018



Montgomery County Industry Sectors Exhibiting Decline in the Number of Employers After the Recession but Recovering 2007 - 2018



Montgomery County Industry Sectors Exhibiting Decline in the Number of Employers After the Recession and Not Recovering to The Original Level 2007 - 2018



The Population of Employers - National

- At a national level, there are approximately 7 million businesses with employees, which can be broken down by size as follows:

Size (Employees)	Establishments		Cumulative %
1-4	4,274,161	54.4%	54%
5-9	1,436,612	18.3%	73%
10-19	1,001,856	12.7%	85%
20-49	716,339	9.1%	95%
50-99	239,959	3.1%	97.6%
100-249	135,004	1.7%	99.3%
250-499	35,784	0.5%	99.7%
500-999	13,071	0.2%	99.9%
1,000	7,888	0.1%	100.0%
	7,860,674	**100%**	

- More than 97% of all companies employ fewer than 100 people
- 85% of all companies employ fewer than 20 people

- At the industry sector level, the picture is more nuanced:

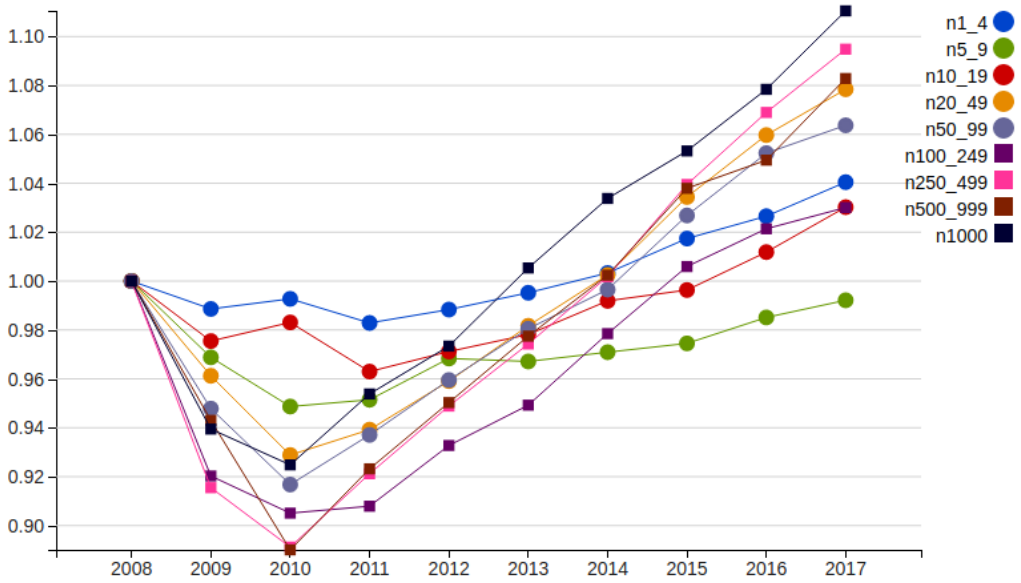
NAICS Code	NAICS Code Description	All Establishments	Number of Employees: 1-4	5-9	10-19	20-49	50-99	100-249	250-499	500-999	1,000
11	Agriculture-Forestry-Fishing and Hunting	0.3%	0.4%	0.3%	0.2%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%
21	Mining-Quarrying-and Oil and Gas Extraction	0.3%	0.3%	0.3%	0.4%	0.4%	0.5%	0.5%	0.6%	0.6%	0.4%
22	Utilities	0.2%	0.2%	0.2%	0.3%	0.4%	0.6%	0.6%	0.8%	1.0%	0.7%
23	Construction	9.1%	11.0%	7.8%	6.7%	6.1%	5.4%	4.6%	3.8%	3.0%	2.0%
31	Manufacturing	3.7%	2.5%	3.5%	4.4%	6.0%	8.6%	12.3%	15.3%	16.7%	11.7%
42	Wholesale Trade	5.2%	5.0%	5.4%	5.7%	5.7%	5.3%	5.0%	4.9%	4.4%	2.3%
44	Retail Trade	13.5%	10.9%	18.0%	17.7%	13.8%	13.7%	17.8%	14.7%	2.1%	1.0%
48	Transportation and Warehousing	3.0%	3.2%	2.3%	2.6%	3.0%	3.6%	4.2%	4.9%	6.0%	4.6%
51	Information	2.0%	1.9%	1.7%	2.0%	2.1%	2.6%	3.0%	3.7%	4.9%	3.5%
52	Finance and Insurance	6.1%	6.7%	7.3%	4.8%	3.3%	3.2%	3.6%	5.2%	8.0%	8.0%
53	Real Estate and Rental and Leasing	5.2%	7.1%	4.1%	2.5%	1.7%	1.3%	1.0%	0.9%	0.6%	0.4%
54	Professional-Scientific-and Technical Services	11.6%	15.1%	8.4%	7.5%	6.4%	6.3%	6.3%	6.7%	6.8%	6.2%
55	Management of Companies and Enterprises	0.7%	0.5%	0.5%	0.8%	1.1%	1.9%	2.9%	4.3%	5.8%	6.1%
56	Administrative & Support , Waste Mgmnt & Remediation	5.3%	5.9%	4.3%	4.1%	4.5%	6.3%	8.2%	11.0%	13.9%	15.1%
61	Educational Services	1.3%	1.2%	1.2%	1.5%	1.8%	2.3%	2.2%	2.2%	3.5%	5.9%
62	Health Care and Social Assistance	11.4%	9.6%	13.6%	13.9%	12.7%	13.0%	15.9%	14.1%	15.8%	26.5%
71	Arts-Entertainment-and Recreation	1.8%	2.0%	1.3%	1.5%	1.9%	2.3%	2.2%	2.1%	1.8%	1.6%
72	Accommodation and Food Services	9.2%	5.1%	8.6%	15.6%	23.7%	19.4%	7.2%	3.2%	3.8%	3.0%
81	Other Services (except Public Administration)	9.7%	11.2%	11.1%	7.8%	5.2%	3.5%	2.4%	1.4%	1.4%	0.9%
99	Industries not classified	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		100.0%	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

More than 5% share in given size range

More than 10% share in given size range

- Manufacturing companies represent a larger proportion of the total than any other traded sector, but a smaller share of small companies than any other sector except for Information
- Professional, Scientific, and Technical Services is the largest sector in the 1-4 employee size range
- Local (i.e. non-traded sectors) dominate the majority of the establishment size ranges

The Population of Employers – National, 2007 - 2018



- At the national level, the population of larger companies was more adversely affected by the recession (in terms of overall numbers) than smaller companies, but has rebounded to a higher level
- But the number of companies in the 5-9 employee size range has still not returned to its 2008 level

The Population of Employers - MSA

- At a the MSA level, there are approximately 154,000 businesses with employees, which can be broken down by size as follows:

Size (Employees)	Establishments		Cumulative %
1-4	82,942	53.7%	54%
5-9	26,643	17.3%	71%
10-19	19,596	12.7%	84%
20-49	15,154	9.8%	94%
50-99	5,606	3.6%	97.2%
100-249	3,178	2.1%	99.2%
250-499	805	0.5%	99.7%
500-999	261	0.2%	99.9%
1,000	151	0.1%	100.0%
	154,336	**100%**	

- The size distribution of companies is closely similar (but not completely identical) to that at the national level

- At the industry sector level, the picture differs significantly from the national one.:

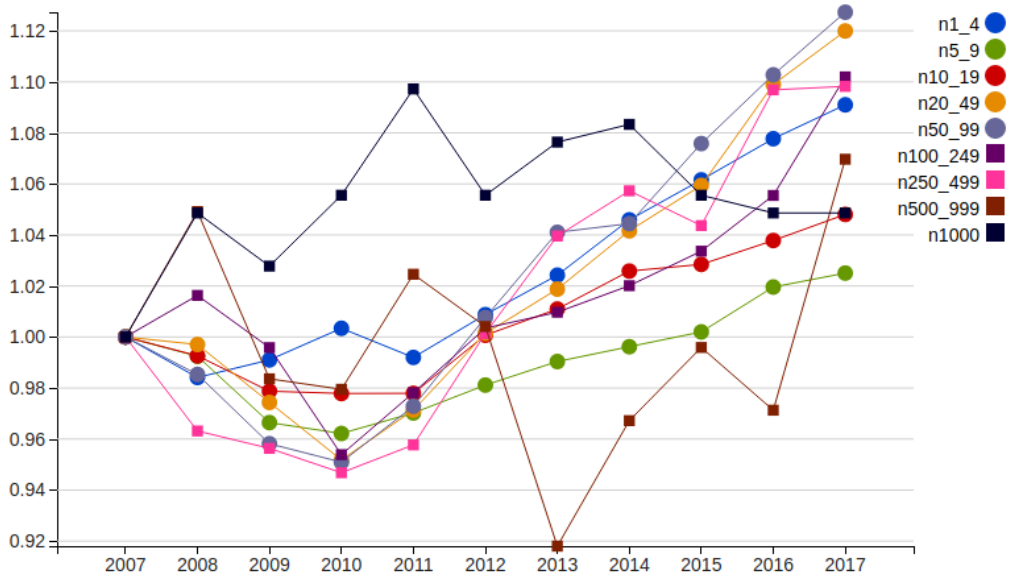
NAICS Code	NAICS Code Description	All Establishments	Number of Employees: 1-4	5-9	10-19	20-49	50-99	100-249	250-499	500-999	1,000
11	Agriculture-Forestry-Fishing and Hunting	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
21	Mining-Quarrying-and Oil and Gas Extraction	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
22	Utilities	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.4%	0.9%	1.1%	0.0%
23	Construction	8.3%	9.7%	7.1%	6.3%	6.4%	6.5%	5.7%	4.7%	5.0%	4.0%
31	Manufacturing	1.4%	1.2%	1.5%	1.6%	1.6%	1.6%	2.0%	2.5%	1.9%	2.0%
42	Wholesale Trade	2.7%	2.7%	2.8%	2.6%	2.7%	2.1%	2.5%	2.0%	2.7%	0.0%
44	Retail Trade	10.5%	8.0%	14.0%	13.9%	11.2%	13.7%	15.1%	9.4%	3.4%	0.0%
48	Transportation and Warehousing	1.7%	1.9%	1.5%	1.4%	1.6%	1.4%	2.0%	3.2%	3.1%	3.3%
51	Information	2.4%	2.2%	2.2%	2.3%	2.7%	3.6%	4.8%	5.1%	10.7%	6.0%
52	Finance and Insurance	4.8%	5.0%	6.6%	4.2%	2.6%	2.2%	2.5%	3.1%	2.7%	6.0%
53	Real Estate and Rental and Leasing	5.1%	6.5%	4.9%	3.6%	2.2%	1.4%	1.2%	1.5%	0.0%	0.0%
54	Professional-Scientific-and Technical Services	21.8%	26.5%	15.5%	15.1%	16.4%	18.7%	21.4%	28.4%	25.3%	22.5%
55	Management of Companies and Enterprises	1.0%	0.9%	0.7%	1.0%	1.0%	1.8%	2.3%	2.7%	4.2%	4.0%
56	Administrative & Support , Waste Mgmnt & Remediation	5.9%	6.0%	5.0%	4.9%	6.0%	7.3%	9.6%	10.3%	14.9%	10.6%
61	Educational Services	2.0%	1.8%	1.8%	2.3%	2.5%	3.0%	3.8%	2.0%	3.4%	6.0%
62	Health Care and Social Assistance	10.8%	9.4%	14.1%	12.8%	11.0%	8.4%	9.7%	10.8%	11.1%	25.8%
71	Arts-Entertainment-and Recreation	1.5%	1.5%	1.1%	1.4%	1.8%	2.7%	2.2%	1.7%	1.1%	2.6%
72	Accommodation and Food Services	8.8%	4.7%	8.6%	14.6%	20.9%	18.4%	8.7%	5.2%	2.3%	3.3%
81	Other Services (except Public Administration)	11.2%	11.6%	12.5%	11.8%	9.2%	6.9%	6.0%	6.3%	6.1%	2.0%
99	Industries not classified	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		100.0%	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

More than 5% share in given size range

More than 10% share in given size range

- Manufacturing establishments represent the smallest percentage of the traded sectors even in the larger size categories
- Professional, Scientific, and Technical Services has the largest percentage of establishments across all size ranges

The Population of Employers – MSA, 2007 - 2018



- At the MSA level, the trends are similar to those at that national level, although the largest size category did not suffer the losses seen at the national level
- Also, all size categories reached a position where there were more companies in 2017 than in 2007

The Population of Employers – Montgomery County

- At a the MSA level, there are approximately 154,000 businesses with employees, which can be broken down by size as follows:

Size (Employees)	Establishments		Cumulative %
1-4	15,617	56.9%	57%
5-9	4,646	16.9%	74%
10-19	3,205	11.7%	85%
20-49	2,403	8.8%	94%
50-99	883	3.2%	97.4%
100-249	508	1.8%	99.3%
250-499	134	0.5%	99.8%
500-999	37	0.1%	99.9%
1,000	27	0.1%	100.0%
	27,460	**100%**	

- The size distribution of companies is similar (but not completely identical) to that at the national and MSA levels

BUT

- The percentage of establishments in the 500-99 size range is half what it is at the national and MSA levels
- The percentage of establishments in the 1-4 person and 10-19 employee ranges are higher

- At the industry sector level, the picture is broadly similar to the MSA as a whole

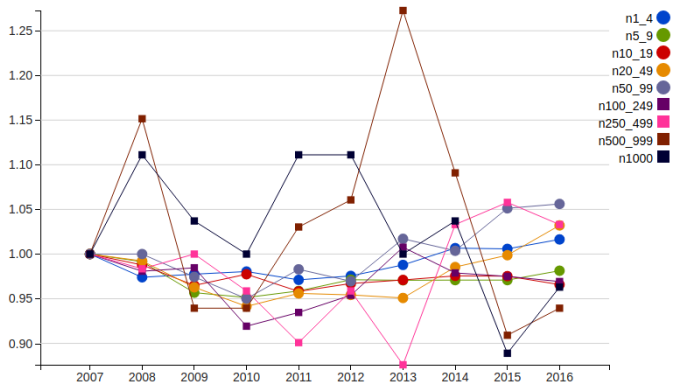
NAICS Code	NAICS Code Description	All Establishments	Number of Employees: 1-4	5-9	10-19	20-49	50-99	100-249	250-499	500-999	1,000
11	Agriculture-Forestry-Fishing and Hunting	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
21	Mining-Quarrying-and Oil and Gas Extraction	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
22	Utilities	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
23	Construction	8.4%	9.8%	7.3%	6.5%	6.2%	5.1%	6.3%	8.2%	0.0%	0.0%
31	Manufacturing	1.3%	1.2%	1.4%	1.9%	1.2%	1.0%	1.0%	2.2%	0.0%	0.0%
42	Wholesale Trade	2.8%	3.1%	2.9%	2.2%	2.4%	1.9%	1.8%	0.0%	0.0%	0.0%
44	Retail Trade	9.4%	6.9%	12.8%	12.7%	10.7%	15.7%	19.1%	10.4%	0.0%	0.0%
48	Transportation and Warehousing	1.1%	1.4%	0.8%	1.0%	0.8%	0.6%	0.8%	0.0%	0.0%	0.0%
51	Information	2.3%	2.1%	2.2%	2.1%	2.3%	3.5%	6.5%	5.2%	8.1%	0.0%
52	Finance and Insurance	5.6%	5.4%	8.0%	4.9%	4.2%	4.3%	4.9%	0.0%	0.0%	0.0%
53	Real Estate and Rental and Leasing	5.3%	6.2%	5.1%	4.1%	3.3%	1.6%	1.4%	0.0%	0.0%	0.0%
54	Professional-Scientific-and Technical Services	21.2%	26.0%	14.9%	13.3%	15.6%	17.3%	15.7%	24.6%	21.6%	14.8%
55	Management of Companies and Enterprises	2.1%	2.4%	1.2%	1.6%	1.2%	3.1%	3.7%	2.2%	0.0%	0.0%
56	Administrative & Support , Waste Mgmnt & Remediation	6.7%	6.8%	5.2%	5.8%	8.4%	8.5%	9.4%	13.4%	16.2%	18.5%
61	Educational Services	2.2%	1.9%	1.9%	2.5%	2.7%	3.7%	3.9%	3.7%	0.0%	0.0%
62	Health Care and Social Assistance	13.6%	12.1%	17.7%	15.5%	13.7%	10.8%	13.4%	14.9%	16.2%	40.7%
71	Arts-Entertainment-and Recreation	1.5%	1.5%	1.0%	1.3%	1.8%	3.6%	3.3%	3.0%	0.0%	0.0%
72	Accommodation and Food Services	7.1%	3.7%	6.8%	14.6%	17.7%	13.5%	4.9%	2.2%	0.0%	0.0%
81	Other Services (except Public Administration)	9.0%	8.9%	10.6%	9.8%	7.7%	5.7%	3.3%	6.0%	10.8%	0.0%
99	Industries not classified	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		100.0%	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

