Makerspaces and Economic Development

Eric Joseph Van Holm
Georgia Institute of Technology and Georgia State University
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Abstract

The maker movement has risen from a fringe hobby to a prominent lifestyle with important implications for economic development. Modernly, tools have been available only to those working within firms and industry or those willing to pay large costs for their procurement. The maker movement presents multiple avenues to increase access to tools and the knowledge of how to use them. My paper explores makerspaces and how they contribute to economic development through business generation and sustainment. Based on interviews with members and the management of makerspaces along with local government officials from across the state of Georgia, I find four principle contributions to 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.

Introduction

The maker movement has expanded swiftly in the last decade and researchers have struggled to keep pace, resulting in sparse literature on what it contributes to individuals or communities. In this paper, I explore how makerspaces further local economic development, thus building evidence of a connection between makerspaces and salient public issues. In particular, I focus on makerspace contributions to metropolitan areas with less than one-and-a-half million residents because these areas have fewer resources to support economic development. The lack
of external supports in the community should enhance the importance of makerspaces and make their contributions more visible.

Makerspaces have received attention from the government, press, and public, particularly for their potential to help launch new entrepreneurs. Chris Anderson (2012), the former editor of Wired Magazine, wrote the book *Makers*, which explores how the increasing availability of tools can generate a “Third Industrial Revolution.” Anderson argues that the maker movement will help people to transition from consumers to producers, and the creativity of the masses will be unlocked by increasing availability of digital fabrication. Demonstrating Anderson’s claims, TechShop, a makerspace franchise with seven locations nationwide, has contributed to successful products such as Square or the DODO Case\(^1\) (Hatch, 2014). These products and others have attracted media stories about makerspaces and their potential as an economic development tool, which have appeared throughout the national press in Time, CityLabs, the Atlantic, Wired, and others.

The maker movement functions without a clear definition, due to its diffused origins and independent growth. Broadly, it refers to the increase in do-it-yourself and do-it-together projects and is related closely to the hacker ethic of sharing, collaboration, and learning through deconstruction and reconstruction (Levy, 2001). Maker culture is connected inextricably with the diffusion of knowledge through the internet and the increasing availability of physical tools. Making can be any type of activity involved in the creation of an object, in any field. Dale Dougherty, the founder of Make Magazine, adopts a broad definition for the term and argues that making is part of all human activities such as cooking, knitting, and gardening (Dougherty, 2012).

\(^1\)Square is a piece of hardware one can attach to their smart phone to read the magnetic strip on a credit card (valued at over $6 billion) and DODO case is a case for Apple and other technology products that has sold over $1 million in products.
Makerspaces, which have opened across the United States and the world, are an important component of the rapid spread of maker culture. Makerspaces, also known as hackerspaces and fab labs, are community workshops where members pay dues in order to access tools and workspace.\[^2\] The primary service these organizations provide is access to a large inventory of tools, typically valued at between $50,000 and $100,000 (USD), a cost that would be prohibitive for an individual but is manageable when spread throughout the membership. Makerspaces have memberships that are open to the public and are generally welcoming to new members regardless of skills or experience. The members of a makerspace form a community, not only sharing space and tools but also knowledge. Members may work on projects collaboratively or independently, 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.

As a recent phenomenon, makerspaces have yet to produce substantial or tangible outputs that researchers can use to measure their contributions, such as the number of jobs produced or patents filed by members. Instead, data for this paper was collected through interviews conducted with the management and membership of makerspaces regarding perceptions of whether and how the organizations were contributing to economic development. The evidence presented in this analysis lays the foundation for later evaluations of makerspaces and provide information so the public may better understand the purpose of these organizations.

Based on the data collected through interviews conducted throughout the state of Georgia, 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

\[^2\] Despite the presence of three common names, makerspace, hackerspace, and fab labs, they all share a common set of functions and uses; therefore, when using the term makerspace in this paper it refers to spaces under any of those names.
encouraging entrepreneurship in the community; (2) supporting small business growth through the provision of services; (3) providing workforce training; and (4) increasing workforce retention.

