

# How Makerspaces Support Innovative Urban Economies

By Calgary Economic Development

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# Executive Summary

Worldwide, millions of engineers, makers, hobbyists, entrepreneurs and innovators are fueling what has been called the next “Industrial Revolution.” Makerspaces are collective organizations designed to increase access to physical tools within a collaborative community. They combine affordable fees with a welcoming environment to learn and create. The makerspace movement is a relatively recent phenomenon, but it is already having an economic impact on municipalities around the world. In Calgary, small-scale makerspaces are beginning to emerge.

As the lead organization tasked with nurturing the acceleration of innovation and industrial diversification in Calgary, Calgary Economic Development is pleased to present this report on the makerspace movement in Calgary and the world. *Building on our Energy, the 10-year Economic Strategy for Calgary* encourages the establishment of innovation hubs to promote a culture of innovation and entrepreneurship. A makerspace could serve as one such hub. Makerspaces serve as a convergence point for local innovators and makers to collaborate and create as they support growth in key, non-resource related industries in our community.

The makerspace movement aligns with the Calgary 10-year strategy to achieve shared prosperity and sustainable development by promoting the retention of skilled workers through economic downturns, help to address a glut of commercial real estate, and building on Calgary’s key entrepreneurial, innovative and technical strengths.

There have been no comprehensive economic impact studies conducted yet to quantify the impact of makerspaces on a local economy. In the absence of such studies, this report demonstrates how makerspaces have benefited cities and companies through a review of case studies and primary and secondary research.

Makerspaces contribute to economic development by providing ecosystems in which individuals can develop the workforce skills needed in today’s manufacturing sector. By serving as an informal introduction to skilled trades through the use of tools as an educational and leisure pursuit, makerspaces expose individuals of all ages to modern, advanced tools. In doing so, makerspaces reinvigorate the mechanical arts on a community level.

By providing people easy access to high tech or high-cost equipment, a collaborative knowledge-sharing environment, low-risk and low-cost product development and low-cost co-working spaces, makerspaces are exceptional environments for developing cultures of innovation and small business growth.

With consumers seeking products customized to their individual preferences, makerspaces enable small and large manufacturers to be more nimble, creative and efficient. For small companies, makerspaces provide affordable access to high tech equipment and a collaborative work environment. They reduce barriers to entry to new markets and facilitate learning, prototyping, manufacturing and commercialization of products. Larger manufacturers access makerspaces to create products more rapidly and incorporate ideas from customers.

Makerspaces are beginning to partner with educational institutions and the private sector to provide students with the practical skills needed to succeed in today’s workforce. Studies show students engaged in active learning activities score better on examinations and are less likely to fail in science, technology, engineering and math (STEM) courses.

Finally, makerspaces are helping cities diversify their industries, such as oil and gas or auto manufacturing, while simultaneously facilitating collaboration between traditionally unrelated industries. There is no limit to the types of ideas and products generated from a makerspace.

# Introduction

*"A community with the tools and culture to connect creativity to making creates artifacts, it makes advances, and it makes history. A community without leaves no mark and is soon forgotten."*

*- Jeff de Boer ASA RCA*



Makerspaces originated in 2005.<sup>1</sup> They are collective organizations designed to increase access to physical tools within a collaborative community. They are an outgrowth of the global “maker movement” that encourages individuals to learn to use tools and become more engaged with their products, by modifying them or building them from scratch. They are a product of, and a recruiting tool for, the maker movement by offering a centre that the public and media can focus upon and encourages its growth.