More than 5% share in given size range

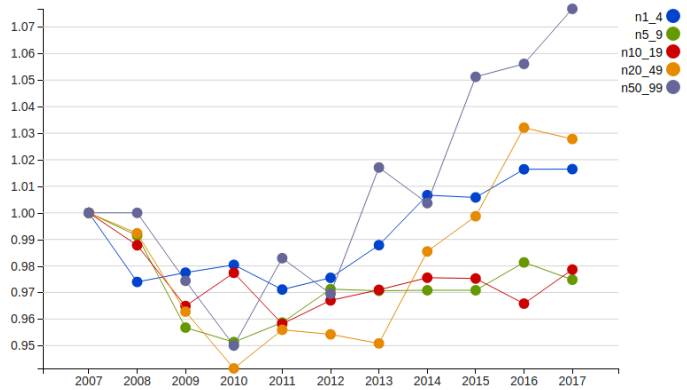
More than 10% share in given size range

- Manufacturing establishments represent the smallest percentage of the traded sectors and is absent from the largest two size ranges
- Professional, Scientific, and Technical Services again has the largest percentage of establishments across all size ranges

The Population of Employers – Montgomery County, 2007 - 2018



All employment size ranges



Size ranges 249 employees or fewer

- The upper chart shows the data for all employment size ranges, and the lower shows only the data in size ranges below 100 employees, in order make the trends clearer (the variations in the larger employment size ranges become more extreme when the total number of companies in those categories is relatively small)
- The data differs significantly from both the national and MSA level data
- Only three employment size ranges show a net increase between 2007 and 2017 (1-4, 20-49, and 50-99 employees)
- Although the 1-4 employee size range shows an upward trend from 2010 to 2017, growth in the 5-9 and 10-19 employee ranges appears to have become relatively flat after 2010

Maryland State GDP by Industry

NAICS Code	NAICS Description	2015	2016	Change	2016 Rank
		(millions of chained 2009 dollars)			
11	Agriculture, Forestry, Fishing and Hunting	662	707	6.80%	18
21	Mining, Quarrying, and Oil and Gas Extraction	312	255	-18.30%	19
22	Utilities	6,012	6,252	4.00%	14
23	Construction	14,195	14,802	4.30%	8
31-33	Manufacturing	18,511	18,151	-1.90%	4
42	Wholesale Trade	14,422	14,411	-0.10%	9
44-45	Retail Trade	17,822	18,148	1.80%	5
48-49	Transportation and Warehousing	6,282	6,445	2.60%	13
51	Information	15,059	15,684	4.20%	7
52	Finance and Insurance	16,868	17,076	1.20%	6
53	Real Estate and Rental and Leasing	55,641	55,731	0.20%	1
54	Professional, Scientific, and Technical Services	32,883	33,956	3.30%	2
55	Management of Companies and Enterprises	3,886	3,952	1.70%	16
56	Admin, Support, Waste Management	10,749	11,120	3.50%	10
61	Educational Services	4,361	4,298	-1.40%	15
62	Health Care and Social Assistance	24,921	25,243	1.30%	3
71	Arts, Entertainment, and Recreation	3,575	3,674	2.80%	17
72	Accommodation and Food Services	8,168	8,179	0.10%	11
81	Other Services (except Public Administration)	7,284	7,410	1.70%	12

Source: Maryland Workforce Innovation And Opportunity Act State Plan, 2018

Change in Business Sector Population (Employers) 2007-2017

NAICS	description	emp	ap	est	n1 4	n5 9	n10 19	n20 49	n50 99	n100 249	n250 499	n500 999	n1000
11----	Agriculture-Forestry-Fishing and Hunting	23%	62%	10%	19%	-50%	0%	100%	0%	0%	0%	0%	0%
113///	Forestry and Logging	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
114///	Fishing-Hunting and Trapping	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
115///	Support Activities for Agriculture and Forestry	36%	112%	11%	20%	-67%	0%	0%	0%	0%	0%	0%	0%
21----	Mining-Quarrying-and Oil and Gas Extraction	0%	0%	-25%	0%	-100%	0%	0%	-100%	0%	0%	0%	0%
211///	Oil and Gas Extraction	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
212///	Mining (except Oil and Gas)	0%	0%	-33%	-100%	-100%	0%	0%	-100%	0%	0%	0%	0%
213///	Support Activities for Mining	0%	0%	0%	0%	0%	0%	0%	-100%	0%	0%	0%	0%
31----	Manufacturing	-26%	-12%	-20%	-16%	-18%	-21%	-26%	-29%	-58%	-33%	0%	0%
311///	Food Manufacturing	7%	40%	29%	77%	13%	-18%	50%	0%	0%	0%	0%	0%
312///	Beverage and Tobacco Product Manufacturing	0%	0%	400%	200%	0%	0%	0%	0%	0%	0%	0%	0%
313///	Textile Mills	0%	-100%	-67%	-100%	0%	0%	0%	0%	0%	0%	0%	0%
314///	Textile Product Mills	-41%	-26%	-27%	-10%	-67%	0%	-100%	0%	0%	0%	0%	0%
315///	Apparel Manufacturing	0%	-29%	11%	13%	0%	0%	0%	0%	0%	0%	0%	0%
316///	Leather and Allied Product Manufacturing	0%	0%	0%	0%	-100%	0%	0%	0%	0%	0%	0%	0%
321///	Wood Product Manufacturing	0%	-8%	-22%	0%	50%	-100%	0%	0%	0%	0%	0%	0%
322///	Paper Manufacturing	0%	0%	0%	-100%	0%	0%	0%	0%	0%	0%	0%	0%
323///	Printing and Related Support Activities	-37%	-41%	-40%	-43%	-45%	-53%	83%	-80%	-100%	0%	0%	0%
324///	Petroleum and Coal Products Manufacturing	0%	0%	50%	-100%	0%	0%	0%	0%	0%	0%	0%	0%
325///	Chemical Manufacturing	0%	0%	16%	100%	0%	0%	-60%	100%	0%	-100%	0%	0%
326///	Plastics and Rubber Products Manufacturing	-18%	87%	-40%	0%	-100%	0%	-50%	0%	0%	0%	0%	0%
327///	Nonmetallic Mineral Product Manufacturing	-68%	-66%	-14%	-20%	0%	67%	-50%	0%	-100%	0%	0%	0%
331///	Primary Metal Manufacturing	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
332///	Fabricated Metal Product Manufacturing	6%	74%	-30%	-50%	-17%	33%	-75%	0%	0%	0%	0%	0%
333///	Machinery Manufacturing	0%	0%	-14%	100%	0%	-50%	-100%	-100%	-100%	0%	0%	0%
334///	Computer and Electronic Product Manufacturing	-11%	16%	-20%	-11%	17%	-33%	-33%	-50%	-20%	-25%	0%	0%
335///	Electrical Equipment-Appliance-and Component Manufacturing	0%	0%	-11%	200%	-67%	-25%	0%	0%	-100%	0%	0%	0%
336///	Transportation Equipment Manufacturing	0%	286%	25%	-33%	100%	0%	0%	0%	0%	0%	0%	0%
337///	Furniture and Related Product Manufacturing	-65%	-62%	-41%	-30%	-38%	0%	-100%	0%	0%	0%	0%	0%
339///	Miscellaneous Manufacturing	-46%	-48%	-33%	-32%	-33%	-10%	-75%	-100%	0%	0%	0%	0%
51----	Information	-18%	2%	-4%	0%	4%	-19%	-26%	23%	-19%	67%	-50%	0%
511///	Publishing Industries (except Internet)	12%	74%	-10%	-12%	-9%	-19%	-17%	67%	-27%	100%	0%	0%
512///	Motion Picture and Sound Recording Industries	53%	151%	-3%	-3%	86%	-60%	-42%	17%	0%	0%	0%	0%
515///	Broadcasting (except Internet)	-39%	-47%	3%	-7%	300%	-57%	-60%	33%	300%	-100%	0%	0%
517///	Telecommunications	0%	0%	15%	46%	-21%	14%	-10%	-44%	-14%	0%	-67%	0%
518///	Data Processing-Hosting-and Related Services	-34%	-19%	-40%	-55%	-27%	-23%	-29%	43%	-67%	50%	-100%	0%
519///	Other Information Services	346%	784%	220%	417%	133%	100%	-50%	0%	200%	0%	0%	0%
52----	Finance and Insurance	-22%	8%	-12%	-8%	-8%	-29%	-19%	-11%	-32%	-100%	0%	0%
521///	Monetary Authorities-Central Bank	0%	0%	-100%	-100%	0%	0%	0%	0%	0%	0%	0%	0%
522///	Credit Intermediation and Related Activities	-31%	14%	-34%	-42%	-19%	-42%	-37%	25%	-9%	-100%	0%	0%
523///	Securities, Commodity Contracts, and Other Financial Investments and Related Activities	-16%	42%	42%	55%	31%	41%	20%	-27%	-33%	-100%	0%	0%
524///	Insurance Carriers and Related Activities	-9%	-11%	-6%	-7%	12%	-24%	6%	-31%	-46%	0%	0%	0%
525///	Funds-Trusts-and Other Financial Vehicles	-100%	-100%	-95%	-95%	-91%	-100%	-100%	-100%	-100%	-100%	0%	0%
54----	Professional-Scientific-and Technical Services	-13%	3%	0%	0%	3%	-8%	1%	9%	-10%	17%	0%	33%
541///	Professional-Scientific-and Technical Services	-13%	3%	0%	0%	3%	-8%	1%	9%	-10%	17%	0%	33%
55----	Management of Companies and Enterprises	-2%	3%	48%	81%	-4%	7%	7%	67%	25%	50%	-50%	-50%
551///	Management of Companies and Enterprises	-2%	3%	48%	81%	-4%	7%	7%	67%	25%	50%	-50%	-50%
71----	Arts-Entertainment-and Recreation	30%	38%	12%	11%	8%	-11%	3%	57%	64%	0%	0%	0%
711///	Performing Arts-Spectator Sports-and Related Industries	82%	67%	1%	0%	0%	-57%	0%	67%	0%	0%	0%	0%
712///	Museums-Historical Sites-and Similar Institutions	-35%	-26%	18%	40%	0%	0%	0%	0%	-100%	0%	0%	0%
713///	Amusement-Gambling-and Recreation Industries	26%	35%	18%	24%	11%	0%	3%	50%	50%	0%	0%	0%

- Red shading shows a loss
- Green shading shows an increase
- The blue border on a row shows subsectors with notable losses

- There have been losses of business in key technically-focused traded sectors
- 325/// includes Pharmaceuticals,
- 339/// includes Medical Devices,
- 54---- includes Scientific Research

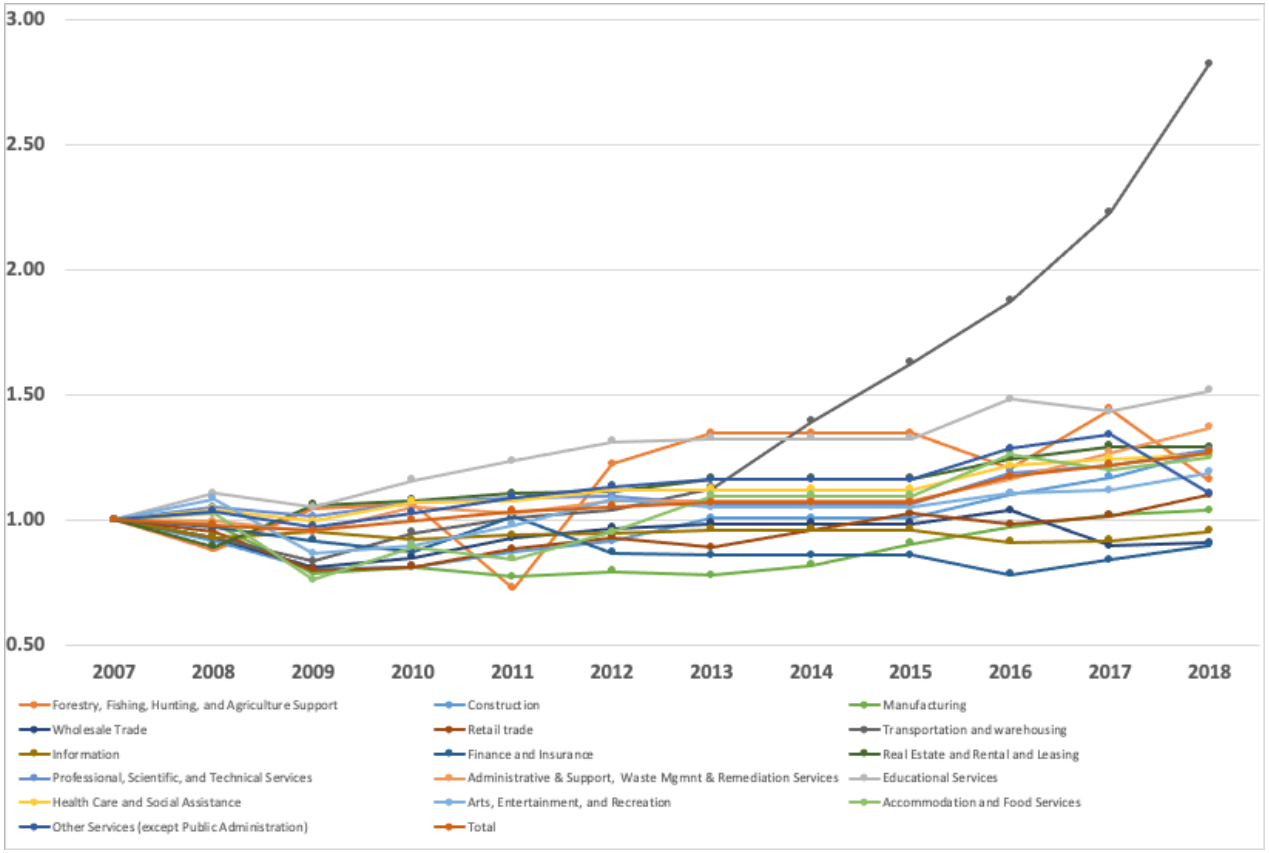
Non-Employer Businesses

Sector	Establish-ments	Receipts ($000s)
Forestry, Fishing, Hunting, and Agriculture Support	133	4,543
Mining	18	$1,870
Utilities	51	$5,363
Construction	9,192	$671,675
Manufacturing	726	$37,592
Wholesale Trade	1,028	$102,659
Retail trade	5,169	$257,170
Transportation and warehousing	15,020	$420,656
Information	1,892	$89,027
Finance and Insurance	2,916	$303,957
Real Estate and Rental and Leasing	11,491	$1,424,418
Professional, Scientific, and Technical Services	25,672	$1,519,833
Administrative & Support, Waste Mgmnt & Remediation Servic	9,459	$258,919
Educational Services	5,217	$94,568
Health Care and Social Assistance	12,799	$519,949
Arts, Entertainment, and Recreation	6,540	$159,312
Accommodation and Food Services	1,884	$64,468
Other Services (except Public Administration)	9,405	$303,093
	118,612	**$6,239,072**

US Census Bureau, 2018

- There were 118,612 non-employer businesses in Montgomery County in 2018 – one for every 9 residents, and one for every 7 adults
- These businesses contributed $6,239,072,000 to the county economy in 2018
- Professional, Scientific, and Technical Services was by far the largest sector for non-employer businesses with twice the number of businesses of the next larges contributor (Health Care and Social Assistance)

Montgomery County Nonemployer Businesses 2007- 2018



- The number of non-employer businesses increased in most sectors between 2007 and 2017
- Declines were seen in Finance & Insurance, Information, and Wholesale Trade
- The largest % growth was in 'Transportation and Warehousing' followed by Educational Services