**Methodology**

*Hypotheses.* While there is no empirical literature demonstrating a connection, there are reasons to believe makerspaces support economic development. The hypotheses for ways that makerspaces contribute to local economic development are visualized in Figure 1. I argue that there are three clusters of inputs that members gain access to by joining makerspaces: other members, specifically their knowledge and input, tools, and the workspace to build. The connections all run through tools, indicating that it is the most critical asset makerspaces provide individuals access to. Described below are several groups of outputs that makerspaces will contribute to, specifically the development and support of new entrepreneurs, particularly ‘accidental’ ones, prototyping, and workplace training. These outputs are described in greater detail below.
I expect that makerspaces will help generate new entrepreneurs, particularly ‘accidental’ ones. Studies have documented the prevalence of lead users, users who have needs from products ahead of the market and expect to benefit from meeting those needs starting firms based on their solutions (von Hippel, 1986). They start businesses despite the fact that they were only looking to solve their own problems prior to identifying that a market exists for their product. Shah and Tripsas (2007) termed such business owners “accidental entrepreneurs” when studying parents that had developed jogging strollers, hands-free baby bottles, and diaper bags oriented towards fathers. The concept of accidental entrepreneurs has been noted outside studies of user innovations, as Aldrich and Kenworthy (1999) asserted many firms are created “on their way to something else” (p. 20).

Makerspaces may contribute to the development of more user innovations, and therefore more user entrepreneurs. Working with community tools, members have the opportunity to modify products they own and often look to meet their own needs. Makerspaces give members greater opportunity to tinker with the products they already own, as well as simplify the process of developing new products. Mahr and Lievens (2012) noted, “The increase in digitalization and decrease in the costs of communication have led to the exponential growth of user innovation platforms” and access to industrial tools should only further that trend (p. 169). Some of the most successful projects in computer sciences were developed by users, in part because the means of production in software were universally available much earlier. Tool availability through makerspaces allows the physical world to be more moldable, and therefore more similar to the digital world (Anderson, 2012; Gershenfeld, 2008). Prior to the surge of the maker movement, numerous user innovations have led to physical products in mountain biking (Lüthje, Herstatt, & Von Hippel, 2005), pipe hanger hardware (Herstatt & von Hippel, 1992), and others;
makerspaces should only encourage further developments if they are able to democratize design and manufacturing (Tanenbaum, Williams, Desjardins, & Tanenbaum, 2013).

Regardless of the origin of the idea, the tools in a makerspace can help individuals to prototype products before taking it to market. Makerspaces allows members to find design issues early through the active development of the product as its first users and make adjustments accordingly. In addition, going through the process of prototyping in a makerspace provides members the opportunity to gain input from other members, giving them immediate feedback and potentially improving the design. Neither of these benefits are available from producing a prototype professionally through a design firm. Through this community process, the member develops a better functioning, better tested model when they seek funding to launch their venture. With the democratization of entrepreneurship (Aldrich, 2014) and the various new means of bringing products to market through online vendors, such as Etsy, or crowdfunding a novel means to develop, test, and prototype new products is necessary.

Makerspaces provide a flexible, creative, and supportive environment to aid innovation as members transform products from ideas to reality. Makerspaces arrange themselves as open communities, where ideas, knowledge, and machines are shared, helping to support product development in a sociable environment. Moilanen (2012) found that socialization was one of the most prominent reasons members joined and remained at makerspaces. The openness in makerspaces is similar to user communities, where there is a free sharing on innovations and ideas (Franke & Shah, 2003). Thus, I expect that members will be working on products they developed the idea for after entering the makerspace.

