

SCALING UP IOT COMPANIES IN SOUTHEAST MICHIGAN

**A Network Analysis of the Region's
Internet of Things Entrepreneurship
Community**

A REPORT BY:

endeavor
INSIGHT

**PART OF A SERIES ON SOUTHEAST MICHIGAN'S COMPETITIVE
ADVANTAGES IN ENTREPRENEURSHIP**

ABOUT ENDEAVOR INSIGHT

Endeavor Insight is the research and policy division of Endeavor, a nonprofit organization that has been supporting high-impact entrepreneurs around the world for more than 20 years. Our team of economists, data scientists, and policy analysts provide data-backed insights on entrepreneurship and its contribution to economic development. We specialize in understanding how entrepreneurship networks can drive job creation and inclusive growth. We partner with organizations that support entrepreneurs, including foundations, multilateral agencies, and corporations.

The methodology utilized in this study builds on previous Endeavor Insight research supported by the Omidyar Network, the Kauffman Foundation, and the Heron Foundation.

ENDEAVOR INSIGHT STAFF

Leah D. Barto	Martin Pickering
Ana Paula Gil	Hamza Shad
Marine Fujisawa	Divya Titus
Alejandro Noguez-Ibarra	

ADDITIONAL CONTRIBUTORS

Maha AbdelAzim
Rhett Morris
Lili Török

CONTACT

For more information about Endeavor Insight, contact Leah D. Barto at leah.barto@endeavor.org.

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Executive Summary

In 2019, Endeavor Insight completed a study with support from the William Davidson Foundation that identified six sectors that make up Southeast Michigan's competitive advantages in entrepreneurship.* Software was one of the sectors highlighted as a local strength. This report revisits that research to identify strategies for furthering the growth of Internet of Things (IoT) businesses, the most promising local subsector.† Data collection was conducted before the COVID-19 crisis, but the findings have been presented so that they are especially relevant to ongoing economic recovery efforts.

Southeast Michigan needs to leverage the region's existing competitive advantages in entrepreneurship.

The COVID-19 crisis exposed Southeast Michigan's continued dependency on the automotive industry. This report provides information on how decision makers can support the growth of local IoT companies. The study shares four major findings:

1. IoT grew from Southeast Michigan's regional assets. Local companies have developed a range of IoT solutions, which include physical products, software development, and data analytics. IoT companies in Southeast Michigan emerged by developing solutions that support local industries. The local IoT sector grew rapidly from 2010 to 2019, with more than 20 percent of companies achieving the scale of 50 or more employees. The potential for this sector to help drive local productivity is high given the strong regional and global demand for IoT solutions.

2. Universities and support organizations are highly influential in Southeast Michigan's IoT sector. Endeavor Insight analyzed the connections that exist among IoT companies in Southeast Michigan to produce a network map that shows the most influential actors in the local sector. The network map illustrates that organizations other than entrepreneurial companies are the most influential. Ecosystems where founders are more connected to one another tend to be more productive.

3. IoT founders face particular barriers in growing their companies, but improving the connectivity among them can help overcome these obstacles. Endeavor Insight interviewed local founders about the challenges they faced when operating their businesses. Access to capital was a primary challenge that local founders noted when scaling their businesses. Access to talent is another common challenge for entrepreneurs, although founders reported that technical talent from local universities was valuable to growing their companies. IoT companies also face industry-specific challenges including a lack of customer readiness that can slow sales.

4. There are several strategies that decision makers can adopt to support the growth of local IoT companies. IoT is a promising avenue for local innovation. The following four recommendations were developed as a practical guide for policymakers, investors, and entrepreneurship support organizations.

Recommendation 1: Encourage self-sustaining ecosystem development. The local entrepreneurial ecosystem can be strengthened by encouraging successful founders to reinvest in the community through mentorship or as angel investors. This would also help to perpetuate founder-to-founder connections, which can be key to a self-sustaining ecosystem.

Recommendation 2: Facilitate collaboration between existing and emerging companies. A significant amount of research and development (R&D) for IoT is undertaken in-house by large corporations, which makes it difficult for separately emerging companies to compete. Local decision makers should incentivize cooperation and discussions between large existing companies — particularly those in the automotive and mobility sector — and emerging innovative companies.

Recommendation 3: Avoid perpetuating top-down approaches. As the needs of founders change, decision makers will need to continue to listen and coordinate more responsive approaches to support them. This type of “bottom-up” approach will help steer the support organizations and institutions.

Recommendation 4: Take steps to promote risk-taking and global ambitions. The local ecosystem has developed a culture of risk aversion, which holds back local investment and founders. Decision makers should look to organizations that connect founders with a global network of industry experts and encourage much larger ambitions among local innovators.

* The analysis for Southeast Michigan in this report is based on the following seven counties: Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne. For more information, please see the report titled “Southeast Michigan's Competitive Advantages in Entrepreneurship” available at endeavor.org/semi-cae.

† IoT companies are businesses relating to systems by which physical devices connect to the internet to share data and communicate with a network without involving human interaction.

INTRODUCTION:

SOUTHEAST MICHIGAN NEEDS TO DIVERSIFY ITS ECONOMY AND LEVERAGE THE REGION'S COMPETITIVE ADVANTAGES IN ENTREPRENEURSHIP.