4.2 Market Access

Market Access

- Access to their intended market is critical for entrepreneurs from an early stage of the process – for customer discovery, to understand the structure of the market, and to build key partner relationships
- Market access can take place through advisors / consultants, large companies (who may, for example be potential partners, suppliers, or analysts)
- Leveraging the available assets requires proactive effort on the part of the entrepreneur
- It can also be facilitated by strong personal networks and by organizations that provide relevant networking opportunities such as professional bodies, trade groups, industry-focused entrepreneur support initiatives, as well as participation in informal networking activities such as meetups
- Facilitating these relationships is an important part of entrepreneur support organizations' role

Existing Company Base (indicative rather than exhaustive)

Software

- Database Management
- Information Services
- Data Science / Data Analytics
- Data Mining
- Data Visualization
- Artificial Intelligence / Machine Learning
- Cloud Services / SaaS
- Mobile applications
- Augmented Reality
- Developer Tools
- Document Management
- E-Commerce

BioHealth

- Therapeutics
- Vaccines
- Bioinformatics
- Clinical Trials
- Medical Devices
- Medical Diagnostics
- Nutraceuticals

Aerospace

- Defense systems
- Unmanned Aircraft
- Coatings

Electronics

- Telecommunications
- Sensors
- Scientific Instruments
- Optoelectronics
- Remote Sensing
- Virtual Reality
- Consumer electronics

Communications

- Infrastructure

Existing Company Base (indicative rather than exhaustive)

Education
- E-Learning
- Education Management Tools

Advanced Materials
- Fibers

Finance
- Cryptocurrencies
- Blockchain
- Payment Processing
- Investment
- Capital Management

Robotics
- Autonomous Vehicles
- Telepresence Robots

Energy
- Clean Energy
- Energy Efficiency
- Energy Management
- Energy Transmission

Hospitality
- Hotels
- Restaurants
- Food and Beverages

Insurance
- Health
- General

Industrial Equipment
- Additive Manufacturing
- Supply Chain Management

Rapidly Growing Maryland Companies

Inc. 500 Rank	Company Name	City	County	Sector
6	**Hunt A Killer**	Baltimore City	Baltimore City	Interactive Entertainment
122	**Four Twelve Roofing**	Baltimore City	Baltimore City	Construction
127	**mPower**	North Bethesda	Montgomery	Government Services
128	**Ad Hoc ResearchLLC**	Havre De Grace	Harford	Government Services
140	**Clear Ridge Defense**	Baltimore	Baltimore City	Government Services
226	**Capital Brand Group**	Silver Spring	Montgomery	Construction
276	**Impyrian**	Fulton	Howard	Engineering
304	**DecisionPoint Corporation**	Gaithersburg	Montgomery	Government Services
377	**Hop Havoc**	Williamsport	Washington	Food & Beverage
425	**T-Rex Solutions**	Greenbelt	Prince George's	Government Services
452	**Confidio**	Towson	Baltimore County	Health
463	**Premier Enterprise Solutions**	Upper Marlboro	Prince George's	IT Management
495	**Grant Leading Technology**	Riverdale	Prince George's	IT Management

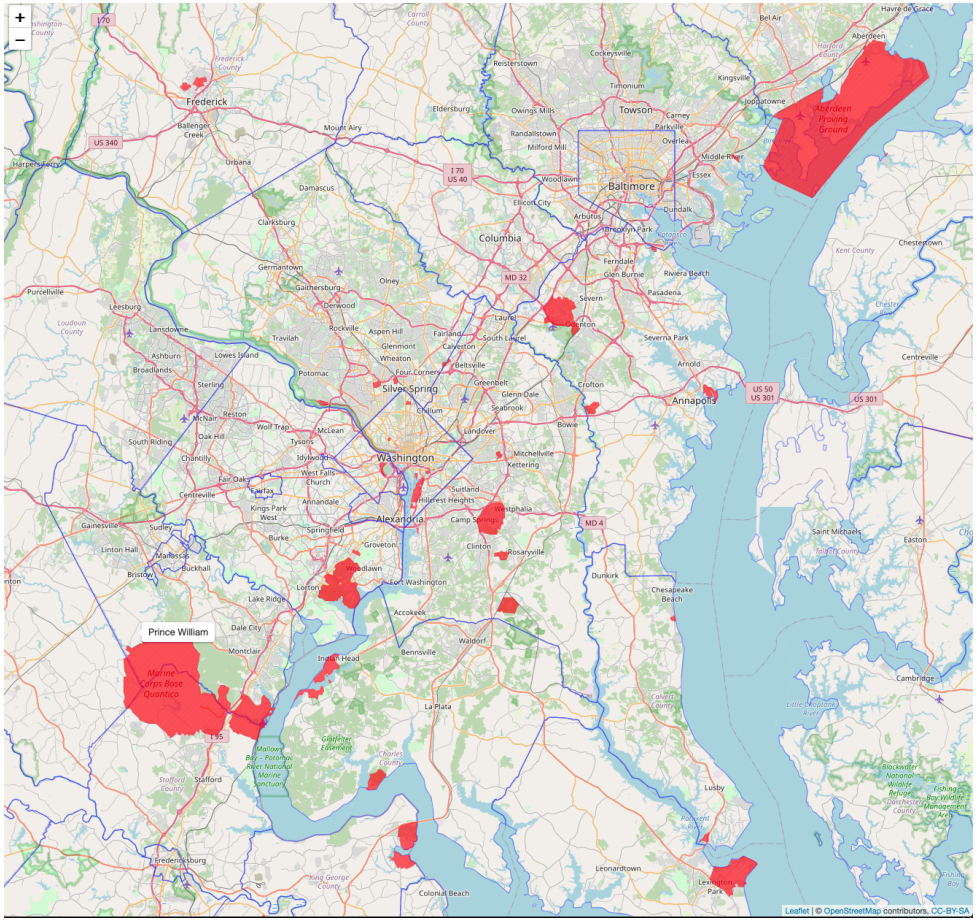
Of 13 Maryland companies in the 2020 Inc. 500 list only three are in Montgomery County

Of these, two are in the Government Services sector, and one is in Construction

Federal Government

- The Federal Government has a significant presence in the Greater Washington region, in respect of both military and civilian agencies, and this presence has a significant impact on the economies of the counties that house federal facilities
- The following slides present data that characterizes this impact in the context of entrepreneurship

Military Installations in Maryland, DC, and Virginia



- Key sources of intellectual property that can form the basis for new entrepreneurial ventures include (not all locations are given their full names here):
  - Aberdeen Proving Ground – Army Combat Capabilities Command (Harford County)
  - Naval Research Laboratory (DC)
  - Fort Detrick (Frederick County)
  - Fort George G Meade (Howard / Anne Arundel Counties)
  - Army Research Laboratory (Montgomery / Prince George's County)
  - National Naval Medical Center (Montgomery County)
  - Walter Reed Army Medical Center (DC / Montgomery County)
  - Naval Surface Warfare Center Carderock (Montgomery County)
  - Naval Surface Warfare Center Indian Head
  - Naval Surface Warfare Center Dahlgren – (Virginia)
  - Naval Air Station Patuxent River (St. Mary's County)
- Many companies in Maryland are engaged in activities in support of military R&D programs at these locations

Department of Defense Expenditure

- In 2019, the DoD spent the following amounts through procurement contracts:

Location	Expenditure / $
VA	38,644,346,544
MD	15,947,141,364
DC	4,156,970,996
Total	**58,748,458,904**

- The largest recipients at the county level (as defined by the Place of Performance in the contracts) were:

Location	Expenditure / $
Fairfax County, VA	15,649,814,632
Washington, DC	4,130,339,308
Montgomery County, MD	3,071,985,310
Anne Arundel County, MD	3,203,668,313
Total	**26,055,807,563**

- The picture becomes complex because the contract holders may be in different locations from the place of performance, and so MD companies are likely to be fulfilling some of the contracts in Virginia (for example), and vice versa, but the overall scale is nonetheless significant

- At a more specific level, in 2019, the DoD expenditure included the following amounts on Research and Development contracts:

Location	Expenditure / $
Fairfax County, VA	2,515,361,736
Washington, DC	379,551,276
Montgomery County, MD	192,044,177
Anne Arundel County, MD	163,704,265
Total	**3,250,661,454**

National Institutes of Health Expenditure

- In 2019, the NIH spent the following amounts through procurement contracts:

Location	Expenditure / $
VA	21,120,741
MD	956,239,429
DC	0
Total	**977,360,170**

- The largest recipients at the county level (as defined by the Place of Performance in the contracts were:

Location	Expenditure / $
Frederick County, MD	712,552,259
Washington, DC	320,772,959
Montgomery County, MD	2,408,581,281
Baltimore City	1,095,930,746
Total	**4,537,837,245**

- The picture becomes complex because the contract holders may be in different locations from the place of performance, and so MD companies are likely to be fulfilling some of the contracts in Virginia (for example), and vice versa, but the overall scale is nonetheless significant

- At a more specific level, in 2019, the DoD expenditure included the following amounts on Research and Development contracts:

Location	Expenditure / $
Frederick County, VA	597,813,177
Montgomery County, MD	296,211,533
Baltimore City	59,183,656
Total	**894,025,310**

4.3 Intellectual Property

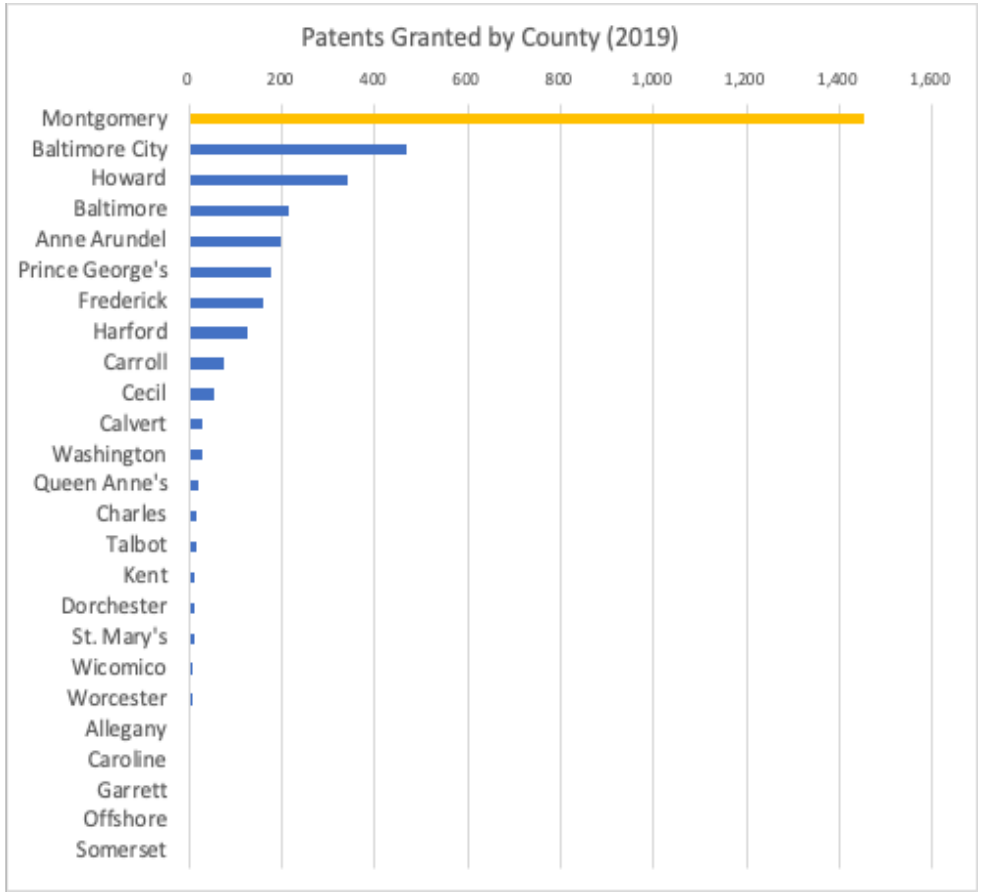
Intellectual Assets - Patents

- While companies that are founded on new developments in science and engineering make up only a part of the overall business population, they frequently have the potential to access global markets and to exhibit rapid growth
- One measure the of capacity within the economy to generate these kinds of companies is the number of patents filed.
- The tables show a breakdown of all patents granted in 2017 to inventors resident in Montgomery County (a total of 1,179) using technology categories developed by the World Intellectual Property Organization (WIPO). These categories are indicated in the table by the first column (as 'W' followed by the category number).
- There are evident strengths in BioHealth and Information Technology and also in Chemicals, Measurement and Control, and Materials Science

IT		
W06	Computer Technology	197
W04	Digital Communication	109
W07	IT Methods for Management	46
W03	Telecommunications	44
W05	Basic Communication Processes	12
		408
BioHealth		
W16	Pharmaceuticals	237
W13	Medical Technology	88
W15	Biotechnology	54
W11	Analysis of Biological Materials	9
		388
Chemicals		
W23	Chemical Engineering	42
W14	Organic Fine Chemistry	39
		81
Measurement and Control		
W10	Measurement	69
W12	Control	10
		79
Materials Science		
W08	Semiconductors	20
W19	Basic Materials Chemistry	16
W21	Surface Technology, Coating	8
W20	Materials, Metallurgy	6
W22	Micro-structural and Nano-technology	5
W17	Macromolecular Chemistry, Polymers	5
		60

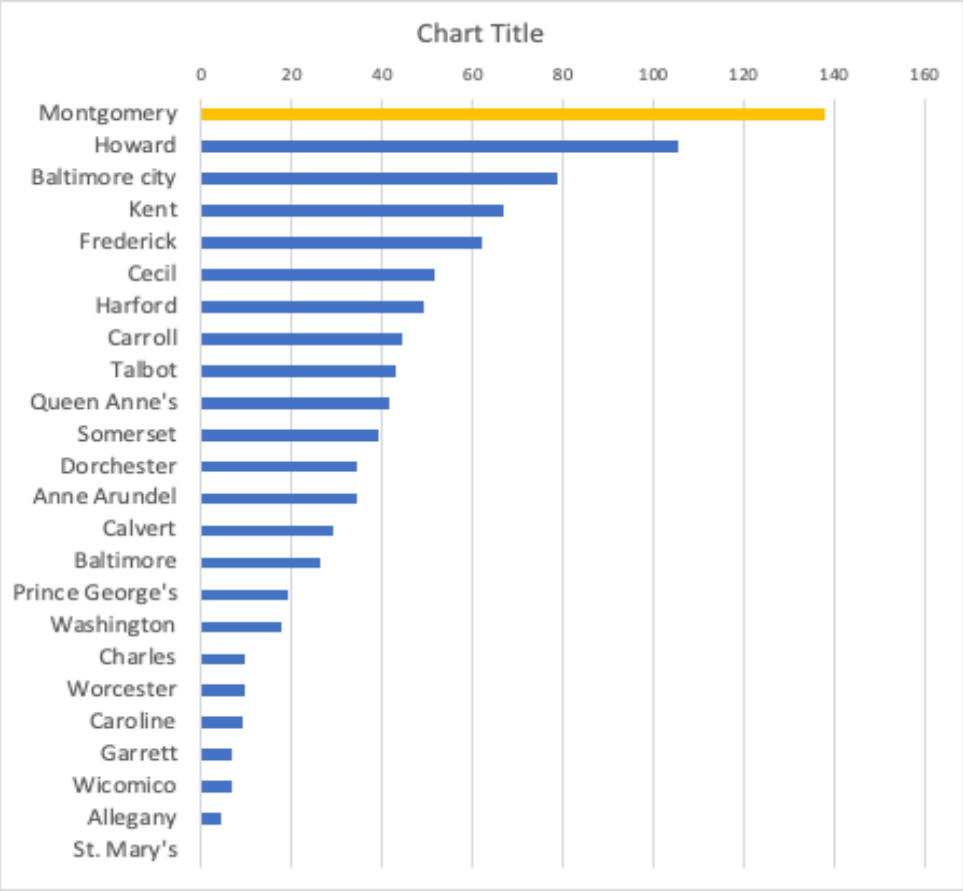
Other Technology Domains		
W29	Other Special Machines	29
W32	Transport	24
W33	Furniture, Games	21
W01	Electrical Machinery, Apparatus, Energy	18
W34	Other Consumer Goods	18
W02	Audio-visual Technology	12
W09	Optics	7
W25	Handling	7
W18	Food Chemistry	6
W30	Thermal Processes and Apparatus	6
W26	Machine tools	4
W31	Mechanical Elements	4
W35	Civil Engineering	4
W24	Environmental Technology	1
W27	Engines, Pumps, Turbines	1
W28	Textile and Paper Machines	1