Finally, makerspaces may serve to educate a regions workforce, particularly in mechanical arts. Over the last decade, there has been a growing concern about the present and
future shortage of skilled workers in manufacturing, though the lack of workers is still debated by researchers (Cappelli, 2015; Neumark, Johnson, & Mejia, 2013). Since many high schools have canceled shop classes, 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 are positioned to act as an informal platform to introduce individuals to skilled trades through tool use as a leisure pursuit. That potentiality is true for makerspaces located both inside and outside of existing schools and colleges. Particularly since the Great Depression, there has been increasing criticism of the focus on baccalaureate degrees as an educational goal for all students, and the over-education of workers, skill gap, and increasing student debt loads have renewed interest in short term certificates from technical programs (Cappelli, 2015; Dadgar & Trimble, 2014; Jepsen, Troske, & Coomes, 2014). Makerspaces present another avenue to worker training in addition to traditional technical and community college programs.

Data. My study focuses on makerspaces in Georgia, specifically those outside of the Atlanta Metro area. Georgia was selected as the case study because of access, both geographically in regards to travel as well as the researcher’s level of acquaintance with the organizations in the state. 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 have populations smaller than those included in the study, but the fact that they are socio-economically attached to Atlanta provides them different access to important resources to support businesses. Makerspaces are often a regional amenity, 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 sample for my research focuses on smaller regions of the country for several reasons. Much of the attention on makerspaces has been generated by projects produced at TechShop; however, TechShop’s business model confines itself to the largest of American cities; understanding whether makerspaces outside those cities and outside the TechShop franchise are contributing to economic development is one goal of the research. In addition, smaller cities should have fewer additional supports for economic development, with smaller development planning offices and fewer incubators and coworking spaces, meaning that makerspaces may have a more pronounced effect. In Atlanta’s metro area, many spaces specialize for hobbyists because there is little need for additional economic development activities; thus, a clearer picture of how makerspaces will aid economic development should be drawn.

The first step of data collection was to identify makerspaces outside the Atlanta MSA. The sampling began by analyzing 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 web searches for each space to identify whether they had an active website or other web-presence.

Once I identified an initial sample of makerspaces, I used a snowball sampling technique to augment my list. I asked participants at each space what other spaces they were aware of and whether they could make introductions for me for future interviews. The technique introduced me to several makerspaces that were not listed on any of the three online directories, which may

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3 According to several interviews, they will only enter an area with at least 3 million metro-residents
not have been identified otherwise. 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.

<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</td>
<td>2011</td>
<td>Rome</td>
<td>36,000</td>
<td>90,000</td>
</tr>
<tr>
<td>HackBerry Lab</td>
<td>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 of the location. Visiting the physical spaces allowed me to observe its configuration and how members that were present utilized the space. After speaking with the management of the space, I often asked available members for an interview in order to broaden my understanding of their activities. I also spoke with planning officials in several cities to understand their expectations for how the makerspace would contribute to their communities.

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 interviewee and the specifics of the makerspace with which they were affiliated. In all, I conducted 34 interviews across the nine sites listed in Table 1. Of the 34 total interviews, 19 were with management, 12 were done with members, and 3 were government officials.

During interviews I took a limited number of physical notes, but always recorded field observations after leaving a site. Interviews were recorded and later transcribed for data analysis. My field notes were analyzed for the presence of the same codes used for the interview data. Members were the least likely to be comfortable being recorded, but detailed notes were taken to record their views; however, the lack of transcripts limits the amount of verbatim quotes that can be reproduced in the results.

I produced a preliminary set of codes to analyze the interview data with prior to beginning data collection, based primarily on the categories of activities I expected as described in the literature review above. However, because the study is highly explorative, I left the list of codes open to be changed based on findings. I used the constant comparative method to integrate the themes of each interview into a coherent model of behavior and continued to code as the
interviews were done in order to uncover new themes. In order to protect the anonymity of interviewees the only information that I will provide identifying quotes will be their relationship to the makerspace, namely whether they are primarily a member, management, or a government official.