The COVID-19 crisis exposed Southeast Michigan's continued dependency on the automotive industry.

For several years leading up to 2020, Southeast Michigan's economy was steadily improving. Detroit was celebrated across the country for the successful revitalization of its downtown areas, and entrepreneurs and students were looking to move to the city.¹ In February 2020, seven years after the city declared bankruptcy, Moody's gave Detroit's rating a positive outlook, citing, among other considerations, its "improved job base" and "rising tax benefits."²

A month later, the COVID-19 pandemic hit, exposing age-old structural problems in Southeast Michigan's economy. The state of Michigan continues to depend on the auto industry, which the Brookings Institution identified as one of the most heavily and immediately impacted industries in the crisis.³ By mid-April, the Washington Post reported that roughly a quarter of Michigan's workforce had applied for unemployment benefits.⁴ The outlook in the city's rating was revised to stable, then negative. By May 2020, Detroit was one of the hardest hit areas by the economic effects of the pandemic in the United States.

Southeast Michigan needs to leverage existing competitive advantages in entrepreneurship to diversify its economy.

Endeavor Insight research suggests that regions have certain competitive advantages in entrepreneurship that decision makers can leverage to diversify local economies. Companies that are larger (employing 50 or more people) and operating in high-value industries are closely linked to important outcomes in cities, such as job creation and higher productivity. There is also evidence from the aftermath of the 2008 Financial Crisis that companies like these tend to be more resilient in times of crisis because they shed fewer employees.*

In 2019, with support from the William Davidson Foundation, Endeavor Insight scanned the region for these productive companies and found that Southeast Michigan is fortunate to have several of them. These valuable companies are concentrated in six sectors that are more prevalent in Southeast Michigan compared to the rest of the United States, giving the region a competitive edge. These sectors are software, specialty food and beverage manufacturing, lending and financial services, consulting, shipping and logistics, and marketing and branding.[†]

This study found that by devoting support to these six groups, decision makers could further diversify the economy and help the companies with the greatest capacity to create large numbers of local jobs.

IoT is emerging as an important pillar of the local economy.

IoT was identified as an important industry to study within the broader software sector, since it has strong potential to help drive local productivity given high regional and global demand for IoT solutions. This report provides information on how decision makers in the private and public sectors can support the growth of IoT companies in Southeast Michigan.

IoT companies, for the purposes of this report, are businesses relating to systems by which physical devices connect to the internet to share data and communicate with a network without involving human interaction. This includes businesses that create a physical device, companies that develop software that enables this connection, and firms that create software that enables the collection, aggregation, and analysis of the data obtained from devices connected to the internet.

For this research, the pathways of local founders from more than 200 companies were analyzed to understand how they built their companies, and what

* For more information, see the Endeavor Insight report titled "How Cities Can Identify the BEST Businesses for Local Economic Growth" available at endeavor.org/best-businesses.

† For more information, see the Endeavor Insight report titled "Southeast Michigan's Competitive Advantages in Entrepreneurship" available at endeavor.org/semi-cae.

challenges they encountered along the way. The report also includes social network analysis to help identify opportunities where decision makers can support IoT entrepreneurs by leveraging network effects in the entrepreneurship community.

Although this research was conducted before the onset of the COVID-19 pandemic, the depth of the crisis makes the findings more relevant as decision makers look for ways to strengthen Southeast Michigan's economy. With this outlook in mind, entrepreneurial IoT companies will

continue to play a critical role in Southeast Michigan's economy well after the pandemic. The following pages share major findings that identify opportunities to better support entrepreneurs in this sector.



CONTEXT:

IOT GREW FROM SOUTHEAST MICHIGAN'S REGIONAL ASSETS.

IoT solutions are changing the way the world works. As an emerging industry, IoT is often called the third wave of the internet revolution, after personal computers and smartphones. This technology is already changing the way consumers live in their homes and manage their day-to-day lives. It is predicted that 50 billion household devices could be connected through IoT within years.⁵ IoT is changing the way businesses across a range of industries automate processes and analyze data. Following the ongoing household and industrial uptake, IoT is also providing solutions in civic infrastructure, through smart cities and smart roads.⁶

In Southeast Michigan, various industries which have long been vital for the local economy have incorporated IoT solutions. Local manufacturing companies are now using IoT devices to gather data and insights from their machinery, allowing for increased efficiency. IoT has also transformed the local automotive industry through new product features, including smart cars connected to the internet and automated driving.

Local companies have developed a range of IoT solutions, which include:

1. **Physical Products:** Companies that design, manufacture, and/or implement autonomous machinery used in industrial manufacturing facilities or farming. This category also includes some companies that create and operate robots, such as drones.
2. **Software Development:** Companies that design and develop software or mobile applications for other businesses that can be used for IoT applications. These companies include those addressing business concerns such as connecting existing products and managing assets.
3. **Data Analytics:** Companies that collect data or provide analytics for a client's business operations, such as customer behaviors, employee efficiency, and operational risks.