Intellectual Property – Patents Granted by County



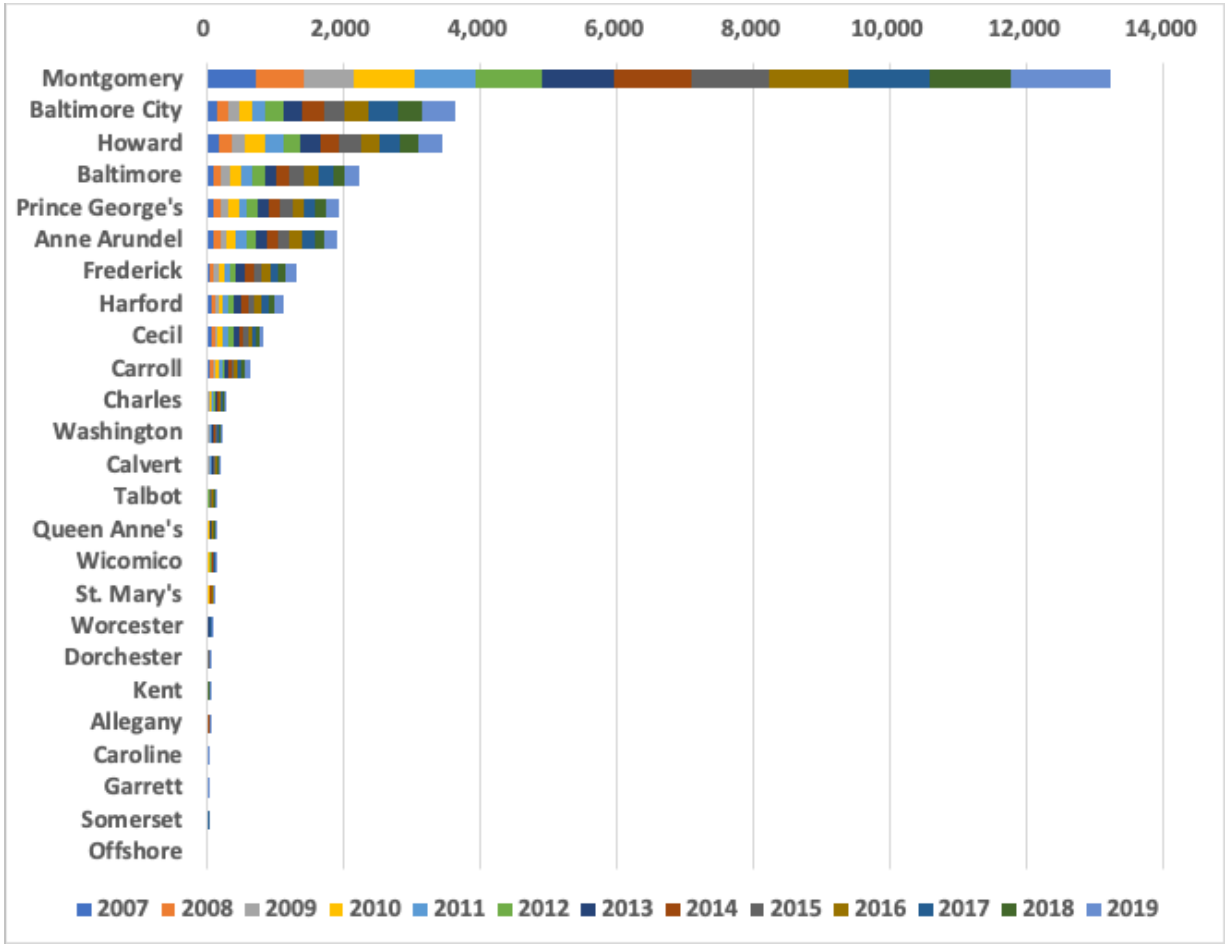
- Montgomery County stands out as the largest generator of patents in the state with more than 1,400 patents being granted in 2019

Intellectual Property – Patents Granted by County Per 100,000 Population

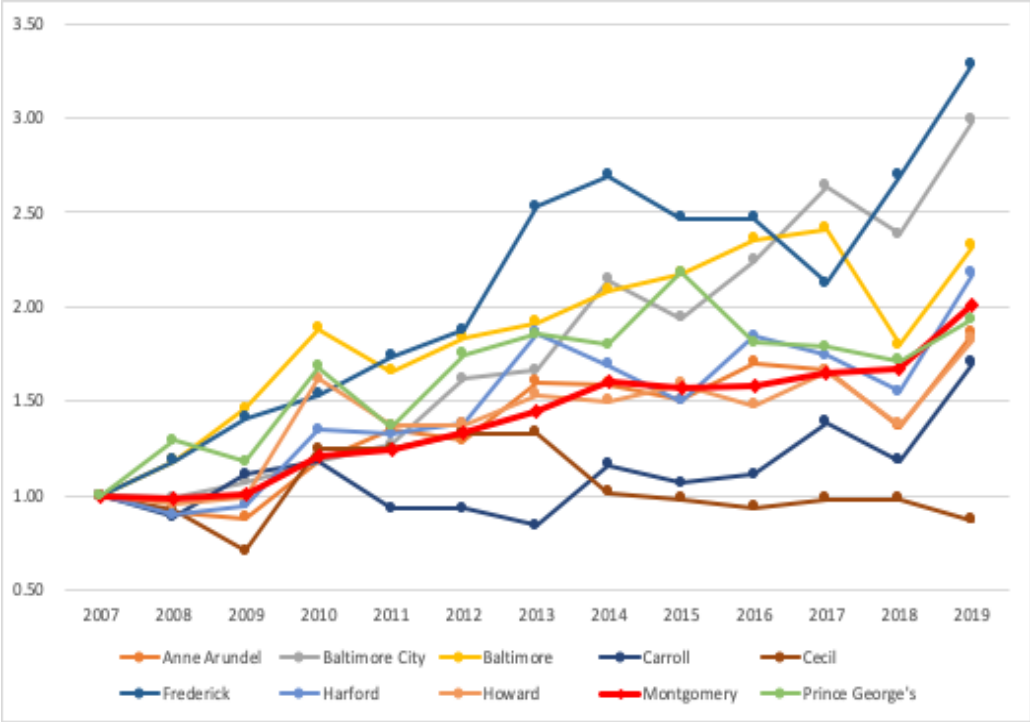


- On a per capita basis, Montgomery County is also the largest generator of patents in the state although the extent to which it exceeds the count for other counties is considerably less

Cumulative Patents Awarded to Montgomery County Inventors 2007 -2019



Intellectual Property – Trend in Number of Patents Filed

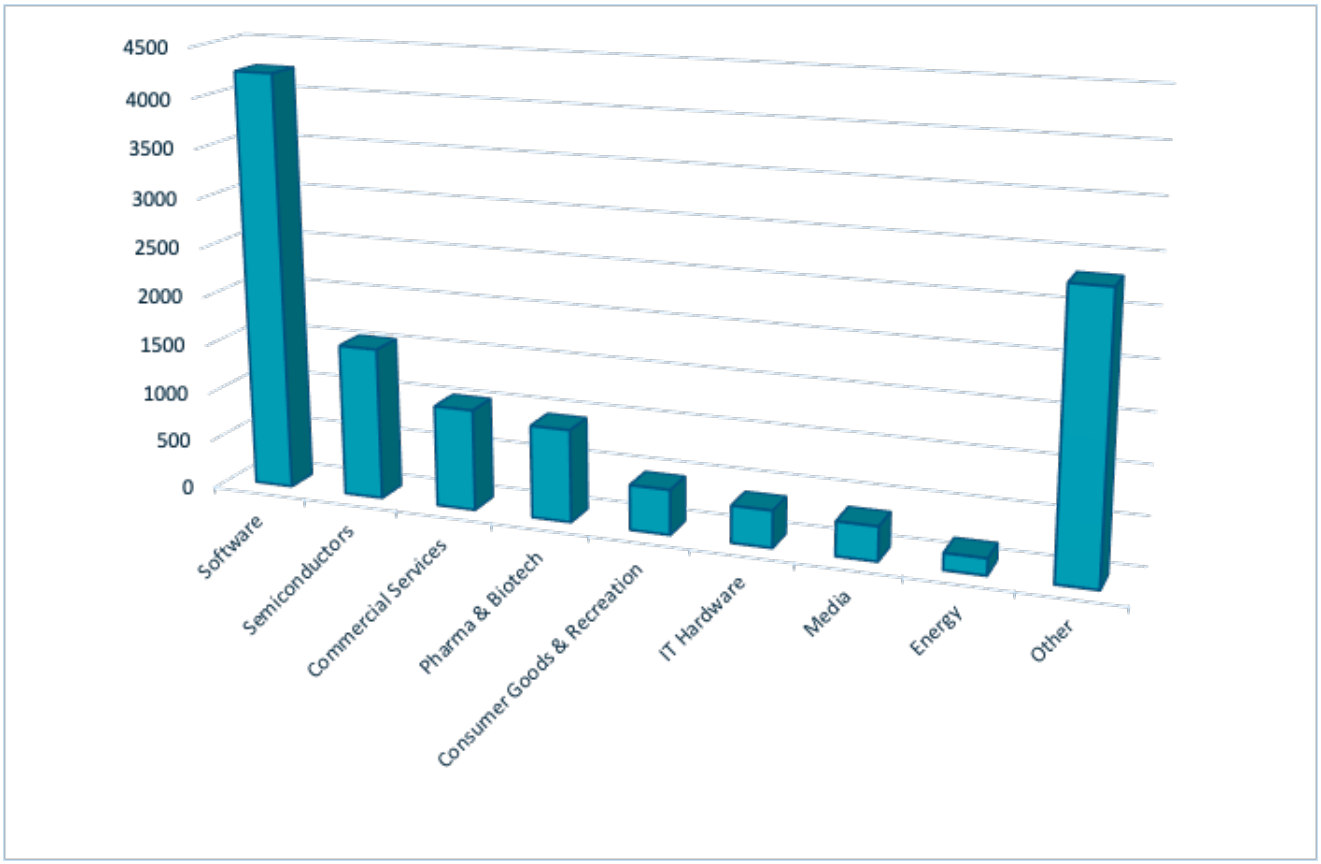


Data normalized with 2007 = 1.00 for each county's data in order to make the relative trends clearer

- In terms of the growth in the number of patents filed, the growth rate for Frederick County, Baltimore City, and Baltimore County all appear to be consistently higher than for Montgomery County
- This could be interpreted as reflecting growth in the level of research and development activity in each these locations relative to Montgomery County

4.4 Finance

Sources of Finance For Entrepreneurs– Nationwide Venture Capital Deal Sectors



In 2019 there were 13,942 Venture Capital deals in the US

The three largest sectors were Software, Semiconductors, and Commercial Services

Source: NVCA, 2020 Report

78

Sources of Finance – Venture Capital

In 2019, Maryland

- Attracted 1.3% of all US venture capital deals
- Ranked 12th in the nation for number of deals per capita (Adjacent states: VA – 13th, DE – 4th, PA – 18th, WV – 51st)

Examples of Maryland-based VCs

• Abell Venture Fund	Baltimore focus
• ABS Capital Partners	Series A/ B
• Anthem Capital	
• Brooklawn Ventures	
• TCP Venture Capital	Early stage
• Inflection Point Ventures	(Delaware)
• Greenspring Associates	Series A/ B
• New Enterprise Associates	
• Novak Biddle Venture Partners	
• Sterling Venture Partners	Series A/ B
• Grotech Ventures (Hunt Valley)	
• New Spring Capital	

Venture Capital Firms / Organizations – DC / Virginia

Total Firms: 185

Investment stage:

- Pre-Seed: 16
- Seed: 96
- Series A: 140
- Series B: 117

1,439 VC firms identified that have historically made at least one investment in DC or Virginia

Source: TechCrunch

Selected DC / Virginia-Based VCs

- Blu Venture Partners
- Tall Oaks Capital
- Paladin Group (DC)
- Columbia Capital (Alexandria, VA)
- Crystal Tech Fund (Arlington, VA)
- Revolution (DC)
- Disruptor Capital (Alexandria, VA)
- eCentury Capital (McLean, VA)
- Edison Partners (McLean, VA)
- NaviMed Capital (DC)
- Quona Capital (DC)
- IMS Ventures (Alexandria, VA)
- K-Street Capital
- Grotech Ventures (Vienna, VA)
- In-Q-Tel (Arlington, VA)
- Liquid Capital Group (McLean, VA)
- New Atlantic Ventures (Reston, VA)
- New Vantage Group (Vienna, VA)
- Route 66 Ventures (Alexandria, VA)
- Sail Venture Partners (Arlington, VA)
- True Ventures (Great Falls, VA)
- QED Investors (Alexandria, VA)
- Updata Partners (DC)
- Valhalla Partners (Vienna, VA)

Sources of Finance (Non-VC)

- TEDCO
- Angel Investors
- Accelerator programs
- Microloan programs
- County programs

Note: The most common sources of funding for entrepreneurs are:

- Existing personal assets
- Debt funding secured on the personal assets of founders
- Unsecured personal debt (primarily credit cards)
- Family and friends

Finance Infrastructure

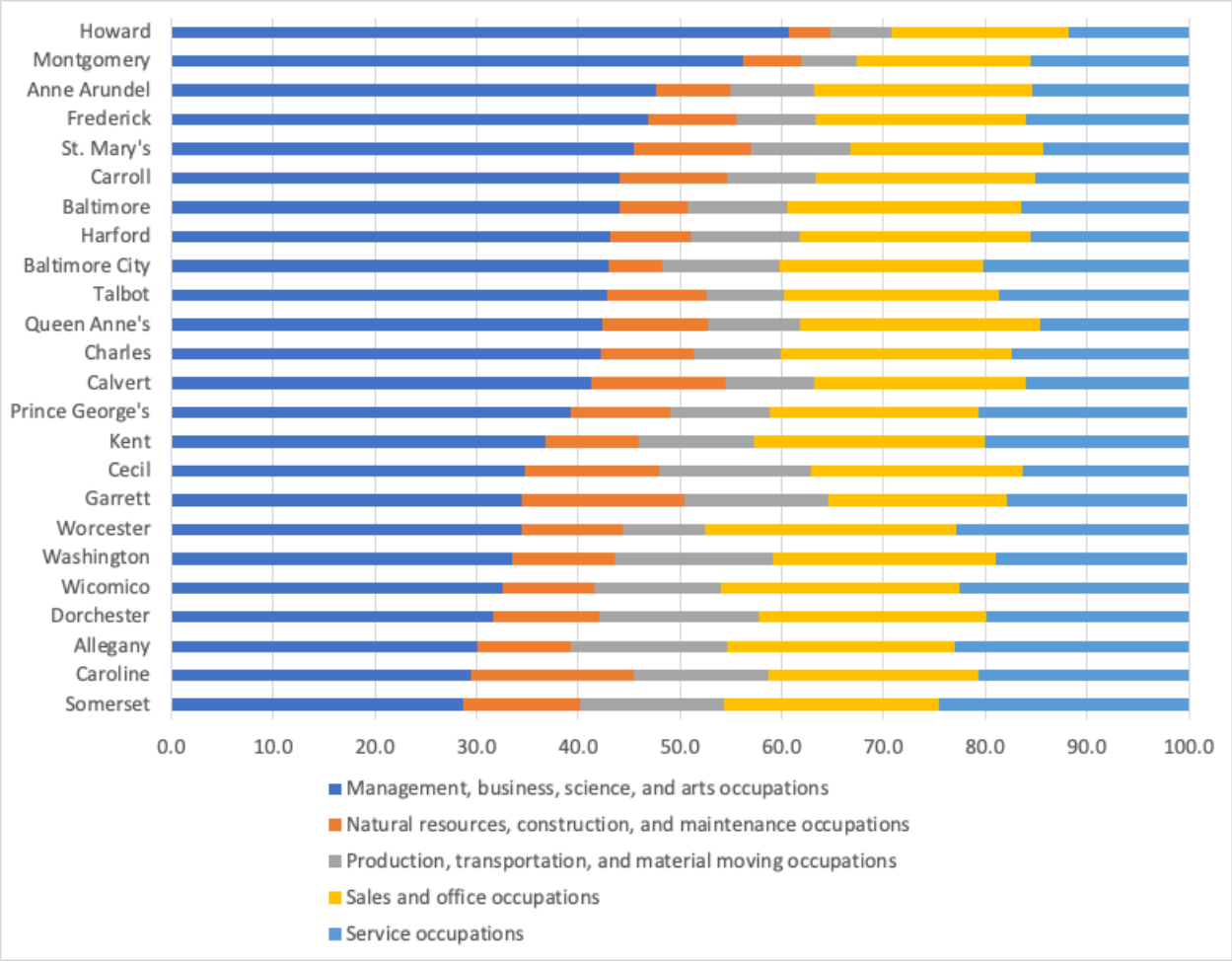
- Along with loan programs and incentives, the county offers:
  - NIH SBIR/STTR matching grant program
  - Biotechnology Investor Incentive Program
  - Cybersecurity Tax Credit Supplement Program
- There are several hundred VC firms in the mid-Atlantic, accessible to County entrepreneurs, and many more have made investments in the region
- In 2019, Maryland attracted 1.3% of US VC deals, but has 1.8% of the US population
- Many Montgomery County companies makes use of the SBIR / STTR programs but there does not appear to be any direct assistance to support BIN companies in doing so other than from BioHealth Innovation (although there appears to be general awareness of the programs)
- TEDCO offers various funding programs for startups and early-stage companies