Results

Among the Makerspaces studied, managers unanimously expressed that economic development was a key component of what their organizations contributed to their communities. As Manager B stated for their makerspace, “our goal needs to be and has to be economic development through nontraditional education.” Similar expectations were cited by government Official C, saying that makerspaces “are symbolic of the need in communities to raise people’s awareness and understanding and access to technologies so that they can go learn based on their interests”. Government Official B saw makerspaces as being foundational to his regions economic growth, because “If you don’t support makerspaces…where are you going to get this creative generation, this innovative generation, to support these long range political goals?”

Within the broader trend of economic development, four themes were apparent across the interviews, both with the management and the membership of makerspaces. While each Makerspace offers different specific programs, the four themes were universal across the cases I studied; however, in newer spaces they were far more aspirational in nature. 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) supplying informal workforce training; and (4) increasing workforce retention.

Culture change. I did not observe the type of entrepreneurial activity in makerspaces I
hypothesized to be occurring. While interviewees perceived makerspaces to be drivers of economic activity in their communities, management also expressed surprise at the lack of original products that members were prepared to develop as the spaces opened. Manager D of one organization admitted “I don’t know if we’ve really facilitated any new ventures here yet... But that’s kind of the next thing, is towards the steps of innovation…trying to create projects.” Makerspaces have been trying to help members create projects, but as Manager R lamented, “…nothing truly scalable has come out yet.” Referring to the lack of scalable products, Manager N went on to mention that their space had “done a lot to get people to where they have a small lifestyle businesses” even if the potential for growth was limited.

The management of several makerspaces described either a lack of entrepreneurial drive in their cities or an absence of willingness to take risks in pursuing ideas being behind the lack of new ventures. That may be a particular issue for areas outside of the nation’s largest MSA’s, as member E said of the difference in entrepreneurial energy: “I think that’s the primary difference between Atlanta and the rest of the state… its own belief in its manifest destiny, so to speak”.

Makerspaces have pivoted to position themselves to act earlier in the entrepreneurial process, as “the funnel, or crossroads, or the platform where people will come” [Manager R] in order to increase their community’s entrepreneurial drive and willingness to go through ideation. However, according to two managers, members in their space have shown large amounts of reticence to consider marketing or scaling their hobbies:

“Most of them strongly resists the idea of having a business.” [Manager D].

“They’ll be more of the hobbyists, the tinkers, and they might have day jobs already, and so when we meet with them a lot of times its saying ‘that’s a great idea, how can we help you do it’.” [Manager J].

To serve that goal, Manager F had positioned his organization as a safe place for
members to test out ideas: “we get the weird stuff...but you have to be, have to be open to that, because right now we can’t say no to anything, because if you say no to anything it shuts the door on that type of thinking...let them run with it.”

Managers viewed acting as a sounding board to be an important role and contribution to helping the long-term growth of their region. As Manager J explained about the challenge his members face in creating new products: “let’s say that you have an armchair idea, and you fall in love with it, sometimes if you’re never able to vet the idea through you can never move forward to the next idea, so sometimes it’s not about the idea that you have”. Makerspaces occupy that role despite a consistent theme that many of the ideas heard were not marketable, but they believed makerspaces were well suited to help people regardless: “it comes down to a place to vet your ideas, if you’re able to vet your idea, you’ll either make it better or move on, and if we create a culture of that release, that creative release, there’s nothing but good that can come out of it.” [Manager J].

Small business growth. Makerspaces support small business growth primarily through the provision of office space and the access to specialty tools. Four spaces in the sample are already involved with coworking services and the rest are interested in offering similar services in the future. Coworking is a separate development from makerspaces, though they both arose at roughly the same time around 2005 (Spinuzzi, 2012), and features a shared work environment where businesses and individuals rent office space. Offering coworking services, Manager F stated, “opens the door wide for people to start businesses without the high overheads of everything, utilities, rent, equipment, everything else, that’s where the ability to retain is, is in that benefit”. Similarly, Manager I stated “we’re definitely helping with existing needs if there were; it’s either convenient or better to do their projects here.”
Coworking in a Makerspace adds an extra dimension of community. By purposefully bringing businesses into the community during working hours, it helps to add diversity to the professions, industries, and specializations in a shared space. Members C specifically highlighted the effect of community and “the creative input that I get from different people for projects that I’m working on” when discussing his reasons for entering the space. Manager A spoke similarly when discussing the most important aspects of the space when explaining “it sounds vague, but a community. Let’s face it a 3d printer is not that expensive, you can get one at your house. We don’t have a crazy amount of equipment…but right now they’re coming in for the community”.