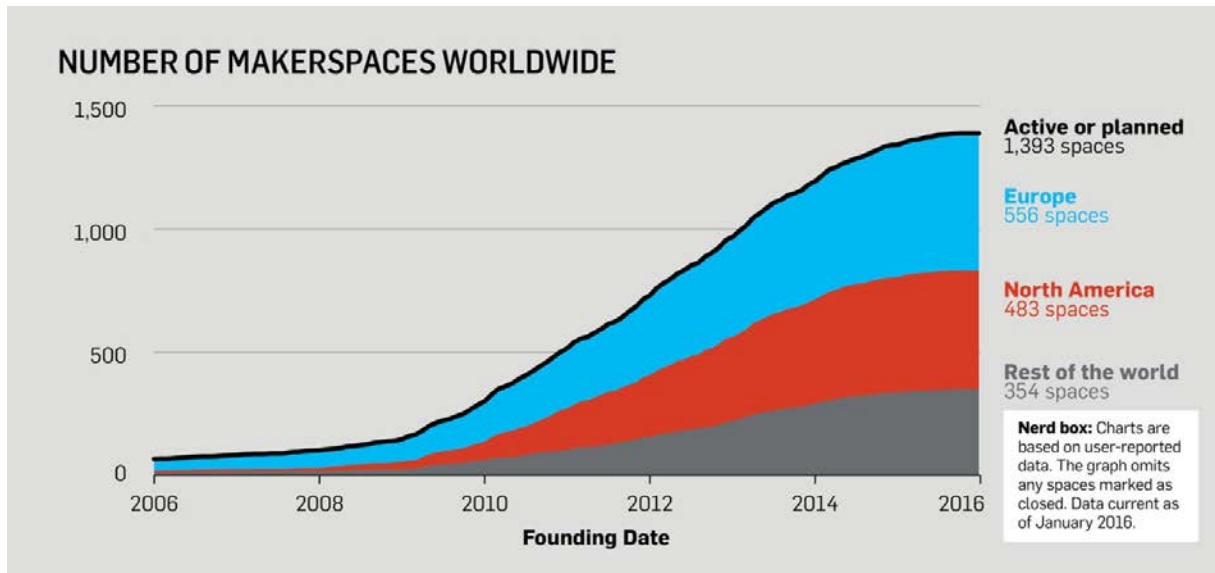
As the name suggests, makerspaces are physical locations with a collection of tools. The spaces are quite diverse, both in the range of locations and buildings they occupy. The tools available are quite flexible. Most commonly, there is a metal shop, wood shop, computer/electronics lab and prototyping studio. Some makerspaces also have a sewing/textile room, ceramics room, photography studio, surfacing/finishing studio, arts/crafts studio, bicycle studio, plastics studio and/or biology lab.

Makerspaces are for anyone; clients range from high school aged to seniors. The spaces have emerged as a haven for hobbyists, makers, artists, builders, hardware developers, engineers, scientists, and entrepreneurs — anyone with a curious mind who seeks to make something.

Makerspaces are typically open to the public. They can be community-based cooperatives, an initiative by a local entrepreneur or a collaboration by big businesses and educational institutions. They are generally inclusive and welcome new members regardless of skills or experience. Members form a community sharing space, tools and knowledge. People work on projects individually or collaboratively but are generally willing to teach the skills or machine operations with which they have experience. Makerspaces not only contribute access to tools but they teach members to use them. Skills are learned in classes or through informal exchanges with members.

## Growing the Makerspace Market

Throughout the world, millions of engineers, makers, hobbyists, entrepreneurs and innovators are fueling what has been called the next “Industrial Revolution.” Makerspaces have exploded in popularity over the last decade. There are now approximately 1,400 active or planned makerspaces worldwide; 14 times as many as in 2006.



