

#HOCOGOESCYBER: A STUDY ON CYBERSECURITY COMPANIES IN HOWARD COUNTY, MARYLAND

ABSTRACT

The geographic location of a cybersecurity company may play an important role in its success. The objective of this research was to establish an operational definition for a cybersecurity company, collect data on some of the factors that affect cybersecurity enterprise in Howard County, and measure how well local institutions of higher education meet the needs of Howard County cybersecurity companies. A broad definition was used for this study after extensive secondary research and expert interviews, and data was collected from a survey distributed to cybersecurity companies affiliated with the Howard Tech Council. The results indicate that Howard County is a great location for cybersecurity companies because of its proximity to federal agencies as well as the cluster of companies already present in the county; however, local education institutions could do a lot more to meet the needs of cybersecurity companies. The Howard County Economic Development Authority will use these findings to market Howard County as “Cyber Central,” encouraging cybersecurity companies to start up in or relocate to the county. They will also be shared via online and print mediums.

Keywords: cybersecurity, economics, classification, cyber-education, cluster, proximity to federal agencies, Cyber Central

INTRODUCTION

Cybersecurity is rapidly emerging as a critical and lucrative economic sector. Many local economic developers therefore have an interest in attracting and retaining firms in this field in order to develop a robust cybersecurity economic sector in their jurisdiction. The first part of the paper explains how companies are classified as a part of the cybersecurity sector for the purposes of the Howard County Economic Development Authority; the second describes the methodology; the third discusses the results of a survey of cyber-security companies in Howard County; and the fourth provides analysis of the results from the author as well as experts who normally deal with queries in the economics of cyber-security. The survey results and cyber-security experts indicate that firms in this sector are attracted to regions with a significant cyber-security sector already in place and a highly skilled and educated workforce. Other factors attractive to cyber-security companies include the quality of cyber-education, proximity to federal agencies, and access to customers.

Most important in local economics is expanding the tax base to enable investments that will further grow the economy and create more jobs. A county with a large tax base can maintain and improve the quality of life of its citizens, public education, public safety, the local environment, retirement spending and recreational activities. Therefore, most of the activities of local economic development agencies relate to convincing businesses to remain in their county or relocate to it (*Introduction to Economic Development* 5; Morgan 4). Common methods of obtaining those objectives include maintaining high quality, even innovative infrastructure, providing forums for professional and enterprise networking, managing land use and zoning in a manner facilitative to economic growth, providing tax credits and worker training as incentives,

offering low-interest loans and marketing the region as conducive to economic success for targeted industries (*Introduction to Economic Development* 49-50).

Because cybersecurity is such a new and emerging economic sector, it has been unclear what characteristics companies search for or require from a region. It is very clear, however, that the sector is lucrative; with an estimated \$207.1 billion in revenue in 2013 at an average 17.5% profit margin (Yang). Cybersecurity is integral to the activities of online payment software developers, online insurance and mortgage brokers, data providers, security service providers and software publishers (Yang). Because of this, states around the country have been offering technology tax credits and Maryland has allocated over \$3 million of its budget to a tax credit specifically for cybersecurity companies that have secured an investment, equal to one-third of the investment ("Cybersecurity Investment Incentive Tax Credit"; Povich). Howard County, the case study for this research, has developed and marketed its own plan to be become known as "Cyber Central." Howard County is somewhat exceptional in that it has a very low unemployment rate consistently below 5% ("Howard County Unemployment Rate") and a high median household income of \$108,000 (U.S Census Bureau). Howard County also has one of the most highly educated workforces in the nation and a robust professional, scientific and technical services sector (*Regional Economic Studies Institute; Strategic Plan* 23).

