

BUSB-433-IW12 GIS for Business: Final Project

“Strategic Expansion Using GIS”

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This report will explore the use of GIS applications to facilitate informed decision making on strategies to improve sales revenue by gaining domestic market share in the Data Storage Component Industry. It will focus on a local small business that sells mission critical data storage components. Two strategies for expansion will be proposed detailing how GIS can be used to gain knowledge about the target region in which to execute the plans.

Aeon Micro Inc. (Aeon) was founded in 2009, in a garage, by two entrepreneurs who had substantial prior experience with repair and resale of hard disk drives. The company experienced rapid growth with first year gross sales exceeding one million dollars. Revenue increased dramatically each of the next four years and reached a peak in 2015 exceeding \$10 million in gross revenue. Aeon now has a staff of 19 employees working from a single location in southern California. A full office staff performs standard business functions like entering sales orders and accounting transactions and performing customer service tasks, etc. The warehouse staff handles receiving, inventory control, production, packaging, and shipping.

Aeon specializes in providing Enterprise Level Data Storage Components (Hard Drives and RAM) to the IT industry. The company is a wholesale distributor of manufactured components from the major players in the industry like Dell, Seagate, Western Digital, etc. They also refurbish and resell out of production and hard to find components for legacy systems. The products the company sells are typically “Mission Critical” meaning that the customers have installation or repair projects in process that cannot move forward without them. Extreme circumstances like these require guaranteed overnight shipping as the customers are often losing significant amounts of money while their critical systems are offline.

“The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.” ([https://www.naics.com/hrf\\_faq/new-faq-title-test/](https://www.naics.com/hrf_faq/new-faq-title-test/)). The NAICS uses codes to define industries based on the type of business being conducted. The Data Storage Component Industry, as it relates to Aeon, resides in a niche between two codes; NAICS 334112 Computer Storage Device Manufacturing and 423430 Computer and Computer Peripheral Equipment and Software Merchant Wholesalers. Companies like Aeon that refurbish and resell components have aligned themselves with the manufacturing sector as opposed to the peripheral wholesalers. NAICS 334112 contains the both manufacturers of the components and refurbishers. This industry is akin to the auto parts industry in that it is an alternative replacement part resource for people that have equipment that they are choosing to repair due to a high replacement cost. These replacement parts are expensive to get from the manufacturer and in some cases are no longer available. Projections and performance have been in a steady uptrend for the past decade which has only plateaued in the past couple of years. Aeon is in the process of transitioning from a small startup just entering the market to an established player with the experience and capital to expand its presence in industry.

While the company experienced rapid growth through the first half of its existence and has maintained a large revenue stream growth has been stagnant for the past several years with the company having difficulty passing the \$10 million per year mark. This may be attributable to a saturation of the local Southern California marketplace as well as changes in the industry as solid-state technology begins to replace the older physical spinning discs which lessens the demand for older replacement components.

Another issue the company faces is shrinking profits as costs increase and revenues remain stagnant. Shipping cost is the second highest cost next to the cost of the components themselves. Fed Ex divides the country into shipping zones (Figure 1) and the more zones that a shipment must cross, between the sender and recipient locations, the longer the shipping time and/or the higher the shipping cost. The most costly shipments are those that must be sent overnight far away. Pricing in the industry is highly elastic, meaning that subtle changes in price will have a dramatic impact on demand. (Schiller,2017) Raising prices significantly is not an option so it comes down to cutting cost. Customers take the cost of shipping into account when calculating their total cost to compare with other suppliers. Offering “Free Shipping” is an incentive for customers to buy but the cost must be rolled into the total price which impacts profitability.