Peek, K. (2016, February 23). *By The Numbers: The Rise of the Makerspace*. April 11, 2016

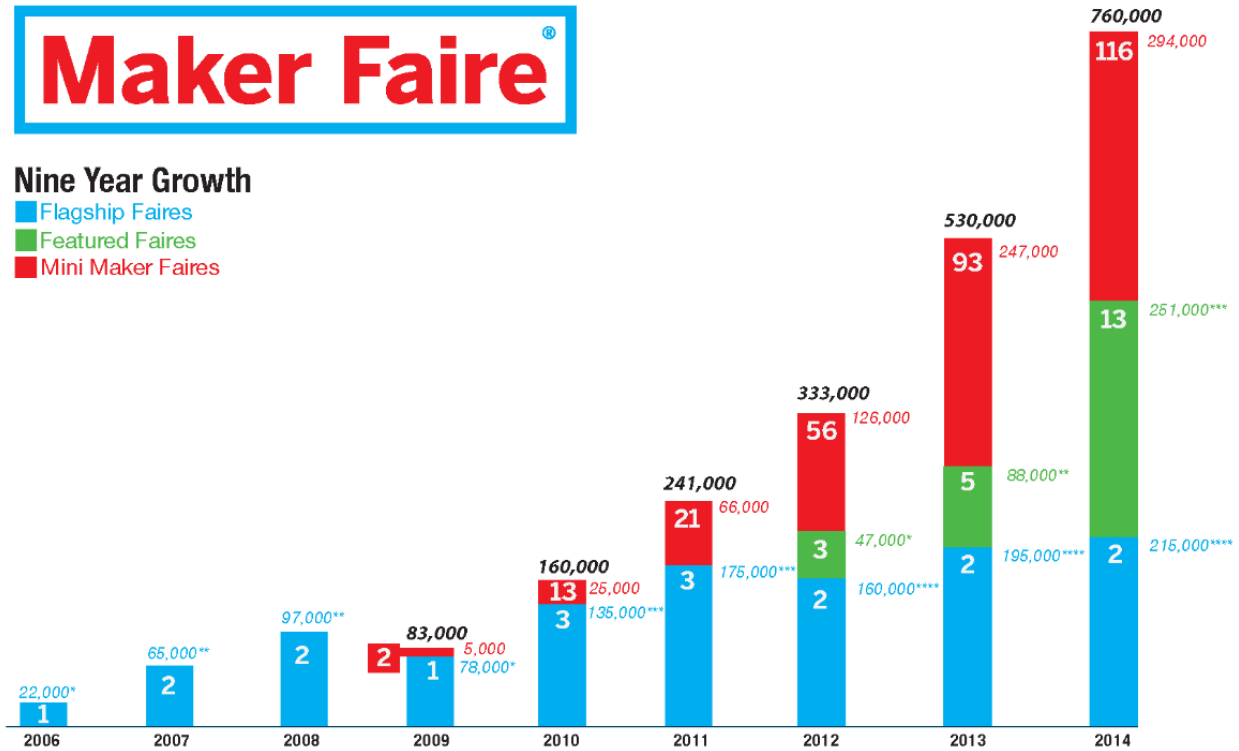
## Demand for Makerspaces

The demand to be part of the “Do it yourself” culture the maker movement is also reflected in the increasing popularity of Maker Faire events. Maker Faires provide recognition for the skills gained by the makers and display their work. They provide a venue for makers to show what they have made and share what they have learned. Beginning in northern California in 2006, the inaugural Maker Faire attracted 22,000 attendees. By 2013, attendance had increased to 530,000 attendees at 100 Maker Faires worldwide.