4.5 Management Expertise

Management Expertise

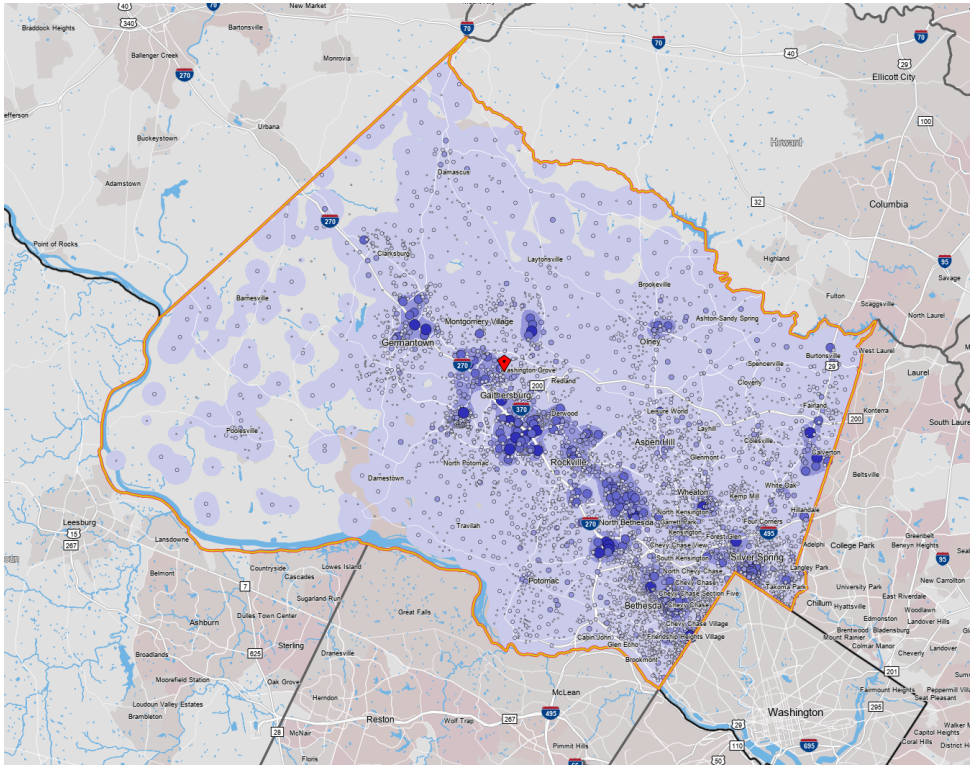
- Obtaining and or developing the full breadth of management skills needed to create and grow a company (especially one operating in a highly technical field) is challenging for many entrepreneurs and many incubators and other entrepreneur support programs provide (or provide access to) relevant programs, often in conjunction with local universities or colleges
- Management expertise will reside in existing companies (particularly those that are seen as leaders in their sectors) but also (potentially) in business schools, and other organizations such as industry association
- Programs such as accelerators, industry-driven training programs, local or regional leadership development programs can also be sources of management expertise for entrepreneurs

Percentage of employment in major occupation categories



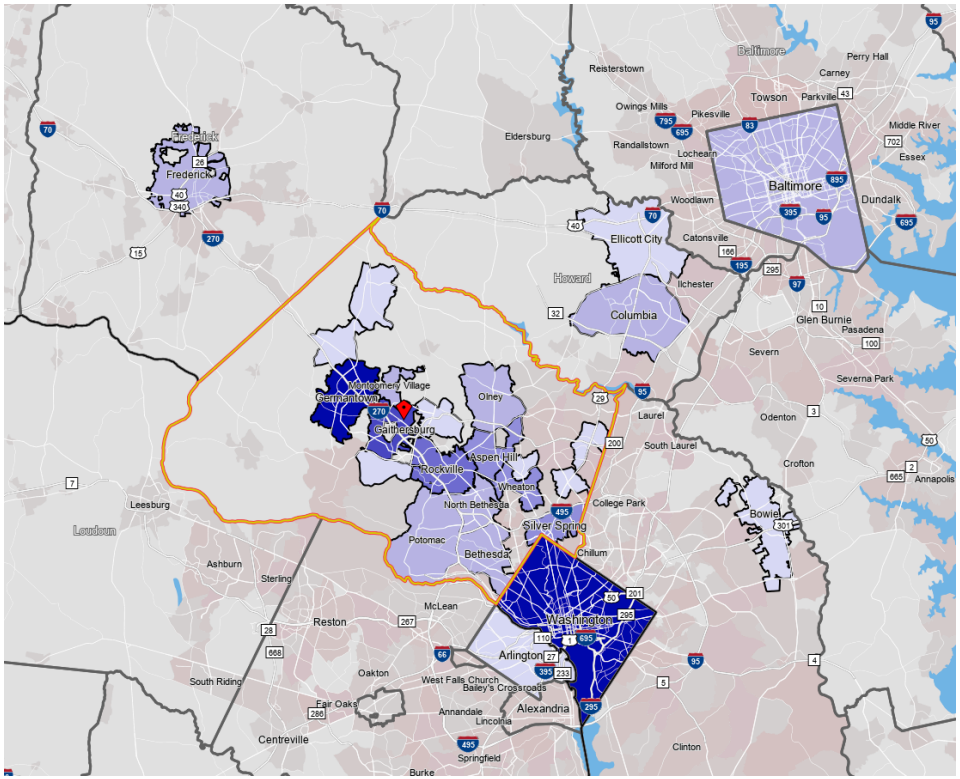
4.6 Workforce

Distribution of Private Sector Employment



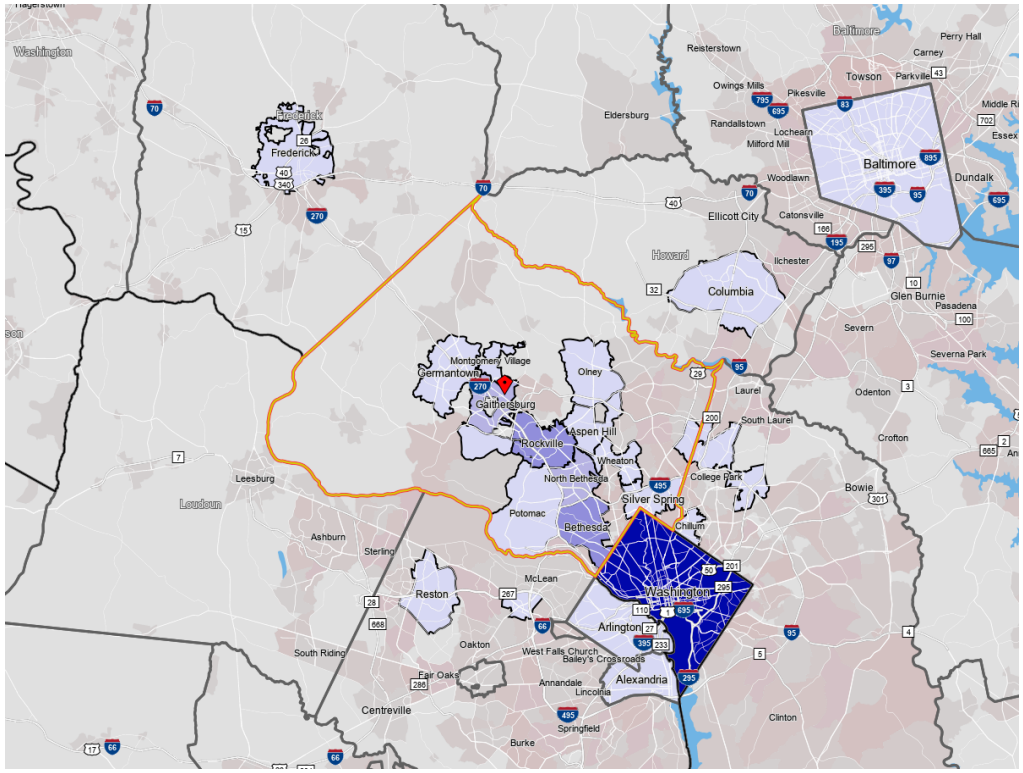
- Significant inflow (206,580 workers) and outflow (211,151 workers), with less than 50% of the private sector workforce both living and working in the County

Where Private Sector Workers Live



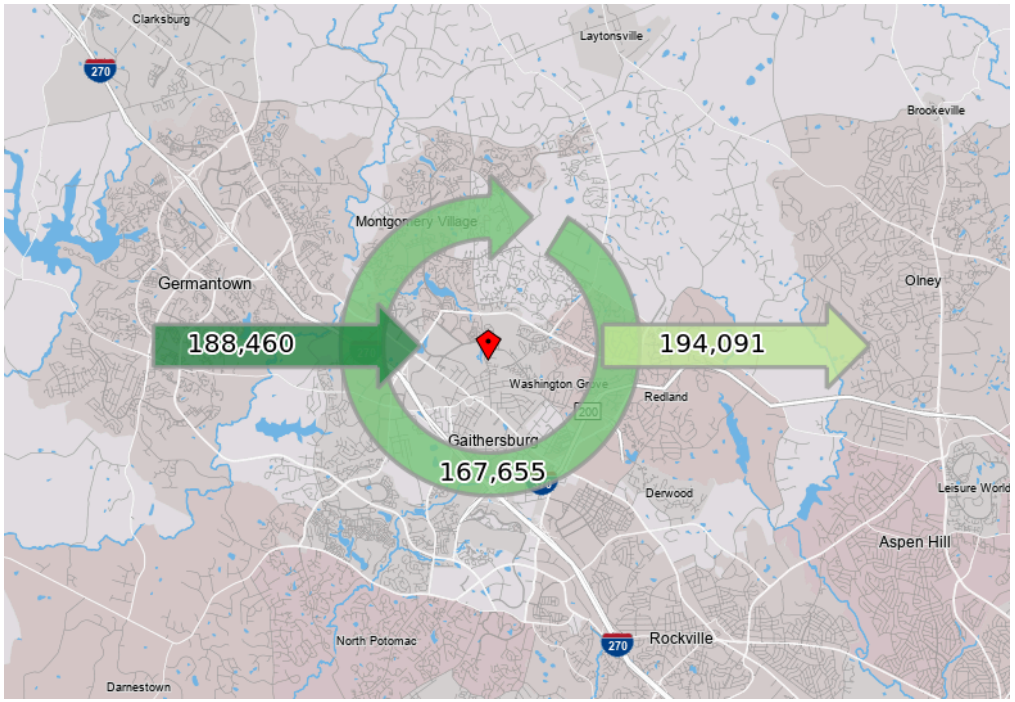
- Frederick, Baltimore, Columbia, DC, and Arlington, VA all have incubation programs

Where County Residents Work (Private Sector Jobs)



- Similar pattern to inward commute

Workforce - Commuting



- Along with its neighbors, Montgomery County shares excellent transportation links in the form of three major airports, the main East Coast arterial route (I95), and the access to the main East Coast passenger rail line, which connects to New York and Boston, facilitating the development of networks and connections within the corridor that runs from Greater-Washington to the Boston Metro Area
- Transportation into DC and between Montgomery County and locations in Northern Virginia (soon to include Dulles Airport) is available via the Metro
- Road transportation is frequently a challenge with long delays being common, even at a relatively local level, particularly during the morning and evening commute periods. There is a massive commute into and out of the County on a daily basis the majority of which is undertaken by road.