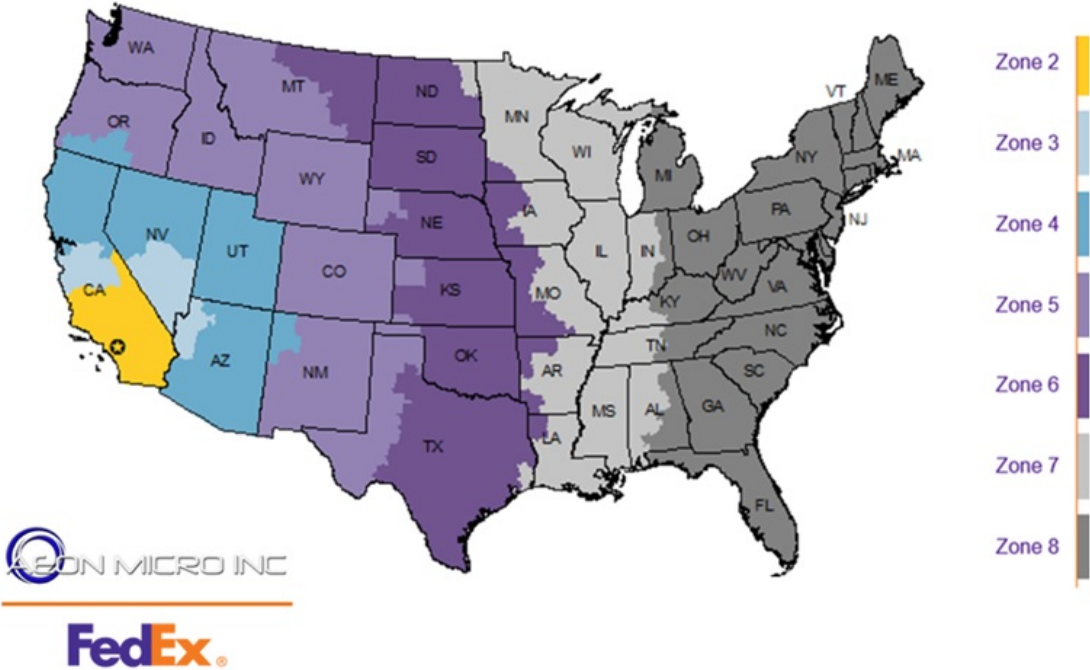


Figure 1

GIS technology can aid in solving these problems for Aeon. Two strategies are being proposed. Strategy #1 is to form alliances within the company's existing customer and vendor base to create a distribution network that can reduce the per order shipment cost and potentially increase sales volume addressing one of the company's primary concerns. By using the GIS to analyze the locations of customers, vendors, and shipments Aeon can determine the regions to target based on concentration of shipments and potential support players. The strengths of this strategy are that it can be implemented immediately yielding quick results and its dynamic nature allows for strategic scalability and focus. Key weaknesses are the release of control of the product handling and fulfillment coupled with the requirement to provide financial incentives to the customer or vendor. This strategy has the potential to increase the size of Aeon's fulfillment network and domestic geographic presence, however it does come with the risk of trust and competition issues with potential partnering companies.

Strategy #2 is to use the GIS to determine a target region for opening a satellite facility based on proximity to customers, vendors, shipments, and other companies within the industry. The strengths of this approach are the retention of total control of the operation and no requirement to share the profits or secrets with other companies. A key consideration of this approach is the high investment cost and long-range implementation time. There is also the additional burden of managing a separate facility and inventory. With this approach Aeon will establish a stronger physical presence in the region and the location will have the potential to grow from a satellite facility into a self-sustaining operation. There are two major disadvantages, the first being the possibility of another player moving in on the region during the time it takes to set up a facility, the second is a lengthy exit process if the company decides it should change its focus to another region.

Each of these strategies requires collecting and using data to build the GIS to determine the target region. Once the region and strategy are identified company representatives will travel to the delivery hot spots, meet with the big players, scout locations, and assess proximity to vendors. GIS applications will be used to facilitate each of these endeavors.

There are three main sources of data used to build the GIS; Aeon's internal company data, Fed Ex shipment data, and data from various ESRI online GIS software. The first data component is Aeon's top customers and vendors based on purchase and sales volume. This data is collected in the company's accounting and inventory system and can be exported to Excel. An address attribute was assigned to each of these data records which were then geocoded to become spatialized data within the GIS. The next component, the shipment data from FedEx, was geocoded in the same manner and displayed graphically by GIS. The location of other companies within the industry that Aeon is not currently doing business with are the final data component. This information is obtained through ESRI's Business Analyst Online (BAO) using the NAICS code to as a filter to show only these specific businesses. Entering all of this data into ESRI's ArcGIS produced the map shown below (Figure 2)

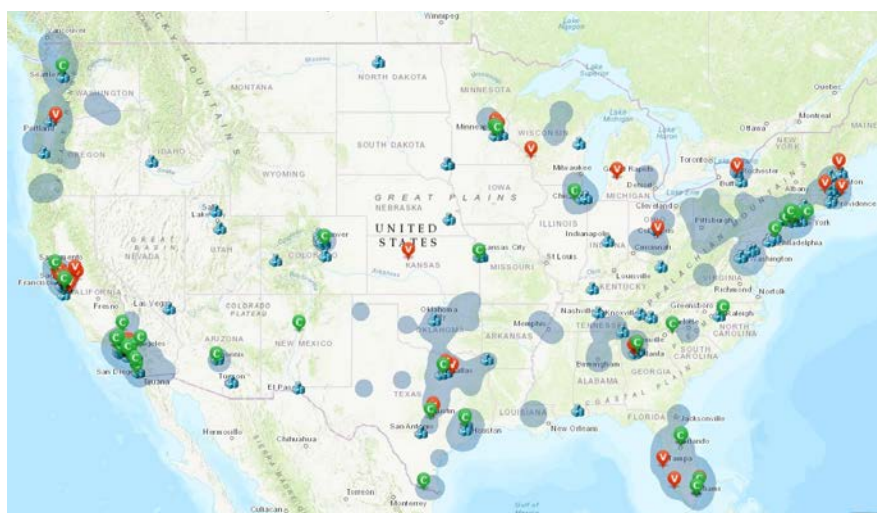


Figure 2

Aeon's Customers are shown with green "C" and red "V" icons respectively, the small blue cluster of buildings icon shows the other companies in the industry, and the gray shaded areas show the concentration of Aeon's shipments.