# Maker Faire®

## Nine Year Growth

- Flagship Faires
- Featured Faires
- Mini Maker Faires



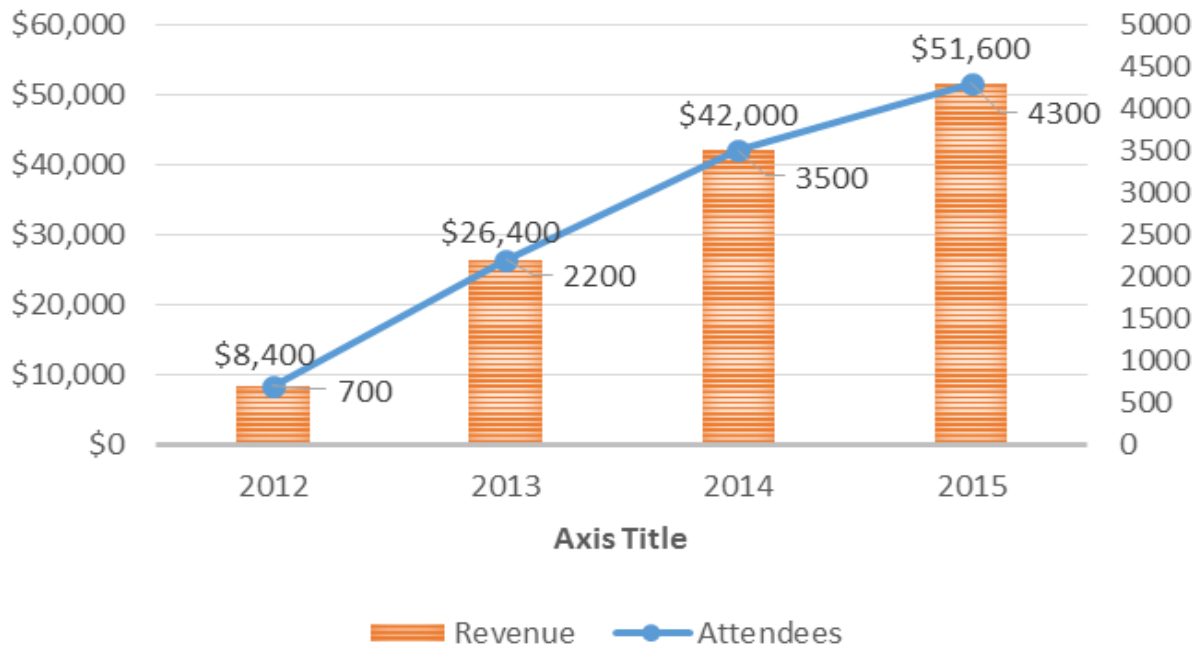
\* Bay Area Faire only  
 \*\* Bay Area, Austin  
 \*\*\* Bay Area, Detroit, New York  
 \*\*\*\* Bay Area, New York  
 \*Detroit, Kansas City, Tokyo  
 \*\*Detroit, Kansas City, Tokyo, UK, Rome  
 \*\*\*Detroit, Kansas City, Tokyo, UK, Rome, Shenzhen, Oslo, Trondheim, Milwaukee, Atlanta, Silver Spring, Orlando, Paris

Hoang, M. (2015, March 23). *Maker Faire Keeps On Growing!* Retrieved April 11, 2016, from <http://www.makerfairekc.com/2015/03/maker-faire-keeps-on-growing/>

In Calgary, the Calgary Mini Maker Faire is increasingly popular. One of the founders, Shannon Hoover, said attendance rose from 700 in 2012 to 4,300 in 2015 and ticket sales increased from \$8,400 to \$51,600 last year. The event generated significant income related to food services, vendor-purchased items and start-ups launched because attendees were inspired to create something.

[CLICK HERE](#) for more information on the Calgary Mini Maker Faire.

## GROWTH OF CALGARY MINI MAKER FAIRE



*Hoover, S., personal communication, April 5, 2016*

The growing popularity of makerspaces is attributable to the increasing demand from individuals who either want to be--or already are--creating their own goods. USA Today<sup>11</sup> has reported in the United States there are approximately 135 million adult makers; "people who employ their creative skills in craft activities, such as making clothing, jewelry, baked goods or works of craft or art, that's well over half (57%) of the American population ages 18 and up."

The combination of a knowledge sharing social environment and access to tools has resulted in a number of individuals creating innovative products and, at times, launching small businesses. Multi-national corporations such as Toyota, Ford, Ikea and General Electric are investing in makerspaces to take advantage of the rapid innovation these spaces generate. Forward-thinking cities worldwide have taken notice and are investing in these spaces to diversify their economies, support economic resiliency and become vanguards of the future global economy.



