Makerspaces: Contributions to Economic Development in Tier 2 and Smaller Cities

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EXECUTIVE SUMMARY

Makerspaces are collective organizations designed to increase access to physical tools within a collaborative community. The spaces combine affordable fees with a welcoming environment to learn, which has lead thousands across the country to engage with new technologies such as 3D printers and computer aided design software.

Recently, Makerspaces have attracted greater attention for their potential contributions to economic development due in part to the commercial products created by members of Makerspaces, particularly out of the national franchise of TechShop. However, the swift and relatively recent expansion of the Maker Movement has limited data collection regarding how Makerspaces aid businesses or entrepreneurs. There is little to no empirical evidence whether Makerspaces effect a region’s economic. Rather than attempting to measure Makerspace outputs, this report summarized the intentions of Makerspace communities with the purpose of laying the foundation for future evaluations of the Maker Movement. In particular, the areas studied lie outside of major metropolitan areas with the intention of understanding whether Makerspaces contribute to economic development beyond populated areas served by TechShop. These areas have greater need for low-cost economic development tools. In total, 34 interviews were conducted across nine Makerspaces in Georgia and outside the Atlanta Metro Area.

Of the Makerspaces studied, members unanimously agreed that economic development was a key component of their contribution to their communities. Makerspaces contribute to economic development in four principle ways: (1) creating a cultural change, by encouraging entrepreneurship in the community; (2) supporting small business growth through the provision of services; (3) providing workforce training; and (4) increasing workforce retention.
Makerspaces are not a stand-alone solution to the economic needs of small cities and regions; rather, they view themselves as an active component of their regions' business ecosystem and strive to fill gaps that they perceive. Thus, they fit well within third-wave economic development strategies by attempting to add to the capabilities of a region and grow small businesses within their communities.
1 Introduction

The Maker Movement has expanded so swiftly in the last decade, both through the United States and internationally, that researchers have struggled to keep pace, resulting in sparse literature on how Makerspaces are used by members or what spaces contribute to their communities. The present report provides evidence of Makerspace community intentions in regards to economic development in order to build evidence of the connection between Makerspaces and matters of public concern. In particular, it analyzes Makerspace contributions to metropolitan areas with less than one-half a million residents.

As a recent phenomenon, Makerspaces have yet to produce substantial and tangible outputs by which researchers can measure their contributions, such as numbers for the jobs produced or patents filed. Instead, data for this paper was collected through interviews conducted with the management and membership of Makerspaces regarding perceptions of their contributions; the evidence presented in this report establishes information on the recent phenomenon. It lays the foundation for later evaluation of Makerspace contributions, so that the public may better understand their intended contributions to economic development.

There are four principle ways Makerspaces outside of large metropolitan statistical areas (MSA) perceive themselves as aiding economic development: (1) creating a cultural change by encouraging entrepreneurship in the community; (2) supporting small business growth through the provision of services; (3) providing workforce training; and (4) increasing workforce retention. Those items should not be viewed as the exclusive domain of Makerspaces. Makerspaces may also contribute to their communities in other ways, including education, resiliency, and community development. Those aspects are beyond the scope of this research, but are significant. They should not be considered as secondary to their contribution in economic
This report also analyzes Makerspaces’ interest in and recommendation of governmental support should they find Makerspace contributions and services worthy of investment. This report analyzes actions that are appropriate (or not) based on the needs of those spaces. During the interviews, members and management were asked what government involvement, including financial or other assistance, would best support their activities. Principally, members responded that the preferred aid would be assistance in the development of new spaces, specifically through the procurement of physical locations and employing them as education centers.

The report begins with introducing the context of the research and a detailed description of Makerspaces, followed by a description of the practice and context of economic development, particularly for less populated regions of the country. The subsequent section describes the methodology of the report. The final section reviews and discusses the results outlined above in detail.

1.1. What are Makerspaces

Makerspaces are collective organizations designed to increase access to physical tools within a collaborative community. Makerspaces are an outgrowth of the broader Maker Movement that encourages individuals to learn how to use tools and become more engaged with their products, by either modifying them (hacking them) or building them from scratch. Makerspaces are both a product of and a recruiting tool for the Maker Movement, by offering a center of activity that the public and press can focus upon and that encourages its growth.