The map shows that the bulk of the activity is focused on the east and west coasts and the southern middle portion of the country. Aeon can already ship to the west coast at the cheapest rates as it does not require crossing more than one FedEx zone. For this reason, it is not a protentional target region. The remaining regions; the north east, south east, and greater Texas area are all potential target regions for both strategies as they contain high concentrations of shipments and potential companies to partner with. This proposal will focus on the south east region (Figure 3) consisting of 5 states: Florida, Georgia, North Carolina, South Carolina, and Virginia.

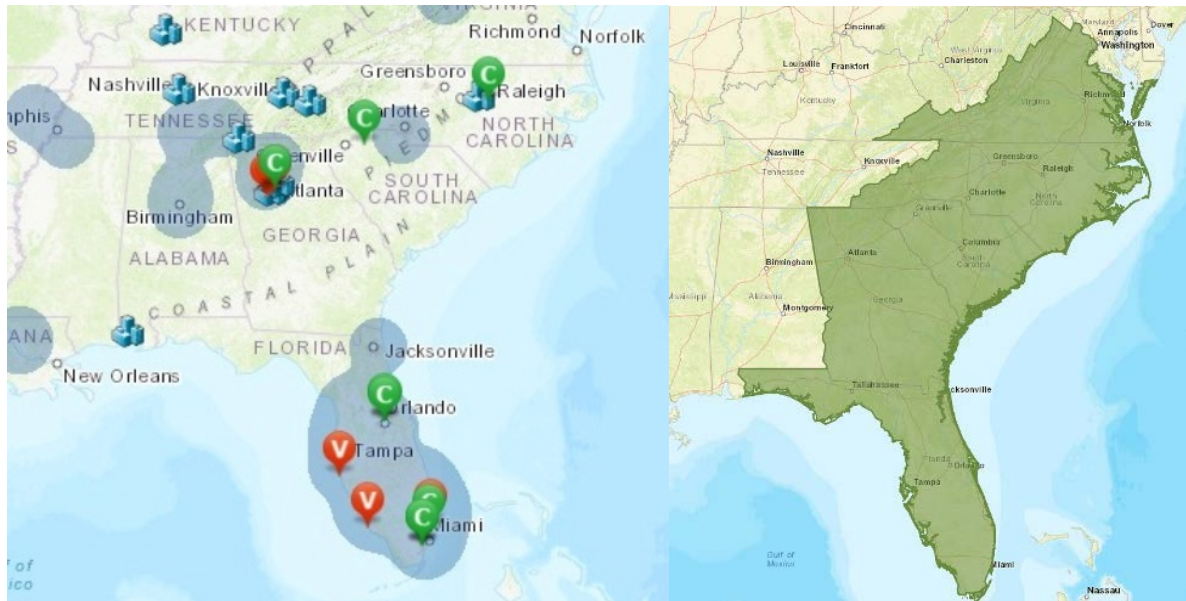


Figure 3

Filtering capabilities in the GIS make it possible to show only data from the 5 states in the target region. This allows for data from the customer and vendor layers to be exported to



create a contact list for company reps traveling to the area. These contacts are the companies to be considered for expanding Aeon’s distribution network using Strategy #1.

GIS for Strategy #2 involved creating an app (Figure 4) with Survey123 for ArcGIS to collect data for potential sites to buy/lease/develop a new satellite facility.

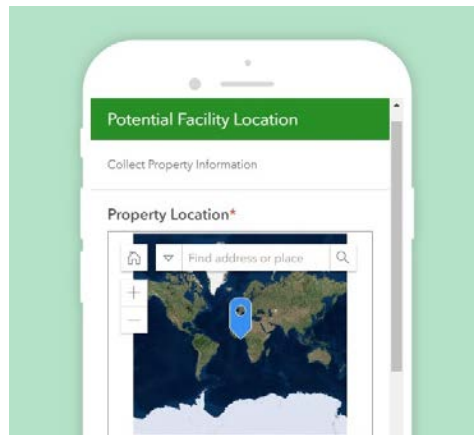


Figure 4

The app allows the field rep to enter pertinent data about the site like the location, price, and features. This data is collected in a table that can be viewed graphically in ArcGIS. Property comparisons between sites can be made by setting display ranges for the various attribute values. Business Analyst Online can be used to generate reports (Figure 5) for the region containing population, demographics, and industry specific consumer behavior.