Median Earnings by Occupation

Median Earnings	Allegany	Anne Arundel	Baltimore	Calvert	Caroline	Carroll	Cecil	Charles	Dorchester	Frederick	Garrett	Harford	Howard	Kent	Mont-gomery	Prince George's	Queen Anne's	St. Mary's	Somerset	Talbot	Washing-ton	Wicomico	Worcester	Baltimore City
Full-time, year-round civilian employed population 16 years and over with earnings	$42,050	$64,500	$54,784	$67,424	$44,320	$62,127	$53,433	$64,198	$42,771	$63,202	$40,439	$61,902	$80,919	$49,563	$71,809	$54,204	$58,077	$64,850	$39,876	$50,429	$48,645	$42,235	$46,839	$47,900
Management, business, science, and arts occupations:	$56,686	$85,888	$73,803	$87,985	$58,034	$79,722	$71,505	$83,159	$55,489	$85,860	$52,134	$80,537	$98,060	$62,569	$97,236	$77,829	$75,264	$85,351	$50,883	$68,650	$64,458	$58,223	$62,268	$64,224
Management, business, and financial occupations:	$54,712	$92,644	$77,216	$99,408	$62,687	$87,519	$79,466	$90,331	$56,343	$93,082	$48,594	$86,744	$103,083	$64,180	$103,705	$83,064	$90,369	$90,587	$48,851	$70,088	$68,638	$67,235	$62,664	$68,329
Management occupations	$60,198	$97,060	$80,497	$104,992	$63,173	$86,828	$85,273	$94,090	$59,243	$99,701	$51,398	$89,809	$110,319	$68,445	$109,929	$84,339	$92,138	$93,243	$49,777	$72,610	$68,657	$70,481	$59,975	$68,634
Business and financial operations occupations	$42,482	$85,680	$73,246	$85,991	$61,780	$90,280	$73,591	$86,171	$54,063	$85,340	$43,516	$83,491	$87,118	$49,375	$94,380	$81,000	$83,931	$82,831	$44,083	$64,732	$68,587	$54,720	$65,750	$67,973
Computer, engineering, and science occupations:	$64,156	$99,354	$84,697	$99,077	$54,171	$97,147	$81,642	$99,199	$69,444	$97,621	$56,831	$95,733	$106,642	$67,679	$102,359	$91,644	$76,833	$99,953	$74,737	$75,363	$77,303	$56,413	$81,063	$74,572
Computer and mathematical occupations	$62,000	$100,982	$90,224	$101,472	$54,341	$101,535	$85,361	$101,490	$75,563	$101,189	$53,438	$95,994	$106,303	$59,031	$102,771	$92,564	$74,000	$92,324	$71,875	$76,653	$77,993	$63,047	$80,203	$81,875
Architecture and engineering occupations	$72,917	$100,573	$81,333	$98,898	$54,541	$94,306	$82,665	$91,864	$91,250	$100,357	$56,802	$98,386	$115,388	$69,792	$102,146	$90,009	$98,750	$105,566	$90,543	$65,833	$82,426	$56,753	$85,179	$82,269
Life, physical, and social science occupations	$56,667	$81,098	$68,818	$95,596	$46,731	$82,639	$75,859	$98,688	$51,328	$88,903	$69,722	$88,000	$99,977	$79,412	$101,581	$84,795	$52,474	$81,923	-	$90,417	$63,224	$53,051	$34,250	$53,688
Education, legal, community service, arts, and media occupations:	$52,746	$61,974	$60,831	$63,048	$50,517	$56,338	$52,715	$63,448	$47,045	$63,480	$47,926	$56,129	$69,890	$56,852	$81,336	$62,483	$57,789	$54,391	$46,250	$54,571	$55,609	$50,614	$52,305	$55,585
Community and social service occupations	$42,578	$56,522	$52,229	$51,510	$48,482	$53,429	$41,174	$52,740	$35,357	$50,408	$48,094	$55,560	$62,550	$41,293	$59,090	$56,420	$47,760	$41,949	$40,764	$52,518	$54,726	$45,704	$50,638	$44,858
Legal occupations	$79,250	$107,750	$100,268	$64,306	$56,000	$76,429	$65,862	$92,500	$63,942	$93,068	$60,625	$68,456	$134,063	$86,806	$149,896	$89,906	$106,364	$93,629	$60,313	$115,357	$78,938	$64,256	$62,050	$88,385
Educational instruction, and library occupations	$58,323	$58,367	$58,433	$64,710	$52,414	$55,711	$55,867	$61,099	$46,145	$61,871	$46,083	$54,547	$66,696	$69,318	$67,945	$58,353	$60,098	$54,218	$51,776	$51,406	$55,844	$55,636	$52,345	$54,119
Arts, design, entertainment, sports, and media occupations	$51,375	$67,986	$58,870	$59,844	$23,750	$59,503	$51,488	$73,430	$57,386	$65,880	$51,458	$54,809	$65,802	$45,096	$78,178	$66,056	$58,313	$80,705	$22,446	$74,886	$51,208	$42,083	$53,281	$58,876
Healthcare practitioners and technical occupations:	$62,879	$73,908	$75,224	$62,661	$60,368	$74,173	$70,660	$66,790	$57,083	$71,110	$61,131	$69,355	$90,577	$61,607	$89,499	$69,409	$72,705	$67,833	$55,357	$78,074	$67,059	$76,555	$72,966	$62,768
Health diagnosing and treating practitioners and other technical occupations	$68,359	$85,705	$84,971	$77,216	$77,500	$80,973	$76,958	$85,758	$69,850	$79,443	$69,299	$78,286	$102,003	$102,292	$102,815	$82,461	$81,000	$84,844	$79,821	$85,104	$80,516	$85,568	$83,636	$71,124
Health technologists and technicians	$40,125	$48,764	$49,370	$35,382	$45,729	$55,330	$49,118	$46,554	$42,347	$46,962	$32,326	$46,391	$49,540	$50,870	$49,871	$50,263	$59,821	$41,781	$43,750	$58,482	$42,412	$40,750	$34,464	$41,265
Service occupations:	$30,728	$39,108	$33,081	$47,513	$28,870	$37,948	$36,949	$44,423	$30,471	$35,628	$25,152	$38,193	$37,322	$26,944	$32,192	$34,384	$34,766	$36,561	$31,365	$32,297	$32,871	$28,492	$28,678	$30,367
Healthcare support occupations	$27,270	$34,305	$32,192	$39,167	$27,639	$30,614	$33,408	$33,547	$22,151	$29,820	$24,725	$31,795	$31,042	$25,568	$32,529	$33,471	$33,819	$32,087	$26,250	$30,938	$31,462	$27,074	$29,449	$31,885
Protective service occupations:	$49,605	$80,240	$54,941	$78,640	$65,833	$77,523	$69,669	$74,016	$55,132	$75,980	$50,694	$74,510	$76,580	$54,934	$65,029	$61,493	$78,951	$76,602	$49,089	$63,466	$56,188	$52,543	$51,711	$44,688
Firefighting and prevention, and other protective service workers including supervisors	$45,333	$75,865	$47,741	$83,711	$56,250	$71,535	$50,000	$72,559	$55,909	$81,010	$63,125	$73,110	$70,417	$54,453	$54,825	$52,513	$82,667	$71,250	$19,188	$79,643	$52,879	$33,646	$38,603	$38,106
Law enforcement workers including supervisors	$50,409	$82,475	$63,102	$68,646	$76,250	$81,417	$75,313	$77,911	$53,333	$73,849	$50,417	$79,565	$80,512	$78,750	$74,617	$72,192	$78,255	$79,799	$49,427	$62,784	$57,956	$56,147	$58,640	$56,207
Food preparation and serving related occupations	$21,324	$26,339	$25,547	$22,430	$20,938	$24,982	$21,955	$25,866	$27,447	$26,598	$19,394	$21,958	$30,442	$20,266	$28,169	$26,343	$25,625	$25,152	$22,917	$28,333	$21,659	$24,459	$24,462	$25,495
Building and grounds cleaning and maintenance occupations	$26,307	$34,575	$27,947	$34,306	$32,787	$30,577	$38,750	$34,120	$31,989	$32,430	$24,979	$31,625	$34,417	$30,792	$28,337	$30,769	$26,218	$33,817	$28,281	$31,598	$33,984	$27,904	$27,012	$27,352
Personal care and service occupations	$28,843	$27,270	$27,631	$28,929	$20,651	$37,689	$28,587	$35,445	$31,953	$31,346	$35,152	$30,607	$33,333	$20,859	$30,953	$30,439	$25,455	$33,100	$21,801	$29,601	$24,103	$34,000	$24,605	$26,636
Sales and office occupations:	$34,873	$50,467	$45,572	$53,718	$38,238	$49,814	$40,883	$49,065	$36,594	$50,605	$32,881	$50,288	$53,721	$42,669	$51,593	$47,839	$48,968	$46,276	$37,405	$42,188	$40,126	$36,262	$41,589	$40,558
Sales and related occupations	$35,847	$54,296	$50,365	$53,523	$40,926	$56,320	$45,433	$40,398	$44,408	$57,371	$40,957	$57,283	$61,812	$53,648	$53,222	$41,051	$55,743	$41,918	$35,167	$47,070	$41,853	$41,240	$49,554	$41,258
Office and administrative support occupations	$33,996	$48,545	$43,565	$53,911	$37,813	$46,929	$40,276	$52,768	$34,110	$45,454	$31,000	$46,759	$50,950	$33,438	$50,056	$50,537	$46,436	$47,842	$38,272	$39,236	$38,665	$34,286	$35,434	$40,303
Natural resources, construction, and maintenance occupations:	$48,071	$53,407	$50,780	$63,276	$44,921	$55,445	$55,768	$61,982	$40,956	$50,741	$35,423	$52,840	$52,103	$42,233	$41,009	$41,200	$50,754	$62,331	$41,591	$40,577	$51,539	$40,317	$41,988	$45,730
Farming, fishing, and forestry occupations	$40,729	$30,329	$25,714	$31,858	$34,375	$36,542	$32,361	$31,705	$31,302	$29,858	$28,508	$36,250	-	$42,063	$41,025	$36,012	$30,600	$18,846	$40,523	$30,913	$31,328	$36,000	$52,614	$33,966
Construction and extraction occupations	$48,242	$51,437	$47,739	$60,296	$41,275	$54,026	$53,834	$54,886	$39,853	$49,506	$36,975	$50,865	$50,391	$35,144	$38,958	$37,946	$49,762	$54,508	$41,042	$45,086	$50,884	$40,801	$35,881	$44,368
Installation, maintenance, and repair occupations	$48,487	$55,745	$53,550	$69,269	$52,612	$59,025	$62,774	$64,989	$42,193	$54,365	$33,065	$56,417	$58,556	$48,220	$47,575	$53,279	$59,242	$65,833	$51,875	$39,898	$53,750	$40,769	$51,139	$48,531
Production, transportation, and material moving occupations:	$37,109	$48,324	$41,615	$49,432	$39,606	$42,393	$44,397	$48,171	$41,747	$40,893	$40,184	$44,462	$42,968	$47,550	$38,566	$41,966	$39,237	$49,257	$30,641	$40,625	$41,097	$35,517	$36,663	$35,617
Production occupations	$34,920	$53,830	$48,758	$57,232	$38,554	$49,556	$52,131	$55,663	$40,028	$40,580	$40,144	$50,942	$47,043	$48,750	$44,816	$40,984	$39,861	$53,958	$30,563	$40,750	$41,169	$33,009	$33,750	$36,281
Transportation occupations	$40,941	$51,165	$43,603	$52,778	$51,198	$46,566	$48,171	$48,517	$52,232	$44,732	$44,188	$51,760	$49,128	$60,560	$38,998	$48,485	$51,979	$52,632	$46,629	$44,167	$49,388	$48,603	$40,709	$40,039
Material moving occupations	$31,588	$35,822	$32,421	$26,593	$30,057	$27,477	$35,905	$37,399	$34,643	$33,567	$26,563	$32,730	$30,837	$31,895	$32,110	$35,426	$29,844	$31,883	$25,747	$22,331	$35,339	$30,259	$30,313	$31,496

- Montgomery and Howard Counties have the highest median earnings for management occupations

Indirect Job Creation by Industry

Employment

NAICS	Major Industry Group	Direct Jobs	Indirect Jobs		
			Supplier	Induced	Total
22	Utilities	100	515.4	442.2	957.7
53	Real Estate and Rental Leasing	100	396.6	483.1	879.7
31-33	Durable Manufacturing	100	289.1	454.9	744.1
51	Information	100	252.0	321.1	573.1
31-33	Nondurable Manufacturing	100	184.8	329.5	514.3
54	Professional, Scientific, and Technical Services	100	142.1	276.2	418.3
55	Management of Companies	100	144.4	255.4	399.9
21	Mining	100	224.0	166.0	390.0
71	Arts, Entertainment, and Recreation	100	123.3	255.2	378.5
52	Finance and Insurance	100	149.7	214.7	364.4
48-49	Transportation and Warehousing	100	112.8	163.3	276.0
42	Wholesale Trade	100	107.3	128.0	235.3
11	Agriculture, Forestry, Fishing, and Hunting	100	93.6	134.8	228.5
23	Contstruction	100	88.0	138.1	226.1
81	Other Services (except public administration)	100	70.1	139.6	210.3
62	Health Care and Social Assistance	100	69.4	136.2	205.6
61	Educational Services	100	63.8	129.9	193.7
71	Accommodation and Food Services	100	53.8	107.4	161.2
56	Admin and Support Services and Waste Management	100	45.5	89.1	134.5
44-45	Retail Trade	100	46.7	75.4	122.1

Source: Economics Policy Institute, 2019 (utilizing data from the US Bureau of Labor Statistics)

Notes

1 *Supplier Jobs includes materials and capital services supplier jobs*

2 *Induced Jobs includes jobs supported by respending of income from direct jobs and supplier jobs, as well as public-sector jobs supported by tax revenue*

- Durable manufacturing has the highest indirect job creation of the traded sectors, followed by Information, Nondurable Manufacturing, and Professional, Scientific, and Technical Services

Culture of Innovation

Innovative Capacity – SBIR Awards in Montgomery County

Metric	Value
Total SBIR/STTR awards (2017)	137
Total value	$49,541,611
Total recipient companies	57

Agency	Value
Dept. of Defense	$24,535,968
Dept. of Health and Human Services	$12,136,936
NASA	$6,249,368
Dept. of Energy	$4,744,810
Dept. of Transportation	$150,000
Dept. of Homeland Security	$100,000
Dept. of Commerce	$100,000
Dept. of Agriculture	$99,807

- While patents provide one measure of the capacity for technical innovation, the number of SBIR awards receive provide some insight into the extent to which those innovations are being translated into marketable products

Innovative Capacity – SBIR / STTR Comparison Between Counties

Rank	Agency		Value
1	Middlesex	MA	$182,910,194
2	Los Angeles	CA	$114, 825,209
3	San Diego	CA	$101,394,710
4	Santa Clara	CA	$54,479,411
5	Boulder	CO	$53,813,581
6	Montgomery	MD	$49,541,611
7	Madison	AL	$44,497,601
8	Prince William	VA	$43,721,409
9	Orange	CA	$36,683,760
10	Alameda	CA	$25,408,214

- Montgomery County is in the top 10 counties in the country for the total value of SBIR / STTR awards received (2017 data)

Culture of Innovation

- Evidence of a culture of technological or business innovation
  - High numbers of patents granted to County inventors
  - Extensive linkages to other centers of innovation (nationally and internationally)
  - High level of usage of SBIR / STTR funding to develop technologies for commercial application
  - Evidence of companies developing innovative products in emerging technology sectors and / or applying technologies to disrupt established sectors
  - Application of new business models by established companies
  - Evidence of companies developing new solutions to old problems

Culture of Innovation

+ On both an absolute and per capita basis, the county is the leader within the state for the number of inventors on granted patents
+ There is evidence of strong connections with major centers of innovation elsewhere in the US, and the County is as the southern end of a corridor that runs from the Greater Washington region to New England which has high levels of R&D and large numbers of innovative companies
+ County companies are making use of the SBIR and STTR programs and are receiving hundreds of millions of dollars in R&D funding from the federal government
+ The presence of the NIST, NIH, USU, and other research organizations are a valuable asset to the county
- The absence of a research university in the County means that there are no opportunities for entrepreneurs to collaborate locally with academic research groups, to make use internships, or to develop relationships with graduate students who could become employees (or founders of companies)
- Universities also provide broader infrastructure to support entrepreneurship, including management programs, proactive support for student and faculty entrepreneurs, and associated physical facilities
- Entrepreneurs and existing companies must look to UMD at College Park, UMD and JHU in Baltimore, or UMBC and Towson in Baltimore County, for these kinds of relationships. Montgomery County entrepreneurs may choose to locate close to them rather than in the County
- While the presence of Federal research facilities in the County is an asset, they are not primarily focused on the translation of research into commercial markets and their impact on entrepreneurship is less than would be the case for a university

Entrepreneurial Culture

Entrepreneurial Culture

- Evidence of an entrepreneurial culture
  - Media coverage of entrepreneurs
  - Media coverage of startups and early-stage companies
  - Local / Regional outlets and platforms focused on entrepreneurial activity
  - Sponsorship of events, initiatives by local entrepreneurs
  - Entrepreneurship education as part of the overall education curriculum from K-12 onward
  - Strong promotion of entrepreneurial activity by colleges, local government, politicians
  - Activities driven by university faculty and students focused on entrepreneurship
  - Events / awards focused on entrepreneurship
  - Business plan competitions, pitch competitions
  - Clubs, meetups, etc. focused on entrepreneurship
  - etc.

Entrepreneurial Culture

	Montgomery County Share of All New Businesses Formed in MD From 2015 to 1026	
--	Total	21%
11	Agriculture, Forestry, Fishing and Hunting	10%
21	Mining, Quarrying, and Oil and Gas Extraction	0%
22	Utilities	29%
23	Construction	17%
31-33	Manufacturing	16%
42	Wholesale Trade	23%
44-45	Retail Trade	15%
48-49	Transportation and Warehousing	12%
51	Information	25%
52	Finance and Insurance	22%
53	Real Estate and Rental and Leasing	22%
54	Professional, Scientific, and Technical Services	29%
55	Management of Companies and Enterprises	60%
56	Administrative and Support and Waste Management and Remediation	17%
61	Educational Services	27%
62	Health Care and Social Assistance	23%
71	Arts, Entertainment, and Recreation	19%
72	Accommodation and Food Services	17%
81	Other Services (except Public Administration)	18%
99	Industries not classified	38%

Source: US Census Bureau (2016)

Physical Infrastructure

Physical Infrastructure

- Broadband availability is very good in the County (but affordability could be an issue for some people)
- Transportation links (air, rail, road) provide good access within the Mid-Atlantic / North-East corridor, nationally, and internationally
- BIN Facilities
  - Companies generally appear satisfied with the physical incubation program; office / lab size is adequate, cost is reasonable, office spaces are nice, and space management teams are good
- In recent years there has been a trend for information workers (i.e. those who are not involved in creating or distributing a physical product) to work from home for some (often a majority) of their work week. This has resulted in companies requiring less office space, adopting communications infrastructure that facilitates this, and creating more geographically distributed organizations (see https://www.seattletimes.com/business/local-business/rei-to-sell-its-new-bellevue-headquarters-and-shift-office-work-to-multiple-seattle-sites/)
- "Full workdays performed at home will triple after the pandemic as compared to before the pandemic. About one-fifth of office worker days will shift from business premises to home." (https://www.brookings.edu/wp-content/uploads/2020/06/5a_Barrero_Reallocation-Shock.pdf)

Physical Infrastructure

- The impact of SARS-Cov-2 on work patterns and office space usage has been massive. It is not clear how this will develop in the long term, but there is evidence to suggest that for information workers this may be the norm going forward, with people choosing (and possibly insisting on) working from home for the majority of their work week:
  - A May 2020 report by Global Workplace Analytics indicated that 31% of people were already working from home before the pandemic but 88% now were, and that a significant majority of workers and managers believed that working form home positively impacted on the performance and quality of their work
  - A May 2020 Gallup poll (https://news.gallup.com/poll/311375/reviewing-remote-work-covid.aspx) indicated that 49% of workers would work from home if possible because they prefer it (a further 22% said they would do so specifically because of the SARS-Cov-2 virus)
- Many technology-focused companies (e.g. Reddit, Square, Spotify, Twitter) have said they will keep their offices closed into 2021
- The broader implications for Montgomery County are likely to be significant. In the specific context of the BIN, this would suggest an opportunity to provide a wider range of types of space both for entrepreneurs and the companies they create. This would include feeder space (co-working, makerspaces, etc.) that could be support entrepreneurs at the early stages of their entrepreneurial journey and 'grow-on' space for companies graduating from the incubators. Some of this space could be owned and operated by partners or affiliates of the BIN (with appropriate agreements being in place)