As the name suggests, Makerspaces are physical locations with a collection of tools. The spaces are quite diverse, both in the range of locations and buildings they occupy. At present,
there have been at least an attempt to open a Makerspace in each of the fifty states. Currently, Makerspaces exist in over 70 countries around the world. The buildings are no less varied: In Georgia alone they occupy a Masonic temple, a former train depot, a music venue, the back half of shops and offices, a mattress factory, and a gym behind a church. The physical space often dictates what type of tools can be operated, specifically in the case of industrial tools, but there is no one-size-fits-all solution for what building specifics are necessary in a space. Generally, Makerspaces occupy 3000-7000 square feet, depending on the size of their membership and the tools being used.

The tools available in Makerspaces are quite flexible, and range from woodworking to software to art and everything in between. Tools may be donated by members, built by members, or purchased out of collected member fees. Many spaces have run crowdfunding campaigns in order to access startup capital to run the space. Costs are often a driver of what tools are available, but so are interests; spaces are often run without an emphasis on hierarchy, meaning that if a member desires and provides for a tool it will likely be added to the space.

Photo credit: Eric Van Holm; pictures taken at (left to right) Clubhouse, HackBerry Lab, and AfterBurner
Makerspaces are typically built to be open to the public. They are generally inclusive and welcome new members regardless of skills or experience. The members of a Makerspaces form a community, not only sharing space and tools but also knowledge. Members may work on projects collaboratively or alone, but are generally willing to teach each other skills or machine operations with which they have experience. Thus, Makerspaces not only contribute access to tools but also establish a creative way for members to learn how to effectively use them. Skills can be learned through scheduled classes organized by the space leaders, or informally by interactions other members.

Makerspaces can be illustrated through comparison with gyms, which helps to explain why members join and how the spaces are utilized. Gyms are similar organizations that allow members to pay a fee and thus gain access to tools they otherwise could not afford on an individual basis. Members may be able to afford (and house) some of the equipment a gym owns, but access to instructors, classes, and community helps to encourage individuals towards their goals. Similarly, Makerspaces encourage access and use of tools, but for the development of “Making” rather than fitness. The main difference between Makerspaces and gyms is that the former are mostly run as nonprofits: all of the spaces in Georgia are nonprofits, or in the process of gaining that status.

1.2 Makerspaces and economic development

Makerspaces have received attention from the government, press, and public, particularly for their potential as a tool of economic development. Chris Anderson, the former editor of *Wired Magazine*, wrote *Makers*, which explores how the increasing availability of tools can generate a “Third Industrial Revolution.” Anderson argues that in the future, more people will become producers, rather than consumers, and the creativity of the masses will be unlocked by
increasing availability of digital fabrication. Mark Hatch, author of *The Maker Movement Manifesto*, is the CEO of Techshop, a franchise of Makerspaces with seven locations. In his book, Hatch recalls his experiences from meeting entrepreneurs and tinkerers at TechShop, where popular products such as Square or the DODO Case were developed. The press has contributed to the excitement, with articles about Makerspaces and their potential as an economic development tool appearing in *Time*, *CityLabs*, *the Atlantic*, and *Wired*.

Makerspaces are just the latest trend in a long line of attempts by state and local government officials to generate growth in their communities. Academics have classified the different focuses of these attempts into “waves” of economic development; Makerspaces do not constitute their own wave, but instead fit nicely into the third wave, which is the most recent to rise to prominence across the United States.

The first wave, known popularly as ‘smokestack chasing,’ but also as the Growth Promotion Approach, focuses on recruiting large employers to one’s region. Governments recruit firms with incentives such as tax abatements, land grants, or loans on friendly terms in order to lower the cost of businesses for the receiving company. Incentive packages have been criticized by opponents, who say they create too few jobs for the public dollars that are invested. In addition, footloose companies often leave once their special incentives expire, or renegotiate for more incentives at that time; if a company is willing to relocate once based on tax incentives, it is logical they would do so again in the future. Competing packages of land and low taxes have sparked a “race to the bottom” among states and jurisdictions, diminishing the public benefits of the jobs created.