esri Market Profile		Prepared by Esri
5 States Florida (12) et al. Geography: State		
		FL(12),GA(13)...
<b>Population Summary</b>		
2000 Total Population		43,308,671
2010 Total Population		50,650,834
2018 Total Population		55,523,609
2018 Group Quarters		1,324,441
2023 Total Population		58,927,587
2018-2023 Annual Rate		1.20%
2018 Total Daytime Population		54,994,552
Workers		25,465,016
Residents		29,529,536
<b>Household Summary</b>		
2000 Households		16,709,338
2000 Average Household Size		2.52
2010 Households		19,608,780
2010 Average Household Size		2.52
2018 Households		21,368,290
2018 Average Household Size		2.54
2023 Households		22,637,149
2023 Average Household Size		2.54
2018-2023 Annual Rate		1.16%

Figure 5

Aeon does not currently use GIS technology to assist with strategic decision making. This proposal is for a one time or periodic use of GIS but there are several ways in which GIS technology could be used on an ongoing basis in the future to gain strategic advantage in the industry. One such use would be to geocode the company's purchase data (inbound product) so that it may be viewed graphically and compared via an overlay with the spatial shipment data (outbound product). This would give insight into the travel patterns of the products informing decisions that could reduce the amount of travel and the associated costs. Adding additional attribute fields to the existing data sets will allow for deeper analysis. For example adding volume and monetary data to vendor and customer records will allow them to be compared and ranked furthering the selection process. The analytic capabilities of ArcGIS and Business Analyst Online can be used on an ongoing basis to analyze potential target regions and facility sites. The US Census Bureau data contained within BAO can also be used to project regional industry growth using factors like population expansion, business development and consumer habits.

There are costs associated with implementing a GIS. The first be the data collection cost, which in this case is minimal, as the data is being collected already by existing systems. The more significant data cost is the conversion and analysis. The greater the detail of the data being collected and analyzed the the higher this cost will be. The GIS Implementation budget must include the subscription or purchase cost of the software. The equipment costs for this proposal are minimal as the required technology (PC, Smart Phone, Tablet) already exists within the company. Though it is typical for employees to be resistant to change the implementation of this GIS application does not result in any real additional labor for the collection of the data which should help to encourage employee adoption. The data conversion will be the most labor

intensive but would be a special project for the IT department. If there were going to be ongoing GIS usage it could become a position of its own.

The significant potential benefits clearly outweigh the projected minimal costs of implementing GIS. The ability to graphically analyze spatial data will give Aeon a competitive advantage as it looks to expand its operation outside of its single west coast facility. This expansion will lead to the revenue growth the company is seeking. The ability to use the GIS to build efficiency in the purchasing, order fulfillment, and shipping processes will lead to reduce costs which coupled with the expected revenue growth this will address the issue of declining profits. These costs savings will also give the company a competitive pricing advantage and forming alliances with additional vendors will increase the company's purchasing power by expanding its supply chain.

The final portion of this proposal covers Porter's 5 Forces of Competition and the competitive strategies that can be used to counter them (O'Brien, Marakas, 2013, p. 52). The first force is the threat of new entrants, this is not seen as an immediate danger as new entrants are potential vendors, customers, and partners. Since this is a niche industry, new entrants can be viewed as a positive sign of industry growth and are a critical part of the proposed alliance strategy. The threat of substitutes is a significant factor in this industry as all companies are selling the same products which gives significant bargaining power to the customer. Aeon can counter this force with a cost leadership strategy made possible by the reduction in shipping expense. The bargaining power of suppliers will be offset by the increased supply chain network and the increased purchasing power that comes with the alliance strategy.

In Summary implementing GIS would be a wise move for Aeon Micro Inc. The minimal implementation costs and its potential to help the company expand and increase market share make it a sound investment.

#### Link to Presentation

<http://redlandsbusiness.maps.arcgis.com/apps/Cascade/index.html?appid=5361a5c4d22f49bf857455f6e5a8fe24&folderid=cfe9b4eaeccf4113b2575fc436c875c8>

### References

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O'Brien, J.A. & Marakas, G.M. (2013). Introduction to Information Systems – loose leaf (16th ed.). New York, New York: McGraw-Hill/Irwin

Pick, J. B. (2008). Geo-Business: GIS in the digital organization. New York, NY: John Wiley and Sons.

Schiller, R. (2017) Essentials of Economics, Tenth Edition. Retrieved from <http://connect.mheducation.com>

### Websites

United States Census Bureau

<https://www.census.gov>

North American Industry Classification System

<https://www.census.gov/eos/www/naics/>