Support Infrastructure

Support Infrastructure – State / Regional Level

- TEDCO – programs focused on finance, virtual accelerator
- UMD – programs focused on technology development / transfer
- More than 40 entrepreneur-focused programs elsewhere in the state (including accelerators, incubators, and coworking spaces). Most of these are within one hour's drive of Rockville.
- Experience suggests that people will travel for up to 30 minutes to get to an incubator / coworking location
- Startup Maryland - a peer-driven, high-growth, and tech venture focused initiative leveraging ecosystem building for entrepreneur and economic development.
- Public Assistance to Entrepreneurship (PA2E) - provide entrepreneurship training for customers with ideas and talent, who are in pursuit of their entrepreneurial dreams of starting a small business while supporting their families - https://dhs.maryland.gov/workforce-development/public-assistance-entrepreneurship-pa2e/)

Support for Entrepreneurship in Maryland

Maryland

- NSF I-Corps Program (refocusing on university-based entrepreneurs)
- FedTech (small-scale implementation of I-Corps model for Federal Labs)
- BioHealth Innovation (elements of support for bioscience entrepreneurs)
- Maryland Technology Council – Mentoring program
- Small Business Development Center (SBDC) – national program: general startup / business advice
- Procurement Technical Assistance Centers (PTAC) national program: assistance with obtaining Federal Govt. contracts
- Maryland Defense Technology Commercialization Center (DefTech) – assistance with commercialization of DoD technologies and partnering with DoD labs to develop new technologies
- Launch Workplaces (multiple locations) – coworking and office space
- hotDesks (Caroline, Talbot, Worcester, Wicomico counties)

National / Remote / Virtual

- Ideagist – international virtual incubator
- NIH in-house accelerator program(s)
- Galvanize – virtual data science boot camps

Support for Entrepreneurship in Maryland

Baltimore

- Betamore – workspace + training + community
- Emerging Technology Centers Baltimore (ETC) – incubator, accelerator programs
- The LaunchPort - coworking, labs, mentoring, funding
- JHU Fast Forward (Part of Johns Hopkins Technology Ventures) – multiple locations. Initiative providing access to internal and external resources for JHU entrepreneurs. Includes coworking space, accelerator programs
- Spark! Baltimore – coworking space
- Harbor Launch @ IMET – incubator with flexible wet lab space, mentoring, services
- Fells Point Culinary Incubator – Mentoring, assistance with strategy, marketing, packaging, distribution
- Co_Lab – coworking space
- B-More Kitchen – coworking kitchen space
- Arts Business Institute – business training and assistance for arts entrepreneurs
- Function coworking community – coworking
- HUB Baltimore – coworking
- Invisible Majority – Incubator for creative arts including facilities for music production

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Support for Entrepreneurship in Maryland

Baltimore (continued)

- UMD Maryland Energy Innovation Accelerator
- UMD Tech Advancement Program (TAP) – incubator
- UMD MTech Ventures – incubator
- UMD Maryland International Incubator – focused on companies locating from outside the US

Baltimore County

- Towson University Incubator – focus on educational technologies
- BWTech (Three facilities located at the UMBC tech park) – broadly-focused tech incubator

Charles County

- Velocity Center – collaborative development center for companies engaged with DoD
- College of Southern Maryland Technology Ventures Program (TVP) – startup program to commercialize DoD technologies

Support for Entrepreneurship in Maryland

Howard County

- DataTribe – accelerator for infotech companies
- Maryland Innovation Center (MIC) – office, business growth services
- DreamPort / Maryland Innovation & Security Institute – Cybersecurity-focused initiative combining specialist technical facilities and resources, programs, and technical challenge events with strong connections to DoD and NSA

Anne Arundel County

- Launch! Annapolis – community for entrepreneurs, meetups

Prince George's County

- Bowie Business Innovation Center (City of Bowie / Bowie State University) - incubator
- Innovation Station – workspace and business assistance

Support for Entrepreneurship in Maryland

Frederick County

- Frederick Innovative Technology Center, Inc. (FITCI) – incubator, accelerator program
- Cowork Frederick – coworking
- The Own It Company - coworking

St Mary's County

- Techport – incubator
- ImPax
- TechBridge

Talbot County

- F3 Tech – Accelerator and tech commercialization support focused on agriculture, clean energy, and environment
- hotDesks@Easton - coworking

Incubation in DC

DC

- 1776 – accelerator/ coworking
- Accelprise – accelerator focused on SaaS
- 1863 Ventures – accelerator
- Halcyon Incubator – incubator focused on social entrepreneurship
- Village Capital – accelerator
- Inclusive Innovation Accelerator – coworking, accelerator
- The Hatchery (sponsored by AARP) – accelerator focused on the needs of people aged 50+
- 5G First Responder Lab (sponsored by Verizon) – program focused on implementing 5G wireless technology for use by First Responders
- DCode – accelerator focused on products for the Federal market
- Eatsplace, Mess Hall, Tastemakers, Union Kitchen – culinary incubators

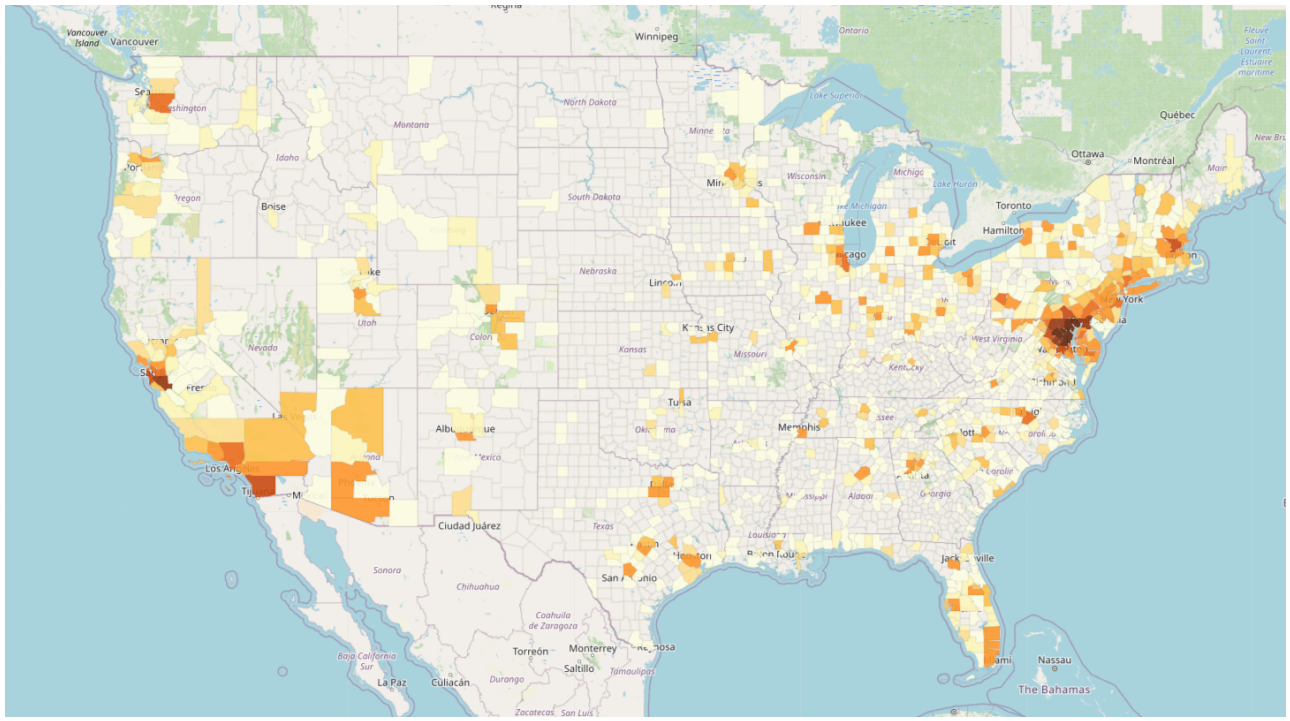
Incubation in DC

DC

- DC Fashion Incubator – mentoring, education, product development support
- FabLabDC – access to 3D printing facilities, and associated education [FabLab is a global initiative]
- HacDC – makerspace
- SB Works – coworking space, mentoring and advisory support, business services
- AdvantEdge - coworking
- Alley – coworking coupled with the opportunity to participate in accelerator programs focused on topics selected by commercial sponsors
- Many coworking facilities also exist in DC in. a variety of locations. Some have a specific focus such as Writers Room, Hera Hub, or the HIVE.

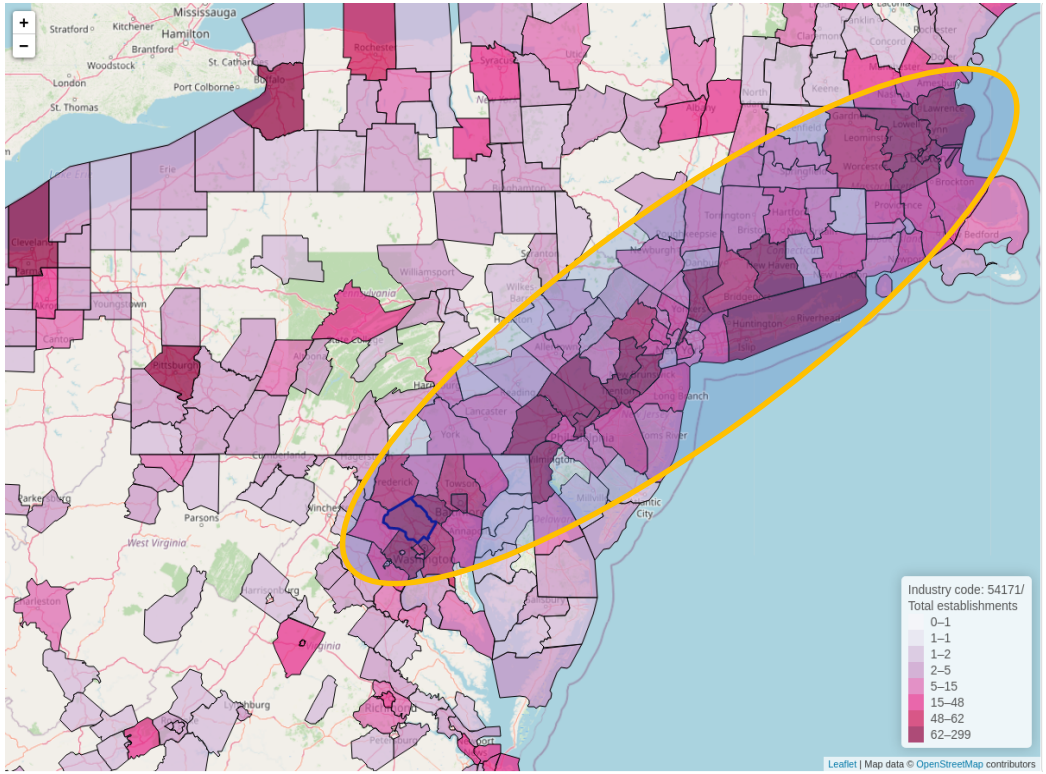
Leadership and Networks

Locations of Inventors on Patents with at least one inventor located in Montgomery County



- Approximately 75,000 patents are included in the dataset
- The supra-regional network (Mid-Atlantic to North East) is evident
- The presence of national networks involving Maryland-based inventors can also be seen

Distribution of NAICS Code 54171: Research and Development in Physical, Engineering, and Life Sciences



- While not unique, Montgomery County has significant comparative strength in R&D and is part of a larger-scale concentration of activity that spans the Mid-Atlantic and North-East

VC deals in the US (2019)

- Five regions in the US account for 60%:
  1) California - 34%
  2) Area marked on map includes 3 regions accounting for 23%
  3) Washington state – 4%

  The Washington-Baltimore-Arlington Combined Statistical Area (CSA) (including Montgomery County) accounts for 3%

US Patents

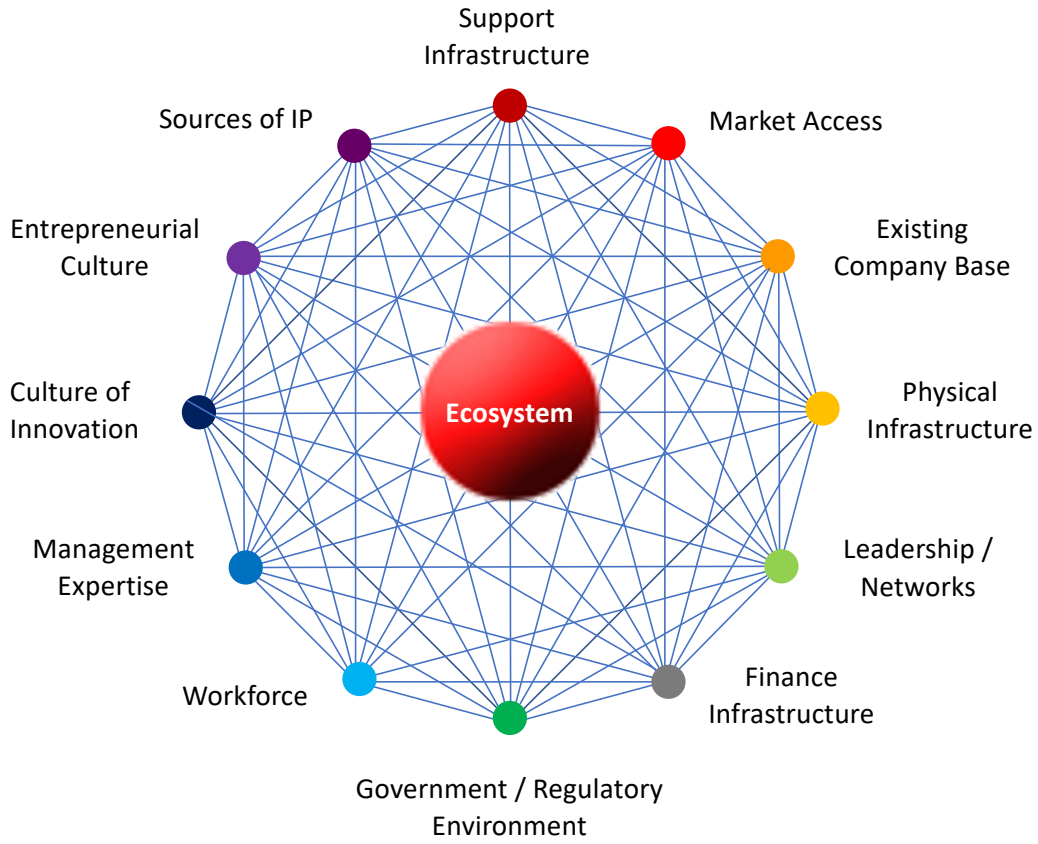
1) California accounts for 27%
2) States which include the area on map account for 22%
3) Washington state accounts for 22%

The Washington-Baltimore-Arlington, DC-MD-VA-WV-PA Combined Statistical Area (CSA) accounts for 6%