Though governments still compete to recruit large employers, the critiques highlighted above contributed to the development of the second wave of economic development. The second
wave focused on retaining local firms and aiding the growth of those companies that were already within the jurisdiction, rather than attracting new businesses. The second wave placed greater emphasis on firm-level assistance, such as support for incubators, providing technical assistance, and attracting investment and venture capital groups. In the second wave, governments became more focused on generating businesses that support regional clusters, rather than seeking to attract large employers without consideration of the businesses eco-system in place.

The third wave of economic development focuses on the fundamentals of the economy, such as infrastructure, education, and job training in order to support and generate growth. This trend reveals governments’ attempts to shift away from high-stakes bets in capital intensive projects or large incentive packages. Third-wave strategies did not replace what preceded them, but attempted to further strengthen what economic planners established by creating the context for economic growth and contributing to capacity building in communities.

Governments in smaller municipalities face different economic problems and challenges than their larger counterparts. Research has shown that the proportion of college graduates in a metropolitan areas in 1970 is a strong predictor of education levels at present. With education as a key contributor to the knowledge economy, areas without that resource have struggled to keep pace with fast growing regions on the coasts. Rural and smaller cities have struggled to attract and retain knowledge workers, as they can earn higher salaries and be more productive in larger metro areas. In addition, knowledge workers are attracted to certain cities due to the availability of cultural amenities, many of which smaller cities struggle to offer. In general, less populated areas of the country have faced net outflows of residents.

Beyond education, other key economic resources for entrepreneurial ecosystem have
uneven availability in small municipalities. Of these, venture capital, which helps support young businesses with funds and mentorship, is highly concentrated on the coasts.

The Maker Movement fits within third-wave development strategies, by encouraging home grown business development and expanding opportunities throughout the population. However, small regions of the country have struggled with economic development due to the knowledge workers leaving and the lack of businesses primed for growth. TechShop has well documented successes, but their business model only operates in larger metro areas. Are Makerspaces an economic development tool appropriate for smaller parts of the country? If so, how do they operate and what do they contribute to their communities? If they are a tool, should government act to support their formation? These questions are answered below.

2 Methodology

This study focuses on Makerspaces in Georgia, specifically those outside of the Atlanta Metro area. During the summer of 2015 I attempted to contact and conduct interviews at every Makerspace in the state of Georgia outside of the Atlanta metropolitan statistical area. Many cities within the Atlanta region do have populations smaller than cities included in the study, but the fact that they are socio-economically attached to Atlanta provides them different access to important resources. Makerspaces are often a regional resource, with members commuting in from beyond the city their space is located within. Therefore, a space within the central city or suburb of an area as large as the Atlanta MSA may have members that live anywhere within the region and have access to all resources therein.

The first step of analysis was to identify Makerspaces outside the Atlanta MSA. The sampling began by looking at the listings on three web directories where spaces list themselves
in order to advertise their presence and attract members. The three directories are: Makerspace.com, hackerspace.org, and fablab.io. Because those directories are member maintained, spaces that are listed have often closed or never opened; after compiling the full lists, I completed webs searches for each space to identify whether they had an active website or other web-presence.

Once an initial sample of Makerspaces was identified, I used a snowball sampling technique. I asked participants at each space what other spaces they were aware of and whether they could make introductions for me. This technique introduced me to several Makerspaces that were not listed on any of the three online directories. At the time of writing this report, I have visited with individuals at every space that has a physical location (i.e., moved beyond planning stage) except for one: Columbia. A map of Georgia with the Makerspaces outside the Atlanta Metro Area is in Figure 1. Table 1 has a list of the Makerspaces in the final sample, the year established, the region they reside in, and their regional population.