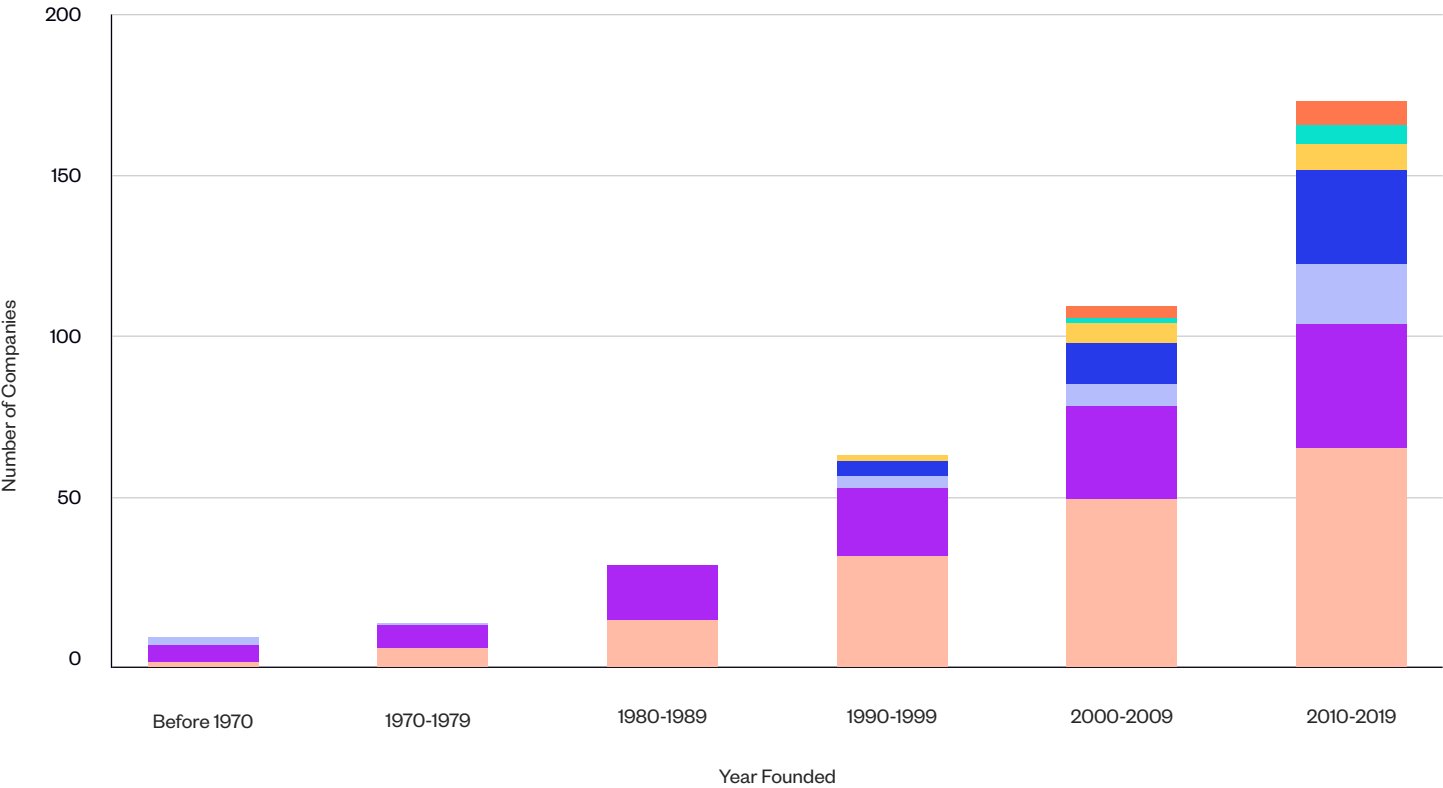
IoT companies in Southeast Michigan emerged by developing solutions that support local industries such as automotive and other types of manufacturing. Over time, their capabilities in cybersecurity and other sophisticated uses of artificial intelligence (AI) allowed the local IoT sector to specialize in business services for healthtech, fintech, and other industries. The graph on the following page illustrates the development of the sector, which has seen the number of companies in the sector grow almost three-fold from 2000 to 2019.

Many of the local IoT companies are tied to the region's prominent automotive sector, and have diversified their product offerings or developed specialized technologies that can advance the industry. **Plex Systems** develops a smart manufacturing platform through which clients can connect, automate, track, and analyze their business operations. The company began as a project within MSP Industries, a Michigan-based auto parts manufacturer. Plex has over 700 customers around the globe, and was acquired by Rockwell Automation for \$2.22 billion in September 2021. **Livio Radio** maintains SmartDeviceLink that allows drivers to interact with smartphone applications through in-vehicle interfaces such as a touch screen or voice control. After raising millions of dollars in five investing rounds, Livio Radio was acquired by Ford in 2013.

Other notable companies have grown by serving industries where Southeast Michigan already has a competitive advantage in entrepreneurship — shipping and logistics and fintech. **LLamasoft**, founded in 2003, provides software that aids in supply chain design. After years of successful expansion and funding rounds, Coupa acquired the company in 2020 for \$1.5 billion. **Clinic** has developed AI that can understand complex conversations from bank customers, allowing them to check balances, report missing or stolen credit cards, and transfer funds. It has raised \$59.8 million over four funding rounds.