SECTION ONE – Definitions

There is not yet one standard definition of cybersecurity. The Anne Arundel Workforce Development Corporation Pathways to Cybersecurity Careers Consortium quotes The U.S. Department of Labor, claiming "the workers who protect the data and systems in networks that are connected to the Internet. But it is no easy task to define who, exactly, these specialists are. In part because of that difficulty, their training requirements vary widely. One thing seems certain, however: Cybersecurity is a growing career field." This uncertainty reveals how new and emerging cybersecurity is not only as an economic sector but as a vital functioning of many companies in any sense. The National Security Agency defines cybersecurity as "measures that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality and non-repudiation" (*CyberMaryland* 2). After extensive definitional analysis and study, Craigen and others proposed that an interdisciplinary and unifying definition of cybersecurity be "the organization and collection of resources, processes, and structures used to protect cyberspace and cyberspace-enabled systems from occurrences that misalign de jure from de facto property rights." This definition is superior for the purposes of this research because it is optimally broad and encompassing.

There is no separate classification for cybersecurity companies. Cybersecurity firms are distributed throughout various industry classifications in the North American Industrial Codes (NAICs). For the purposes of its tax credit, the Maryland Department of Business and Economic Development identifies a cybersecurity company as one that is involved primarily in developing innovative and proprietary cybersecurity technology, defined as "products or goods intended to detect or prevent activity intended to result in unauthorized access to, exfiltration of, manipulation of, or impairment to the integrity, confidentiality, or availability of an information system or information stored on or transiting an information system" ("Cybersecurity Investment Incentive Tax Credit"). This study includes companies specializing in cybersecurity technology,

those providing cybersecurity services, and those with a substantial cybersecurity component—even if they do not specialize in cybersecurity.

Below are some definitions that may be helpful for understanding this report.

- *Educational opportunities*: entry-level training, degrees, courses, certifications and clearances qualifying people for work in cybersecurity and offered at an institution accessible to the local jurisdiction
- *Attract*: encourage existing cybersecurity companies to relocate their headquarters and offices to the local jurisdiction
- *Retain*: maintain cyber companies' satisfaction with being located in the local jurisdiction

SECTION TWO – Methodology

The sample (n=13) was not random; it was a convenience, voluntary response sample of cybersecurity companies affiliated with the Howard Tech Council. A Google survey was emailed to about eighty technology companies in the Howard Tech Council's database. However, the sample was representative. Included in it were sole proprietorships (n=2), limited liability companies (n=4), corporations (n=4) and S corporations (n=3). Responses were not attributed to individual responders. About one half of the companies focused on governmental contracts and about half focused both on the public and private sectors. The companies ranged in size from 1 employee to 5400 employees and in revenue from less than \$1.5 million to greater than \$100 million. There is an extreme lack of information about the population—all cybersecurity companies located in Howard County—because cybersecurity does not have its own NAIC code. Because of this, and because of the nature of this study, extreme caution must be taken before making any generalizations.

It can be presumed, however, that the results are indicative of the experience of cybersecurity companies that are active in the Howard Tech Council. Because the Howard Tech Council is already one of the marketing points of the HCEDA, the results are useful for its purposes. In other words, executives at the HCEDA can cautiously claim that the geographic benefits found in this study exist for any cybersecurity company that chooses to take advantage of active membership in the Howard Tech Council. The hypothesis was that such companies chose to locate in Howard County primarily because of proximity to federal agencies and the cluster of cybersecurity companies already in the county. It was also hypothesized that the locally accessible cyber-education institutions were meeting the needs of Howard County companies by providing quality educational opportunities.

SECTION THREE - Results

The findings indicate that the proportion of cybersecurity companies that determined the apt location for their operations based on the “cluster of cybersecurity and technology businesses” in Howard County was 62 percent. The proportion of companies that determined where to locate based on “proximity to federal agencies” was 54 percent, which was also the proportion of respondents that determined location based on “access to customers or suppliers.” For this item,

respondents checked all boxes that applied. The item is reproduced below. The response with the next highest proportion was “highly educated workforce,” at 46 percent.

Why did you choose to locate your company in Howard county? *
Please check all that apply.