Figure 1. Map of Makerspaces in Georgia outside Atlanta Metro
Table 1. Study Sites

<table>
<thead>
<tr>
<th>Makerspace name</th>
<th>Opened</th>
<th>City</th>
<th>City Population</th>
<th>Regional Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clubhou.se</td>
<td>2012</td>
<td>Augusta</td>
<td>200,000</td>
<td>550,000</td>
</tr>
<tr>
<td>Spark Macon</td>
<td>2014</td>
<td>Macon</td>
<td>150,000</td>
<td>230,000</td>
</tr>
<tr>
<td>Maven Makers</td>
<td>2015</td>
<td>Savannah</td>
<td>140,000</td>
<td>350,000</td>
</tr>
<tr>
<td>Hackyard</td>
<td>2012</td>
<td>Athens</td>
<td>115,000</td>
<td>190,000</td>
</tr>
<tr>
<td>AfterBurner</td>
<td>2015</td>
<td>Warner Robbins</td>
<td>67,000</td>
<td>140,000</td>
</tr>
<tr>
<td>7Hills, HackBerry Lab</td>
<td>2011, 2014</td>
<td>Rome</td>
<td>36,000</td>
<td>90,000</td>
</tr>
<tr>
<td>Georgia Southern FabLab</td>
<td>2016</td>
<td>Statesboro</td>
<td>28,000</td>
<td>70,000</td>
</tr>
<tr>
<td>Milly Makers</td>
<td>2015</td>
<td>Milledgeville</td>
<td>19,000</td>
<td>55,000</td>
</tr>
</tbody>
</table>

Interviews were typically conducted at the Makerspace, following a brief tour. Visiting the physical spaces allowed me to observe how the space was configured and how it was being used by members present during the tour. I often asked available members for an interview. I also conducted interviews with members outside of the space at later times. To guide the interviews, I reviewed the websites of the organizations to understand how they described themselves in relation to economic development. While questions were prepared beforehand, the interviews were semi-structured and allowed to evolve based on the experiences of the interview and the specifics of the Makerspace with which they were affiliated. In all, 34 interviews were conducted across the nine sites. Interviews were recorded and later transcribed for analysis using the constant comparative method to integrate the themes of each interview into a coherent model of behavior.
3. Findings

Of the Makerspaces studied, members unanimously expressed that economic development was a key component of their contribution to their communities. Across the interviews, both in conversations with the management and the membership of Makerspaces, four themes of how they contribute to economic development where clearly apparent. While each Makerspace offers different specific programs, the four themes were universal. Makerspaces contribute to economic development in four principle ways: (1) creating a cultural change, by encouraging entrepreneurship in the community; (2) supporting small business growth through the provision of services; (3) providing workforce training; and (4) increasing workforce retention.

Makerspaces are not a holistic solution to the economic needs of small cities and regions; rather, they view themselves and an active component of their region’s business ecosystem and attempt to address perceived gaps. Thus, they fit well within third-wave economic development strategies, attempting to add to the capabilities of a region and grow small businesses within their communities.

3.1 Culture change

The management of several Makerspaces described either a lack of entrepreneurial drive in their cities or a lack of willingness to take risks in pursuing ideas. While members perceived Makerspaces as being intended as drivers of economic activity in their communities, management also expressed surprise at the lack of products that members intended to develop. Makerspaces make product design more affordable, in so far as making the cost of prototyping a few hundred dollars rather than the tens of thousands a professional firm may charge. However, the first step is to get members to be willing to make a prototype. Many of management’s
solutions were simply encouraging members, or perspective members, to pursue their product concepts.

This is also where Makerspaces differ most strongly from incubators in most cases. Incubators are tailored towards individuals that have a product ready to launch or a business primed for growth; the members of Makerspaces in these smaller cities may eventually reach that stage, but in general they do not enter the space with much more than an idea at most. The majority of members are there simply to explore the tools or expand their activity in a hobby they have practiced at home in the past.

Makerspaces have endeavored to change their cities culture before the space opened. Organizations in Macon ran a “Macon Made” campaign in order to instill a sense of pride in community members and show them how entrepreneurial their city already was. Statesboro worked to develop an electronic incubator two years prior to opening their FabLab (slated for spring 2016) in order to demonstrate and cultivate the tenants they desired. In addition, across the four years of preparation for the space they ran public events to generate excitement in the public and educate them about the Maker Movement. When opened, the incubator adjoining the Statesboro FabLab is already booked to capacity.