SOUTHEAST MICHIGAN'S INTERNET OF THINGS COMPANIES

AUTOMOTIVE MANUFACTURING SECURITY & SERVICES HEALTHCARE RETAIL & CONSUMERS FINTECH SHIPPING & LOGISTICS



Note: Based on 174 companies where data is available.
Sources: Endeavor Insight analysis, company websites, LinkedIn, Crunchbase.

OPPORTUNITY:

THE IOT SECTOR HAS HIGH POTENTIAL FOR CONSIDERABLE GROWTH.

The local IoT sector has grown rapidly from 2010 to 2019, with more than 20 percent of its companies achieving the scale of 50 or more employees. The potential for this sector to help drive local productivity is high given the strong regional and global demand for IoT solutions.

According to PwC, adoption of technologies including IoT can safeguard businesses against future economic downturns, like the one caused by COVID-19.⁷ There are signs that spending and investment in IoT is proving resilient to the pandemic. This is particularly true for those companies selling to other businesses (B2B). Research from Strategy Analytics shows that U.S. companies' spending on IoT products as a share of overall IT spend remained high in 2020, even at a time when many long-term investments were deferred in favor of short-term operational support. In addition, the

strong continued investment in 5G networks will have a substantial impact on IoT investments and usage in the coming years.⁸

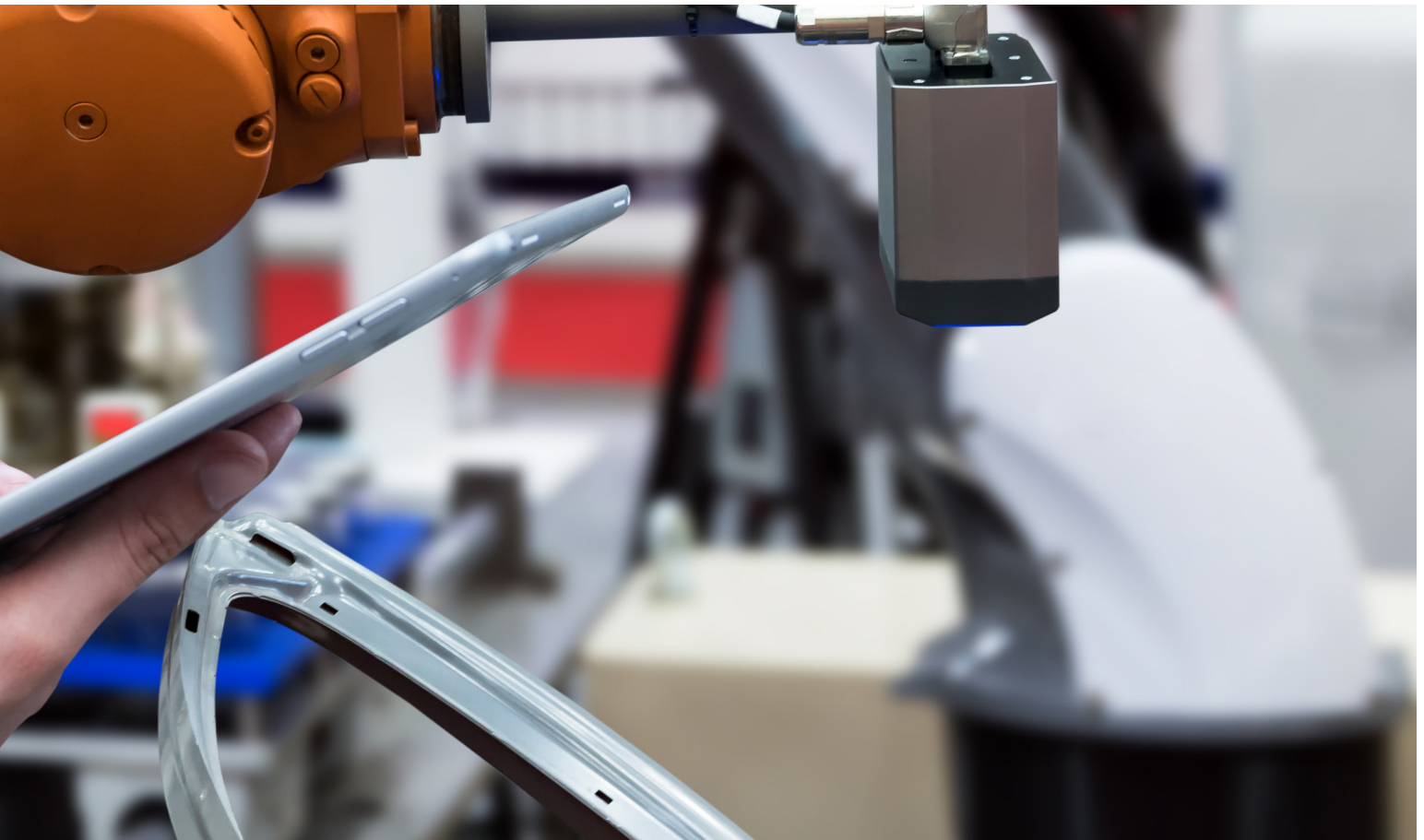
With the household IoT sector now part of the mainstream, investor attention is increasingly drawn towards Industrial IoT (IIoT, a subset of IoT), which many investors consider having untapped potential. Investment in IIoT started more slowly than in household IoT, a factor that is partly down to large industries being historically slow adopters of new technology. The substantial capital investments required for asset-heavy large industries mean that proof of concept is a tougher hurdle than for household investments. But now that large manufacturing, oil and gas, and utilities companies are becoming convinced about the savings that can be made from closely monitored data provided by IIoT, the



subsector is drawing increased investment. And the machine learning that is inherent in IIoT solutions allows companies to respond more quickly to market changes.⁹