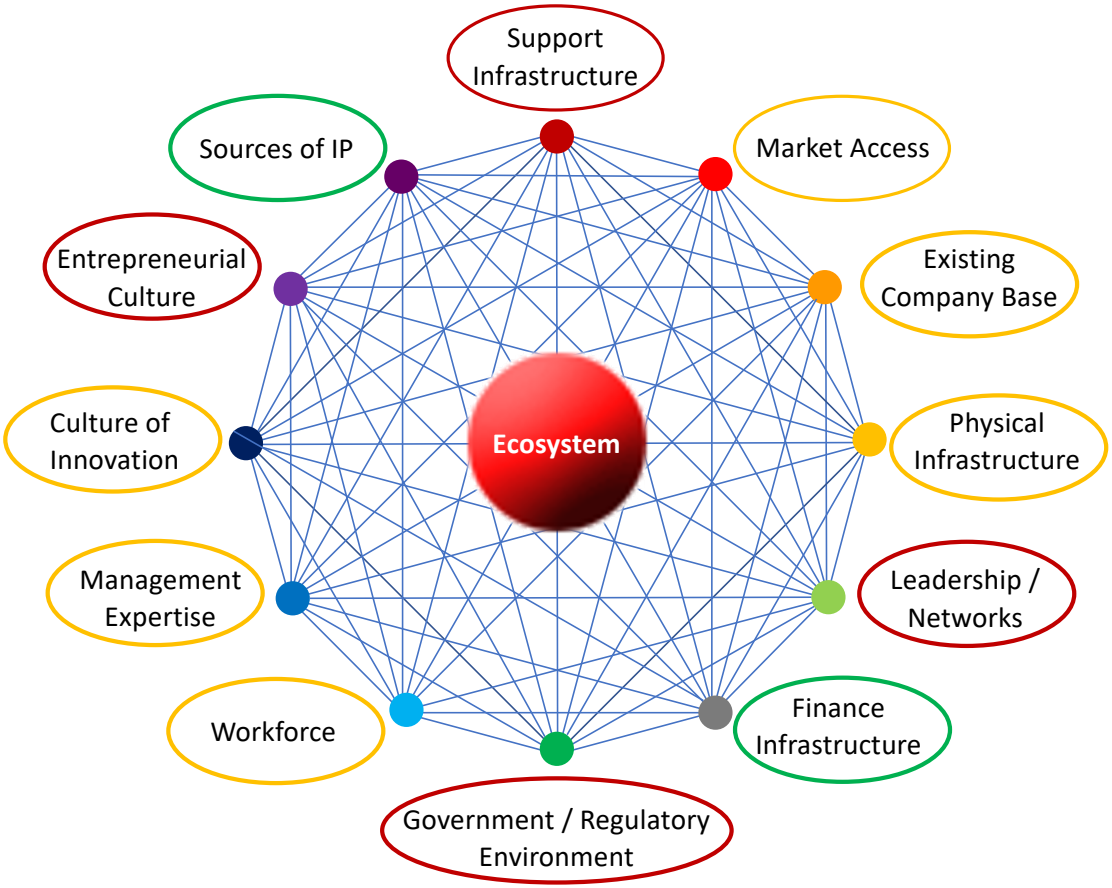
Academic Institutions

States which include the area on map account for 14 of the top 100 universities in the world (*Times Higher Education, 2020*)

Summary


Support Infrastructure
Market Access
Existing Company Base
Physical Infrastructure
Leadership / Networks
Finance Infrastructure
Government / Regulatory Environment
Workforce
Management Expertise
Culture of Innovation
Entrepreneurial Culture
Sources of IP
Ecosystem

County Entrepreneurial Ecosystem



Data Sources

Data Sources – 1

- Montgomery County - Online resources, published reports
- US Census Bureau - Databases
- US Patent and Trademark Office - Databases
- Crunchbase - Database
- Techcrunch – Online resources
- USASpending.gov – online resources, databases
- US Small Business Administration (SBIR/STTR data)
- Maryland Business Innovation Association – online resources
- Maryland Economic Development Association – online resources
- Virginia Economic Development Association – online resources
- Maryland Manufacturing Network – online resources
- Maryland Defense Network – online resources
- US Bureau of Labor Statistics – online resources, databases
- US Department of Commerce (Bureau of Economic Analysis) – online resources, database
- US Small Business Administration – online resources, database
- Venture Forward – online resources, database
- Angel Capital Association – online resources
- The Ewing Marion Kauffman Foundation – published reports, online resources, databases
- AT Kearney, Inc. – published reports, online resources
- The Milken Institute – published reports, online resources

Data Sources - 2

- Oxford Economics – published reports
- Open Street Map
- SSTI – online resources, publications
- IEDC – online resources, publications
- AURP – online resources
- International Business Innovation Association – Published Documents, Member resources
- AUTM – online resources, databases
- Federal Laboratory Consortium – online resources, databases
- 2ThinkNow – Database
- John Hopkins University – published reports
- Pitchbook – Publications, database
- National Venture Capital Association – Publications, database
- PwC – Online resources, database
- Business Insider – Online publication
- Opportunity Atlas – online resources
- Newspapers.com – online resources
- Inc. Magazine – online resources
- Justicemap.org – online resources
- BroadbandNow – online resources

MONTGOMERY COUNTY
ECONOMIC DEVELOPMENT
CORPORATION MARYLAND

TO: **Gene Smith, Montgomery County Council**
FROM: **Christy Blake, Phillip Singerman, Bill Tompkins, and Brad Stewart**
DATE: **December 16, 2021**
RE: **MCEDC Analysis of the Montgomery County Business Incubator Network**

Scope of Work

The Council's Planning, Housing, and Economic Development (PHED) Committee requested that the Montgomery County Economic Development Corporation (MCEDC) prepare a high-level assessment of the County's Business Innovation Network (BIN). MCEDC worked collaboratively with County staff focused on the incubators to conduct a review of the BIN program.

Background

Montgomery County has legacy investments in existing business incubator facilities. Developing a more diverse and robust innovation and entrepreneurial ecosystem in Montgomery County is a recognized County priority. Numerous studies have provided strategic guidance and specific recommendations to achieve the County's priorities.

Business incubation, in its broad contemporary definition, is an effective and proven tool to support a small business entrepreneurial ecosystem. On-going rapid changes in communications technology, the utilization of physical space, and the development of new business incubation/acceleration models, require a reimagining and reinvigoration of the County's current business incubation support program.

Montgomery County's business innovation network should have the following major components:

- Infrastructure Maximization: A focused high-value use of existing incubator facilities, reinforcing successful models and reimagining others.
- Collaborative Ecosystem: A greater concept of business incubation, supporting a more diverse set of incubation organizations and models, through coordination, best practice sharing, and sustained but competitive funding.
- Inclusive Equity: A sophisticated county-wide entrepreneurial and innovation support program, encompassing women owned enterprises and economically and socially disadvantaged individuals.
- Operational Sufficiency: Adequate funding to support the necessary internal and external resources to execute these components and adequate staffing to provide oversight to the expanded programs.

Recommendations

The MCEDC recommends taking a comprehensive approach to managing the County incubator facilities by creating a Montgomery County (MoCo) Entrepreneurship and Innovation Center, which is another integrated step towards the development of a successful Montgomery County entrepreneurial ecosystem. The county incubator system would be supported in part by the MoCo Entrepreneurship and

Innovation Center, which MCEDC has proposed funding in its FY2023 workplan (details are provided below in the MCEDC Partnership section). The Center would bring together the existing (both public and private) incubator companies with other resources to provide support for entrepreneurs, training, coaching, networking opportunities, access to capital networks, and other programs and facilities which advance Montgomery County's goal to become a strong center of business innovation. Start-ups and emerging businesses would be targeted across key industry sectors such as life sciences, technology, hospitality, quantum computing, and nonprofits, while engaging with community anchor institutions.

To ensure a more inclusive innovative economy, small, minority, women, and veteran-owned businesses would be recruited to participate in the incubation network. Additionally, there is an opportunity to welcome international businesses to Montgomery County by providing international soft-landing assistance. The MoCo Entrepreneurship and Innovation Center could be housed at one of the revitalized County owned facilities and would be funded by the MCEDC.

Considering the need for greater oversight, management, funding responsibilities required by the enhanced role of the county in this broader and more complex approach to business incubation, MCEDC supports the Montgomery County Government (MCG) request to add three new staff positions in the FY2023 Budget request for the Incubator NDA. The new positions will reduce the need for outside contractors and will provide the County with more direct control over programming and will provide for a more visible County presence in each of the incubators. The additional staff would participate in program planning and support at the county-owned facilities, interact with prospective incubator tenants, provide referrals and introductions to resources for entrepreneurs, and track progress of incubator clients (details are provided below in the Administrative Operational Recommendations).

Specific recommendations for County owned and supported incubation facilities include the following:

1. Key industry sectors that Montgomery County should target through proactive economic development efforts, as listed in the October 2021 Economic Advisory Panel (EAP) Connecting the Dots Action Plan[1] co-chaired by Norman Augustine, Retired Chairman and CEO of Lockheed Martin Corporation, and DeRionne Pollard, Ph.D., former President of Montgomery College, identified. These key industry sectors include:
    - Life Sciences
    - Hospitality Technology
    - Quantum Computing
    - Advanced Technologies including Cybersecurity

Life Sciences

The Economic Advisory Panel (EAP) Action Plan stated that with considerable recent global pandemic-related recognition and job growth success, Montgomery County must maintain life sciences as an economic development priority and identified as its first implementation action the creation of an additional two million square feet of laboratory infrastructure. Additionally, the Milken Institute[2] found that life science entrepreneurs need access to physical infrastructure that can help them move from R&D to demonstration and testing, and the Axcel Report[3] further recommended the continuation of the

[1] "CONNECTING THE DOTS: Accelerating Economic Growth in Montgomery County, MD" An Action Plan from the MCEDC Economic Advisory Panel October 2021

[2] "New Opportunities for Job Creation in Maryland's Life Sciences Industry" by Alissa Dubetz, Charlotte Kesteven, and Aaron Melaas

[3] Business Incubator Review and Entrepreneurial Ecosystem Study by Axcel Innovation LLC

Germantown Innovation Center with enhanced life science specialized expertise. The Germantown Innovation Center (GIC) has demonstrated its success over the years and anticipates several graduations by the end of 2021.

> ***Action Item: The County has a plan to convert 10 offices into 4 wet lab spaces; $600,000 is currently available, $400,000 additional funding will be needed to complete the conversion and has been requested by the County. Creation of additional wet lab space for early-stage companies should also be considered.***

Because of the demonstrated success of the GIC, MCEDC supports the continued operation of other incubator facilities. Although the Silver Spring Innovation Center (SSIC) and the Rockville Innovation Center (RIC) are not specialized and could be easily replicated in private facilities, they do represent a legacy investment by the County and should be refocused to support the strategic industry sectors or repurposed for other public purposes.

Hospitality Tech Innovation

The EAP Action Plan stated as its purpose that "Montgomery County can enhance its significant hospitality presence and leverage the post-pandemic reinvention of the industry." Further research conducted by MCEDC found that very few counties dominate a major global industry as much as Montgomery County dominates the hotel industry. Of the publicly traded US hotel companies and hotel REITS, more than 50% of the revenue and market capitalization domiciles in Montgomery County. Accordingly, the EAP recommended inaugurating a CEO-led Hospitality Sector Work Group, which could consider developing a hospitality tech incubator/accelerator.

> ***Action Item: Working with the hospitality work group, MCEDC and the County should examine the creative Israeli model for establishing corporately sponsored business incubators, in a facility designed to support the hospitality industry.***

Quantum Innovation

The EAP report stated that it would be advantageous for Montgomery County to "Develop a foundation... to attract existing firms and premium quantum technology start-ups by utilizing local and regional assets to play a leadership role in the global quantum imperative." Montgomery County has related assets, access research, technology, investment capabilities, and proximity to innovative federal research. The County is well-positioned to lead at the intersection of quantum technology and the life sciences problem in complex areas such as drug discovery, clinical trial design, genome sequencing, personalized medicine, pandemic preparedness, and health data encryption. The County is ideally located at the center of "The Quantum Crescent," 50-mile technology corridor from NIST through Silver Spring to NSA.

> ***Action Item: The County should advocate for the inclusion of a quantum incubator in the Connected DMV's continuing efforts to develop a regional Quantum Innovation Growth Cluster. Federal funding for business incubation programs exists at EDA, SBA, and other federal agencies. A feasibility study for the establishment of a quantum-focused incubator should be immediately commissioned.***

Advanced Technologies including Cybersecurity

The EAP action plan stated as its purpose to "Utilize Montgomery County resources, including access to top talent and key federal institutions, to pivot towards an even greater role in supporting cyber

security." Montgomery County has strength in a wide range of diverse types of young cyber security and software companies, which are dispersed among the existing business incubators. Howard County has been selected as one of only 60 communities to receive Phase I EDA funded BBB Regional Cluster designation, which MCEDC supported.

> ***Action Item: Working with federal, academic and industry partners, the County should enhance existing efforts to strengthen entrepreneurial start-up/scale-up support programs, including building upon the Maryland Tech Council's Venture Mentoring Service, BioHealth Innovation's NIH sponsored Entrepreneurs in Residence, TEDCO's NIST funded Science and Technology Entrepreneurship Program. Such an effort would support Howard County's Phase II application.***
>
> ***The NIST-sponsored, MITRE-managed National Cyber Security Center of Excellence (NCCOE) could be enlisted to support the overall effort, through a planned renegotiated Partnership Intermediary Agreement (PIA) with the County.***

Underrepresented Business Incubation

There is also a focused opportunity for the BIN to support start-ups for businesses of color. The Silver Spring Innovation Center (SSIC) has been included in a redesignated federal "HUB Zone" and could support minority and differentially abled entrepreneurs seeking to develop a stream of revenue through procurement opportunities with federal, state, and local governments, plus large local companies with supplier diversity programs. Programming at the SSIC could specifically include a curriculum and networking for underrepresented business owners to be provided by the County's diverse community-based professional service providers and business groups. Specifically small, minority, women–owned, differentially-abled, and veteran owned businesses, along with their trade association counterparts would be called upon to develop joint programming initiatives to support entrepreneurship and business sustainability to this important sector of our economy. This opportunity would require additional programming resources, but potentially no modifications to the facility.

Community Partner Opportunities

There is a desire to respond to opportunistic programs around placemaking in the County working with community partners. This provides us with the chance to expand on the concept of community wealth building. The County would identify underutilized property assets such as the CHI facility to test concepts, such as small-scale food manufacturing, energy conservation businesses concepts derived from the new Climate Action Plan, and other community-based partner operations.

Administrative Operational Recommendations

The County has demonstrated success in efficiently overseeing the incubator facilities and should continue to have financial and facility management responsibility. Managing the financial operations of the County incubators is a complex process using varying accounting processes put in place under different business models. In its current form, the County's budget does not provide a clear picture of how much the County-owned incubators cost the taxpayer or the corresponding benefit they provide. The current line item does not include revenue but includes expenses unrelated to the business incubators. The County should re-title its "Incubator" Non-Departmental Account to "Entrepreneurship" to reflect the use of these tax dollars and align with the recommendations of this report more accurately.

The governmental role of MCG would be to oversee facility management, financial management, portfolio management, and on-site programming at the GIC, SSIC, and RIC. Illustrative responsibilities include:

- Ensure the facilities are well maintained, and operate efficiently and effectively to offer flexible space to emerging companies, for international soft landings, and large corporations seeking "swing space" to experiment with a location in the County;
- Interact with portfolio companies to track progress, plan graduations into commercial space and provide quality referrals to community partners, professional service providers; and
- Plan and coordinate onsite programming with three levels of curriculum, including ABC's of business, industry specific, and networking.

Considering the need for greater oversight, management, funding responsibilities required by the enhanced role of the County in this broad and more complex approach to the incubators, the County's request to add three new staff positions in the FY2023 Budget request for the Incubator NDA portfolio is reasonable.

MCEDC Partnership

The role of the MoCo Entrepreneurship and Innovation Center is to review the entirety of entrepreneurship services and support to ensure that a broad, complete spectrum of business education and support is provided and accessible to all county citizens and business segments in all geographical areas.

In addition to recommendations concerning changes to the County-operated facilities, MCEDC will work with the County on the following activities:

- Review the current operating policies and procedures for the incubators, including reenergizing the Tenant Review Committee with specialized professional/industry expertise and creating an Entrepreneurship and Innovation Advisory Committee to include a broader spectrum of ecosystem stakeholders.
- Make recommendations to include more targeted and specific programming while streamlining assets that already exist in the ecosystem.
- Coordinate with State and Federal resources to optimize programs and activities, and advocate for Federal and State funding and programs for continued growth and expansion.
- Provide focused resources under one communications, marketing, and outreach approach through digital marketing, website, newsletter.
- Find strong programmatic partners to support the County incubator facilities and facilitate program activities, such as angel capital investment conferences, business pitch competitions
- Integrate the incubator tenants into MCEDC's business support efforts.
- Include the County's incubation program into the Comprehensive Economic Strategy requirements

Closing

In summary, working collaboratively together with MCG and MCEDC can leverage business stakeholders and revitalize and refocus Montgomery County's incubator operations into a more comprehensive component of the County's entrepreneurship and innovation network. The investment resources required to do this would be minimal and the transition could take place before FY23 begins.