Makerspaces endeavor to create a safe place to fail for burgeoning entrepreneurs; management across the spaces encourages the discussion of ideas, knowing full well that few will be successful. The management never wants to discourage members from creating a new product, regardless of whether they believe the idea has commercial potential; a broad belief was shared across spaces to support any idea. A similar theme has been developed in venture capital; only one in ten businesses is successful, but the one success is profitable enough to fund the entire operation. Makerspaces sees the necessity in encourage 10, or even 100 ideas, in order to
launch any entrepreneurs into their communities.

Thus, Makerspaces in smaller cities of Georgia have not produced the type of innovative products coming out of TechShop. No entrepreneur has entered with an idea as revolutionary as Squared, prototyped it, and brought it successfully to market. However, there are businesses being run out of Makerspaces, which endeavor in other ways to support their growth.

3.2 Small business growth

Makerspaces support small business growth through the provision of office space and the access to specialty tools. Four spaces, in Augusta, Athens, Statesboro, and Rome, are already involved with coworking services. Coworking space is a separate development from Makerspaces, though they both arose at roughly the same time around 2005. Coworking spaces feature a shared work environment where businesses and individuals can rent office space, which is attractive to small businesses because it allows them to access professional services such as conference rooms, teleconference facilities, printing, and others while sharing the costs with other businesses.

Coworking in a Makerspaces add an extra dimension of community, by bringing in individuals that are not associated with a business into close contact; individuals working on a very different field or industry can bring an orthogonal view that aids creative thought. Businesses have been shown to thrive in coworking spaces and the spaces open in Makerspaces have already shown large returns. In 2014, businesses kin Makervillage in Rome, Georgia produced $2.7 in revenue and 17 jobs while the Clubhouse in Augusta, Georgia had a $5 million impact on the local economy. While not all spaces currently offer coworking, many expressed the hope that as their membership and physical space evolved they would be able to
offer similar services.

The second way small businesses can grow is by use of specialty machines they couldn’t afford by their own purchase. I spoke with one small woodworking business that had been able to take several jobs that would have required a machine they could never afford otherwise, because the space gave them access. Other businesses enjoyed the access to specialty metal working equipment and computer graphics packages that they would have difficulty finding otherwise.

This service is a critical logic of Makerspaces. Coworking spaces are successful because most people don’t need uninterrupted access to a copier all day, Makerspaces offer similar access to other machines that are used rarely but can be beneficial. When a business can share the costs of these machines, they are able to take jobs they otherwise could not compete for and grow their businesses at an accelerated rate. The management of these spaces expressed hope that they would eventually outgrow the facilities of the Makerspace and knew that the services they offered would have played a role in that progress.

3.3 Workforce training

Over the last decade, there has been a growing worry about a present and future shortage of skilled workers in manufacturing, though evidence is still tentative. Makerspaces are positioned to act as an informal way to introduce individuals to skilled trades through tool use as a leisure pursuit. Since shop classes have been canceled in many high schools, school-age individuals do not have many opportunities to engage with mechanical tools unless they enroll in a credential program through a technical school.

Makerspaces help to reinvigorate the mechanical arts by exposing individuals of all ages to how
technically demanding manufacturing has become modernly. The types of activities practiced in Makerspaces, such as the use of computer aided design software to guide precision machines, are heavily relied upon in industry.

Beyond the simple introduction to using tools and creating goods, Makerspaces can provide a baseline of training for individuals that they can further in formal institutions of education, or move into new careers based on the skills they learn. Makerspaces cannot provide certifications yet, but several expressed interest in setting up formal agreements with local employers, though that has not occurred to thus far. However, even without credentials, Makerspaces offer individuals the opportunity to demonstrate skills through projects; Individuals have received jobs from other members based on the work they produce at Makerspaces. In the future, Makerspaces may serve as a key conduit between employers and employees looking for high-skilled workers.

Many of the spaces are involved with education programs, particularly summer camps that introduce students from elementary and middle-schools to the technology they offer. The educational programs run in these spaces for students should not be viewed strictly as vocational education, but rather as programs designed to introduce students to emerging technologies in a fun, problem based setting. Introducing students to these emerging technologies at a younger age will have long-term benefits in terms of their dexterity and capability with evolving machineries.