Two local companies that have developed to span both the household and IIoT sectors are Vectorform and its spin-off, Powerley. **Vectorform**, founded by Jason Vazzano and Kurt Steckling in 1999, provides a platform and consultancy that assists organizations building digital products, especially in regard to IoT.¹⁰ Vectorform has expanded steadily since its inception, and was awarded a \$375,000 incentive from the Michigan Economic Development Corporation in 2013 to add jobs and grow its office space, a project estimated to have prompted \$2.24 million in private investment.¹¹ In 2016, Vectorform joined the Endeavor network. **Powerley**,

created by a partnership between Vectorform and DTE Energy in 2015,¹² provides energy management tools that help households transition to a clean energy future. Powerley received the 2017 Emerging Business of the Year award by the Michigan Energy Innovation Business Council.¹³ In 2019, Powerley partnered with Oracle Utilities Opower to enhance the digital customer experience for utility companies, providing an easy way for households to become cleaner and more efficient.¹⁴



ANALYSIS:

UNIVERSITIES AND SUPPORT ORGANIZATIONS ARE HIGHLY INFLUENTIAL IN SOUTHEAST MICHIGAN'S IOT SECTOR.

Social networks shape the ways in which entrepreneurship communities develop. Endeavor Insight analyzed the connections that exist among IoT companies in Southeast Michigan using a methodology developed by members of the Global Entrepreneurship Research Network. The resulting network map can be found on the next page.

This methodology looks at four specific relationships among founders and their companies: serial entrepreneurship, former employment, mentorship, and investment. These connections illustrate the ways in which local founders take the knowledge and other resources acquired from founding one firm and use it to support others. By studying the relationships in entrepreneurship networks, it is possible to follow the movement of people, knowledge, and capital, and use this to draw lessons on the state of the entrepreneurship community.

Each entrepreneurial company is represented by a blue circle, and each entrepreneurship support organization, university, or investment firm by a gray circle. The size of each circle on the map represents a founder's influence on the community as measured by their outward employment, mentorship, and investment connections to other members of the network. Many of the influential actors in the local IoT sector are universities and support organizations that were founded several decades ago.

Each concentric ring on the map represents a time period in the entrepreneurship community's life and helps demonstrate the growth of the network over time. In later time periods, the rings are noticeably more crowded due to a large number of new companies being founded.

Several notable companies have been started by University of Michigan alumni. **Duo Security** is a security systems provider to protect users and devices, co-founded in 2010 by Dug Song. Song is a University of Michigan alumnus who is also involved in regional philanthropic efforts. After becoming the first unicorn company in Michigan, Duo Security was acquired by Cisco for \$2.35 billion in 2018. **Altair Engineering** is another company that was successful developing applications for IoT, founded by James Scapa, a

University of Michigan alumnus. The company provides cloud and software solutions for areas including simulation, high-performance computing, and artificial intelligence. Altair went public in 2017, raising \$156 million. **Xeeva** was founded by Dilip Dubey, a University of Michigan alumnus who had previously founded Netlink. Xeeva provides AI-powered software for various industries including industrial manufacturing and automotive, and raised \$40 million in 2018.

While the network map indicates that IoT founders are benefiting from the available local resources, it also shows that connections among founders are rarer. According to Endeavor Insight research, connections between founders play an important role in helping entrepreneurship communities create jobs. When experienced entrepreneurs mentor new founders, when they make angel investments in others, and when entrepreneurs gain experience working for companies at scale, new companies are significantly more likely to grow and employ 50 people or more.¹⁵

The nature of these connections also influences company growth rates. For example, founders that work at a company with 100 or more employees before starting their own firm are nearly twice as likely to build high-growth companies as their peers. Founders who receive mentorship from experienced entrepreneurs are two to three times more likely to build high-growth companies. When it comes to challenging moments in scaling a company, these potential mentors can provide valuable advice to new founders because they have solved similar challenges in the past.

The challenge to foster a self-sustaining entrepreneurial ecosystem also extends to support organizations. Some local accelerators have supported IoT with funding for such programs tied to the mobility industry. However, a slump in sales, such as the one in 2020, affects the larger entrepreneurial community.

Patterns of influence shape entrepreneurship communities over time. Influential actors tend to transmit their values through these networks. The network map of Southeast Michigan's IoT community illustrates that the community may be experiencing "top-down" growth,

where institutions, rather than entrepreneurs, are the most influential. In these cases, Endeavor Insight has observed that institutions often set priorities and funding opportunities that may not involve decision making from founders themselves. In contrast, communities that

have taken a “bottom-up” approach, where founders are elevated to positions of influence and leadership in the community, tend to be much more productive.