- Proximity to federal agencies
- Cluster of cybersecurity and technology businesses
- Highly educated workforce
- Quality of life
- Specific education or training programs
- Access to customers or suppliers
- Public school system
- Local government services
- Other:

An item with identical answer choices asked respondents “what about being located in Howard County has been beneficial to your business?” The proportion of respondents that checked “cluster of cybersecurity and technology businesses” increased to 77 percent. The proportion that checked “proximity to federal agencies” increased less, to 62 percent. The proportions that checked “highly educated workforce” and “access to customers of suppliers” each remained the same.

Which cyber-education institutions are useful to your business' needs, particularly employee training or education? *
Please check all that apply. Consider degrees, certificates, clearances, non-degree training programs, etc.

- Anne Arundel Community College
- Capitol College
- Coppin State University
- Howard Community College
- Johns Hopkins University
- Montgomery College
- Morgan State University
- Prince George's Community College
- Towson University
- University of Maryland College Park
- University of Maryland Baltimore County
- University of Maryland University College
- Institutions outside of Maryland
- None
- Other:

The proportion of companies that selected University of Maryland at Baltimore County (UMBC) as an educational institution useful to their businesses' needs was 54 percent, the highest amongst all those listed. Interestingly, the proportions of companies taking advantage of educational opportunities at Howard Community College (HCC) and Anne Arundel Community College (AACC) were equal, at 23 percent. The proportion of companies that found their employees through referrals was 69 percent. Meanwhile, the proportion that found their employees through Maryland universities and colleges was 46 percent. Both of these items also asked respondents to check all that apply. The item asking about institutions useful to the business needs is reproduced above.

Finally, respondents were asked to scale from 1 (not at all) to 5 (perfectly) "how well cyber-education institutions in and around Howard County meet employment and training needs." The mean response was 3.08, with 8 out of the 13 respondents selecting 3.

SECTION FOUR - Discussion

The proportion of respondents who selected "cluster of cybersecurity and technology businesses" and "proximity to federal agencies" as benefits of being located in Howard County is an increase from the proportion that selected those as reasons for locating in the county. That seems to indicate that once companies did choose to locate in Howard County, some of the attributes they had not considered became beneficial for their operations. Because the sample size is small and because random methods were not employed in this study, however, a 2-proportion z-test would be inappropriate to test for statistical significance.

Both proximity to federal agencies and cluster of cybersecurity and technology businesses are factors that are fairly unique to Howard County and surrounding regions, suggesting that a cybersecurity company determining where to locate might narrow the options significantly if considering these factors. A highly educated workforce is also predominant in this region and specifically Howard County. Interviews with some of the Chief Information and Security Officers surveyed also confirmed that the decision to locate in Howard County is primarily based on access to customers or suppliers, proximity to federal agencies and the cluster, with a general emphasis on the "rich resource pool."

The relatively higher proportion of companies that selected UMBC as useful to their businesses' needs suggests that the cyber-incubator programs and special degrees offered at that university might be helpful to cybersecurity companies in the region. It is interesting that Howard County cybersecurity companies used educational opportunities at HCC and AACC at similar rates, because that finding suggests that HCC does not have the advantage of proximity. It might be surmised that this is because AACC has a robust cybersecurity training pipeline that works directly with companies in the region, requiring in its programs hours of training with experienced cybersecurity professionals. The low percentage of cybersecurity companies that partnered with HCC, as well as the mediocre rating of how well cyber-education institutions met companies' training and staffing needs, might be an imperative for the Howard County government to develop and sustain a pipeline. Less than one half of the companies relied on education institutions to find employees. If Howard County is to become "Cyber Central," then employee and training needs would continually grow. It appears that companies have thus far

relied on the cluster to staff open positions, evidenced by the high proportion that reported that they find their employees using referrals. Interviews with company executives and experts in cybersecurity research also confirmed that, while relying on referrals to fill open positions has been adequate, there is a concern that it is not sustainable.

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