3.4 Worker retention

Makerspaces are a community, and those involved with their construction become heavily attached to the spaces. Members primarily join in order to access tools, but they also generate social capital as they share space and knowledge with others. The management of
Makerspaces hope that by attracting and producing high-skilled individuals, social capital will help to keep them folks in place and stem some of the brain drains these cities have faced.

Many of the projects worked on in Makerspaces are collaborative ventures, and many involve in upgrading the space itself. The Clubhou.se in Augusta is working to add a community garden to their space, which members expressed either having a lack of expertise or space to do at their own homes; however, they were happy to create it in a communal location. Public investments of these sort are perceived to help keep individuals invested in the city they live in. In addition, by creating more high skilled individuals, these spaces hope to help create the type of employment market that attracts human capital workers to a region.

Spaces also offer events, such as Open Make Nights where nonmembers can visit the space, and more substantial events such as Maker Faires. The more organizations a city possesses that are arranging public events, the more opportunities the city has to engage its citizenry. These events may seem small in scale, but as the Maker Movement becomes larger, they can help to brighten their communities.

3.5 Support from Government

Makerspace management was generally weary of heavy government involvement in the establishment of a space, because the notion of community is so critical to its continued operation. Various levels of government in Georgia have helped to fund and establish Makerspaces, but by moving through local communities rather than establishing the space through the government these initiatives have been viewed as being successful.

The Georgia Technology Authority (GTA) awarded grants to six spaces to be used for education programs, giving school-age children access to the space. In addition, the GTA helped to fund
the opening of two spaces, Columbus Makes It, and Spark Macon, with grants focused on the purchasing of equipment. Georgia Power helped to fund a summer camp at HackBerry Lab, and the city of Statesboro helped fund the opening of its FabLab.

Makerspaces expressed a willingness of interest in engaging with governments for support, though they confessed challenges in the past with explaining their mission and activities. Financial sustainability can be challenging for spaces, so the government funding of summer camps and other educational programs helps to enhance access to the space while generating a new stream of revenue for the Makerspace.

Consistently, the greatest challenge to establishing a space was locating a physical location with affordable rents. It was suggested by the spaces that government owned buildings that were sitting vacant would be ideal locations. Makerspaces have worked to rehabilitate substandard buildings in the past, so the condition is not a challenge for their purposes. If a government desires to see a Makerspace, a low-risk for of support would be to grant use of a publicly owned building at a low monthly rent.

4 Conclusion

Makerspaces in Georgia outside the Atlanta metropolitan statistical area have grown quickly, particularly in 2014 and 2015. These spaces each expressed a focus on economic development, and view their role within their city’s business ecosystem. At present, their activities focus on: (1) cultural change in the local communities; (2) support for small business growth (3) training of workers in high-skilled industries (4) improving the retention of workers. At present, they are too recent to evaluate based on the outputs of the spaces, so this report focuses on their intentions in order to facilitate later evaluations once they have matured. In addition, this report has
attempted to guide actions for governments in how to support Makerspaces in their communities.

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i Hacking here refers to its initial conception, of breaking an item apart to better understand it. The term became connected with computer security because the digital world was easier to break apart decades ago, though its original meaning can be seen in modern hackerspaces.

ii These locations refer to 7Hills (Rome), Maven Makers (Savannah), Spark Macon (Macon), Maker Station (Marietta), MASS Collaboration, (Atlanta), and Decatur Makers (Decatur).

iii Dale Dougherty, the founder of Make Magazine and an early proponent of the Maker Movement, defines making as being part of any human action including cooking, knitting, building, tinkering and gardening. Thus Making simply refers to the making of anything


xvi The knowledge economy refers to the increasing importance of human capital in the economic development. It marks the transition from an economy focused on manufacturing towards one based on the creative and mental output of workers to drive economic growth.


xx At present, their business model requires a metro region with 1.5 million residents to consider opening a location


https://hbr.org/2015/05/why-people-thrive-in-coworking-spaces


Maker Faires can be described as regional events that gather Makers to show off their wares, projects, and accomplishments and share with the broader community.