IOT FOUNDERS FACE PARTICULAR BARRIERS IN GROWING THEIR COMPANIES, BUT IMPROVING THE CONNECTIVITY AMONG THEM CAN HELP THEM OVERCOME THESE OBSTACLES.

Entrepreneurial IoT companies that scale to 50 or more employees offer the greatest benefit to the local economy. Companies that grow to that size add disproportionately more jobs, and employees in the local technology sector are paid some of the highest average wages in the region.¹⁶ In order for Southeast Michigan to reap the full benefits of the sector, decision makers should understand the needs of the founders leading these highly specialized companies and create a more coordinated support system that can spur further innovation in the region.

Endeavor Insight interviewed founders to ask about some of their most common challenges. During the interview process, several obstacles particular to this industry also arose. The findings below are based on the responses of more than 20 entrepreneurs who participated in the survey.

ACCESS TO CAPITAL

Access to capital was the primary challenge that local IoT founders noted when scaling their businesses. This is consistent with findings from other entrepreneurial ecosystems that Endeavor Insight has studied.

Founders noted in interviews that big investors often overlook Michigan, but the tide may be turning. In general, venture capital (VC) is growing in Michigan, presenting further opportunities for IoT companies. Between 2016 and 2020, VC investments in the state rose by 886 percent, and the COVID-19-induced dip in 2020 was lower than elsewhere. There were 119 deals worth a total \$3.3 billion in 2019, and 94 deals totaling \$3.1 billion in 2020. More startup capital is also being directed towards consumer-facing and software firms, rather than purely research-oriented companies

emerging from the University of Michigan, as had been the case previously. The trend continued into 2021, with a total of \$500 million committed in two April deals, for StockX LLC, a Detroit-based e-commerce company, and Rochester's OneStream Software LLC.¹⁷

There is growing confidence in Michigan's startups as VC firms become more willing to look beyond traditional coastal states. Despite these trends, there is caution about too much capital coming from outside the state.¹⁸ As exits occur, the wealth accrues to those institutions and individual investors elsewhere (most often on the coasts), rather than being reinvested in the region, which hinders the self-sustainability of the local entrepreneurship community over time.

Founders have mentioned that local investors are better acquainted with the more traditional manufacturing sector and remain largely risk averse, especially when it comes to more cutting-edge technology.¹⁹

ACCESS TO TALENT

The lack of access to talent is magnified in relatively new sectors such as IoT and was highlighted in interviews as a challenge by several IoT founders, though many reported that technical talent from local universities was valuable to growing their companies. LLamasoft co-founder Don Hicks explained in an interview with Inno Insights that “LLamasoft has had to become very global much faster, and Ann Arbor has been the place where you can hire people who are more aware of the world.”²⁰ The Midwest, and Michigan in particular, has an advantage, being home to a diverse talent pool, and boasting several renowned technical universities. The region still lags behind Silicon Valley and New York City in terms of allure, but the region does enjoy something of

a boomerang effect, with Midwesterners often settling back close to home when starting a family, drawn by existing networks, attractive costs of living, and — increasingly — job opportunities in tech sectors.²¹

Founders also noted how the low cost of living helps retain employees. However, recruiting, especially for specialized talent needs, can be difficult. This challenge is not restricted to Southeast Michigan. In 2019, a global World Economic Forum survey found that only 27 percent of small companies and 29 percent of large companies felt that they had the right blend of technical talent for digital transformation.²² The COVID-19 pandemic has further raised global demand for new technologies, amplifying the talent gap further.²³

Research from Canonical in 2017 showed that in Europe, 68 percent of IoT related firms found it hard to find and recruit employees with relevant IoT expertise. Within the field, the most scarce were personnel with skills in big data and analytics, which were also highlighted as the most important attributes for IoT professionals.²⁴

Within the United States, the outlook is better. Official employment forecasts suggest that by 2029, the number of software engineers will rise by 22 percent, compared to growth of 5 percent for other occupations.²⁵

ACCESS TO CUSTOMERS

Customer acquisition is a common challenge for entrepreneurs. Customer readiness can be one of the biggest hurdles for IoT sales. According to a Deloitte report covering the Danish IoT market, top managers at firms that are potential customers for new IoT solutions often have a knowledge gap regarding the benefits that IoT can bring, which can lead them to push against large structural upgrades. The perceived high cost often overrides the financial benefits that can accrue from introducing IoT solutions. The lack of historical precedence can also make companies wary of adopting IoT solutions. And once they are convinced that such an investment would be beneficial, there are often barriers related to the operational and governance changes that companies would need to take on.²⁶

Sales for B2B IoT companies are more complicated, as they often involve a combination of hardware and software solutions. This can make the customer conversion process long, and closing a single deal can mean obtaining approvals from decision makers across

multiple buyer departments. All these complications can make B2B IoT sales much more complex and time-consuming than sales in other industries, with the sales process lasting months or years.²⁷

Despite these challenges, local founders noted some advantages to working with clients while being headquartered in Southeast Michigan. They noted the benefits of easy access to an international airport and the advantage of the time difference when working with customers on the west coast.