By working alongside businesses in other professions, members spoke about hiring other members to help with aspects of their business or to provide other services; they highlighted the high amounts of interaction and ability to market their own work as benefits of the space. However, Manager K highlighted how makerspaces and coworking spaces differ and can act as compliments:

“I see a coworking space as being the cleaner side of a makerspace… if that business is not necessarily selling a product but more so developing a product or coming up with a new idea, invention, or creating furniture, or whatever it may be, they need to actually build something, solder something, prototype something, making something, that’s the piece where a makerspace comes in.”

By providing specialized machinery that would otherwise be outside of a small business’s budget, they can help companies to grow:

“The makerspace has contributed to my business because we’ve gotten access to a few more power tools that are used on rare occasions but when they’re needed they’re needed and I wouldn’t have been able to justify spending on them as early as we were having them… the benefit of having the right tools early is huge.” [Member D].

Generating access to tools is a critical logic of the need for Makerspaces. Coworking spaces are successful because most people do not require uninterrupted access to office
equipment all day. Makerspaces offer similar access to manufacturing tools that are rarely utilized but can be beneficial. When a business shares 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.

Workforce training. Over the last decade, there has been a growing concern among researchers and the public about the present and future shortage of skilled workers in manufacturing, though evidence is still tentative and unsettled (Cappelli, 2015; Neumark et al., 2013). However, participants in the sample cited the same fears, particularly government officials:

“if we’re going to sit here and talk about a renaissance of manufacturing and a reshoring of companies coming back to make things, and you have nobody that has any experience on how to make things or what to make, what to make next, then you’ve got a problem. You can’t sustain that reshoring if you will. I have manufacturing companies up here…that struggle to find experienced machinists and welders and all sorts of those jobs, very middle class very blue collar kind of jobs…you go down here to the technical colleges…but even at their best they’re turning out so few people still that it’s a problem.” [Official B].

Government Official A sounded similar alarms when he said: “the biggest issue in the digital economy is… workforce skills development, so I came to think of makerspaces as a potential place where digital skill development could occur.”

Because 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, through formal classes or informal instruction, provide access to information on how to use tools:

“no matter what kind of equipment they have, it’s pretty much a given that there is going to be someone there that is an expert on that piece of equipment, and if you’re interested in using the laser cutter there’s going to be someone there who
will say ‘yeah I’ll teach you how to use the laser cutter, I’ve been using that for ten years’ and so you can learn from experts on anything.” [Member C].

Beyond the simple introduction to using tools and creating goods, makerspaces provide a baseline of training for individuals. These individuals then have the opportunity to further their training in formal institutions of education, or move into new careers based on the skills they learn. The hope that makerspaces would help to introduce young members to mechanical trades was mentioned by Manager G:

“I think if you have people that are teens that they are in the school system and want to work in kind of a part time position and have the skill set to help code or work… like at [a local business] he doesn’t have enough people that can repair equipment, and I don’t think that’s a thing that you need a degree for, but you do need some familiarity with computer chips and cellphones”.

Makerspaces currently cannot provide certifications, but several expressed interest in setting up formal agreements with local employers or working closer with local school systems: “if there’s a manufacturing company in [city] and they’re saying ‘we can’t fill out jobs’, there’s nobody here, we don’t have an apprentice program, well you know you could work with us on helping you to train that next generation and they would realize these jobs are just as lucrative.” [Manager H].