INDUSTRY-SPECIFIC CHALLENGES

Founders of IoT companies face additional challenges when growing their companies. Security concerns, such as a malware attack, have been cited as one of the main barriers to success in the industry. These concerns can be split into three areas: the authorization for a connected device to receive and send data, the challenge arising from having to use an open port for some operations without exposing all the connected IT to open ports, and end-to-end encryption.²⁸

IoT solutions that are based on novel technologies that combine hardware and software face particular challenges. Some companies already have a core capacity in one area, but not the other, so there is a challenge in deciding whether to subcontract or to compete for talent. If they are developing a hardware device themselves, the R&D process can make for extremely long development timelines that require prototyping, special facilities or equipment, and highly trained personnel. The inherent risk of developing new solutions can mean that the business never gets off the ground, or once the product is ready, the go-to-market strategy may need additional fine tuning before it can be profitable. This can make it difficult to attract investors, and bootstrapping can prolong an already lengthy timetable.*

* Endeavor Insight's series of reports on innovation examines the differences between hardware and software companies according to their founder pathways and challenges. See, for example, "Entrepreneurial Ecosystems in Agriculture" at endeavor.org/entrep-in-agriculture.

RECOMMENDATIONS:

THERE ARE SEVERAL STRATEGIES THAT DECISION MAKERS CAN ADOPT TO LEVERAGE IOT AS ONE OF THE REGION'S COMPETITIVE ADVANTAGES.

The COVID-19 crisis is a reminder that Southeast Michigan needs to diversify its economy and become less dependent on the automotive industry.

Decision makers should look to the entrepreneurial assets already present in the community as the region navigates the resulting economic shocks. IoT companies represent one of the region's competitive advantages in entrepreneurship, and they are emerging as a major pillar of local economic recovery.

To support the industry and fortify the local economy, decision makers need to help IoT companies scale. As one of the most promising avenues for local innovation, IoT companies have already proven to be able to generate high-paying local jobs and leverage the region's available resources.

One of the most effective ways that decision makers can boost the local sector is to focus on identifying and supporting smaller companies with the most potential to scale, as well as large companies as they continue to grow. There are several strategies that decision makers in the public and private sectors — such as policymakers, investors, and entrepreneurship support organization leaders — can adopt to help IoT companies scale. Local leaders can use the following four practical recommendations as a guide.

1

Encourage self-sustaining ecosystem development.

The local entrepreneurial ecosystem can be strengthened by encouraging successful founders to reinvest in the community through mentorship or as angel investors. This would also help to perpetuate founder-to-founder connections, which can be key to a self-sustaining ecosystem.

Southeast Michigan is home to several successful founders who have the potential to foster a more productive entrepreneurship community. As Dug Song, co-founder of Duo Security, says,

*"There are a lot of individuals who could be angels in Ann Arbor, a lot. The bigger problem we have is there is no culture around it. The first thing that happens after you successfully exit a company in Silicon Valley is you find ways to make more money that keep you involved in the community. I can't tell you how many successful entrepreneurs I have met here who don't roll back in. You have to pay it forward because that is the only way we can build a real entrepreneurial community."*²⁹

There is a growing network of local investment firms that collaborate with out-of-state investors. Greater willingness by Michigan-based firms to commit funds could act as a stamp of approval for out-of-state firms, which may initially be reticent due to a lack of local knowledge.³⁰ Decision makers can now do more to encourage local investment that can help retain wealth in the region and support the next generation of IoT founders. Support organizations in particular can help facilitate these relationships by tapping into their alumni networks, as well as connections at affiliated investment firms.

2

Facilitate collaboration between existing and emerging companies.

The local IoT sector is still strongly tied to the automotive sector, but there are signs of diversification. A significant amount of R&D for IoT is undertaken in-house by large corporations, which makes it difficult for separately emerging companies to compete. Although corporations may be wary of direct collaborations, increased dialogue about the growth of the entrepreneurship community and the region's global positioning would help to strengthen the local ecosystem. Local decision makers should incentivize cooperation and discussions between large existing companies — particularly those in the automotive and mobility sector — and emerging innovative companies.

3

Avoid perpetuating top-down approaches.

The network map of the IoT sector in Southeast Michigan showed the most influential players in the local ecosystem to be universities and support organizations. While founders benefit in many different ways from their support, such a pattern of influence risks the perpetuation of top-down approaches. Previous Endeavor Insight research has shown that a bottom-up approach, where founders themselves are elevated to positions of responsibility and encouraged to drive change, is more productive.

Decision makers need to continue to listen to founders and coordinate more responsive approaches to support them. This is particularly important in such a fast-changing environment as IoT, in terms of the technologies and the business models that bring those solutions to customers.

This type of “bottom-up” approach will help focus the influence of prominent support organizations and institutions. Although they have offered resources to many of the companies studied, they may not be equipped to offer tailored support to the most promising founders that are scaling their companies and doing the most for the local economy. When developing new efforts in response to those founders' needs, decision makers should work to further identify existing resources that already exist in the community to avoid gaps or overlapping activities.

4

Take steps to promote risk-taking and global ambitions.