Worker retention. Makerspaces are communities, and members involved with their construction become heavily attached to the spaces. As Manager A expressed, there is hope that the attachment to makerspaces can help to increase retention: “[our city] doesn’t have the retention that it needs to keep creative people here, it’s a conduit for creative people…. There’s a lot of people that can’t stick around, because there not a place to stick around to, to stick around for…so we need to create a space.”

The importance of community was expressed by Manager B when discussing one of their members: “Why is he driving [42 minutes]. It’s because of community. He’s a 3d printer
guy. He’s got 3d printers at his house...he comes here to teach people 3d printing. He’s not even here, he probably doesn’t do nearly as much of his business here, as ‘I just want to be plugged into a community of likeminded people.’” The management of makerspaces and government officials expressed hope that by attracting and producing high-skilled individuals, social capital will help to keep individuals in place and stem some of the “brain drain” these cities have faced: “they now have the tools and resources that we hope when they figure it out, when they get that business going, that they stay here…I think it keeps our college students and graduates and folks that are working on ideas, keeps them in town”[Official B]

Manager P expressed a similar theme when describing that “one of the issues that we have in our society here is that we recruit engineers from big cities and there is no support for them here… a lot of times they sign up for a three year contract, they get their initial training and they go get another job.” The manager hoped that engineers would be more likely to stay in the city long-term if there was a more competitive labor pool in place, as generated by the makerspaces acting as a “STEAM activation tool”. [Manager P]

The emphasis on retention was echoed by members. Member G discussed how that their college gave them access to tools, and without the makerspace they may have needed to move after graduation to continue working on their commercial products:

“I kind of have access to some stuff currently …but not for long, so once I leave I’m looking forward to joining. it’s tough when you surrounded yourself with so much 3d printing and a whole woodshop and then to not have access to that… the things that I make currently I’d like to continue to make, and that’s only through having a woodshop and 3d printing and laser printing.” [Member D].

The attempt to improve worker retention goes beyond the training of the labor pool and the provision of services such as tool access; spaces have involved themselves in their communities, offering events that reach beyond their memberships. One space described

17
themselves as “the preeminent civic pride organization in town is what it comes down to, anything that you do to be happy and proud of yourself, we’re all about” [Manager J]. While such efforts may not singlehandedly increase worker retention, the management hopes it can improve the cities culture and inspire additional efforts to improve the city.

**Discussion**

The hypotheses I described above in order to frame the research were only partially confirmed. The management of makerspaces do view their organizations as contributing to local economic development, and across cases highlight consistent activities they are involved in. However, the businesses they support are in existing fields and they have struggled to turn members into entrepreneurs, in part because they perceive members as lacking confidence in their own ideas. Because of a lack of entrepreneurship, little prototyping has been done but the tools in spaces have supported businesses ability to take new contracts. The management of makerspaces do perceive themselves as contributing to workforce training, though that aspect remains informal and is largely an aspiration for their spaces future. Lastly, makerspaces view themselves adding to their regions ability to retain workers, partially by offering a community for them to join but also by adding to the civic pride and number of community events that occur.

The results presented in this paper are exploratory and introductory; makerspaces are a new development and many of the services spaces cited as being offered have only been available for less than a year. Thus, whether those services will have their expected effect or will even be worth retaining is an open question; makerspaces continue to evolve and should be expected to transition as they receive new information and as the needs of their local communities change.
Makerspaces are not a stand-alone solution to the economic needs of small cities and regions; at present, their memberships are too small and their funding too limited to expect fundamental changes to result from their presence. However, as detailed above, their contributions are multifaceted and their presence in a community aids other efforts underway. Makerspaces view themselves as 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 (Leigh & Blakely, 2013).

Further research is needed to understand how makerspaces inside and outside of the large cities differ. In addition, the sample for this study was geographically bounded, and makerspaces in other regions may diverge in whether and how they support local economic development. In addition, the perceptions of how these spaces serve economic growth can serve as the basis for future evaluations, to understand whether makerspaces are successful in their goals.

References