The local ecosystem has developed a culture of risk aversion, which holds back regional investment and founders. Although local venture capital (VC) is now growing, there remains some reticence. Investment from outside of the region accrues wealth elsewhere, and eventually companies may relocate.

This has been accompanied by a vicious cycle, where founders sell too early, as they lack mentors and role models that can demonstrate the value of scaling internationally and the pathways to get there. Decision makers should look to organizations that connect founders with a global network of industry experts and encourage much larger ambitions among local innovators. Offering Southeast Michigan as a hub for global experts could also help the region to retain more of the talent that the local university network produces.

Methodology

Competitive Advantages in Entrepreneurship:

Endeavor Insight identified Southeast Michigan's competitive advantages in entrepreneurship in a 2019 study by scanning the region for industries with a high concentration of larger, high-value, entrepreneurial companies.

The methodology and results of the study were developed in partnership with the William Davidson Foundation. Additional details can be found in the report titled "Southeast Michigan's Competitive Advantages in Entrepreneurship," available at endeavor.org/semi-cae.

Sampling Frame:

Companies were considered "targets" and included in the sampling frame if they met the following criteria:

1. The company is local. Companies were included if they were:

- a) founded in Southeast Michigan, or
- b) currently headquartered in Southeast Michigan after they were founded elsewhere.

Target companies also included businesses that have closed after being founded or headquartered in the area, or those that have been acquired after being founded or headquartered in the area.

For the purposes of this research, Southeast Michigan was defined as the following seven counties: Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne. These counties include the cities of Detroit and Ann Arbor.

2. The company's industry falls within the sector covering IoT businesses.

IoT businesses were defined as companies relating to systems by which physical devices connect to the internet to share data and communicate with a network without involving human interaction. This includes businesses that create a physical device, companies that develop software that enables this connection, and firms that create software that enables the collection, aggregation, and analysis of the data obtained from devices connected to the internet.

3. The company is entrepreneurial.

Entrepreneurial companies are defined as businesses that were started by individuals. This definition excludes businesses that began as either:

- a) Government entities, or
- b) Local divisions of corporations based in other cities.

Data Collection:

The data collected for this project comes primarily from surveys and interviews with local entrepreneurs and stakeholders.

This study began by compiling a primary company list from multiple sources, including Pitchbook, D&B Hoovers, and Crunchbase, as well as the portfolio companies of investors and entrepreneurship support organizations operating in Southeast Michigan.

Only those that were target companies moved forward for further investigation, i.e., those founded or headquartered in Southeast Michigan, with entrepreneurial origins, and in the selected industry.

Entrepreneurs from the target list received invitations to fill out an online survey or set up an interview (either in person or over the phone). This mass outreach campaign used standard questions, but the interviews were adapted to be more conversational.

Endeavor Insight maintains confidentiality, and collected data is accessible only to Endeavor Insight and its research partners.

In order to ensure that the company list was comprehensive, a secondary list of companies was compiled from those mentioned in the interviews and surveys that were not already on the primary list. The secondary list also included additional companies sourced from the portfolio companies of those associated with the new mentions.

The secondary list also included new companies found on LinkedIn while collecting data on entrepreneurs and companies. These secondary targets then received invitations to complete surveys and interviews.

Network Analysis:

Previous research by Endeavor Insight has found that there are four main connection types among entrepreneurs that drive the growth of an industry. These are:

1. Investment;
2. Mentorship;
3. Serial entrepreneurship; and
4. Former employee spinoffs.

To learn about these connections within entrepreneurship communities, the surveys and interviews discussed above focused on four core questions:

1. Who invested in your company? (This includes both angel and institutional investors.)
2. Who was your mentor during the growth and development of your company?
3. Have you founded other IoT firms in Southeast Michigan?
4. Which of your former employees have gone on to found IoT firms in Southeast Michigan?

The survey and interviews also asked about work and education history. LinkedIn provided data to fill in the gaps for founders who did not respond. The responses to these questions formed an edge list of connections among organizations, along with a corresponding set of four types of outbound connections. The edge list then informed all subsequent network analysis and created the network map visualization.

For each network analysis, each founder was assigned to only one company or organization. Where an entrepreneur had founded multiple companies, his or her most prominent company represents his or her influence in the analysis and on the map. This was based on an index of founding date, number of employees, total investment, and exit sizes.

The size of a company's influence in the network was based on directed closeness centrality for unconnected graphs. In other words, the size of an organization was a function of the number of connections that the organization and its entrepreneurs had to others in the network.

Companies were only included in the analysis if it was possible to identify their founding year. Companies that were no longer operating were included in the analysis if it was possible to find enough data to target them. For companies that were acquired, the number of employees at the time of acquisition was used. The proximity of companies in network mapping visualizations does not necessarily reflect the degree of connectivity. However, the maps will occasionally feature clustering sub-networks in order to emphasize the role of specific companies in the sector.

Limitations:

Omitted variables may have played a role in sampling, creating bias that would otherwise expose gaps in the research process. The study's double interview, verification, and analysis procedures were meant to offset any adverse effects. If gaps in or misinterpretations of the data were revealed during the analysis, the map and results were corrected.

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