# Economic Impact of Makerspaces

Although the makerspace movement is a relatively recent phenomenon, they are already creating an economic impact on municipalities across the world. There have not yet been studies (that are publicly available) conducted to quantify the economic impact of makerspaces, such as measuring the number of companies and jobs created, taxes generated or number of patents filed. Though not an economic impact study, this report provides case studies utilizing primary and secondary research to demonstrate how makerspaces have benefited local economies.

## Skills Development

*"When planning for a year, plant corn. When planning for a decade, plant trees. When planning for life, train and educate people."  
- Chinese Proverb: Guanzi (c. 645BC)*

Makerspaces are training grounds for developing the skills needed by today's manufacturing sector. They achieve this by providing access to tools, educational sessions and opportunities to share information and exchange ideas with other makers.

## TOOLS

Makerspaces provide people with access to tools that make product design and prototyping more affordable, as far as making the cost of prototyping a few hundred dollars rather than the tens of thousands a professional firm may charge. Most people do not have the access to capital, nor the space to purchase and house tools such as CNC routers, laser or plasma cutters, welders, woodworking tools, 3D printers, powerful computers, hand tools, vises, etc. For a small monthly fee, makerspaces provide members access to these tools.

## PROJECTIONS FOR EQUIPMENT USED IN MAKERSPACES

- 3D printers will grow from a \$288 million market in 2012 to \$5.7 billion in 2017. (Forbes, August 2014) <sup>iii</sup>
- MakerBot sold approximately 7,500 3D printers from 2009 to 2012, generating an estimated \$10 million US to \$15 million US in revenue. (Wired, Apr 2012) <sup>iv</sup>
- In 2011, more than 300,000 Arduino boards were commercially produced. Two years later, 700,000 boards were in users' hands. (Medea, April 2013) <sup>v</sup>
- Marketsandmarkets reports the laser processing market will grow from \$6.4 billion US in 2015 to \$9.75 billion by 2022. <sup>vi</sup>

## WORKFORCE TRAINING

Over the last decade, there has been increased concern about a shortage of skilled workers in manufacturing. Makerspaces informally introduce individuals to skilled trades through tool use as both an educational and a leisure pursuit. Since many high schools have eliminated “shop” classes, school-age individuals have fewer opportunities to use mechanical tools unless they enroll in a technical school program.

Makerspaces can help reinvigorate the mechanical arts by exposing people of all ages to modern, technically advanced tools used in manufacturing industries. Types of activities undertaken – such as use of computer-aided design software to guide precision machines – are typical in industry. The hands-on training provides people an opportunity to demonstrate skills. Individuals often receive jobs from other makerspace members. Makerspaces also have potential to serve as a key conduit between employers and highly skilled workers.

Makerspaces typically provide staff to teach individuals how to use new tools through group classes and workshops and individual one-on-one sessions. Additionally, the open floor plans encourage collaboration. Individuals with different backgrounds (engineers, artists, carpenters, etc.) using the same space to create products can observe and perhaps offer suggestions on how to improve products, how to reduce cost, or how to make improvements.

Examples of Classes and Workshops at Artisan’s Asylum<sup>vii</sup> in Boston:

- **Metalworking Tool Training 101** – Learn to pick the right saw, drill holes and grind burrs. Get an introduction to metalworking, welding and learn to use tools including an abrasive saw, horizontal band, pedestal and angle grinder, hand and drill press.
- **Tool Training, 3D Printer** – Learn to operate a 3D printer.
- **Basic MIG Welding** – Basic training for those new to welding and those looking for a refresher.
- **Tool Training, CNC Plasma Cutter** – Learn to use a computer-controlled, water-cooled plasma cutter, translate hand sketches and CAD drawings into patterns cut from metal sheet.



*Instructor helps measure a plank at a woodworking workshop in Helios Makerspace.*

## Promoting Innovation Culture and Small Business Growth

*"This is where innovation is occurring and Intel has a great interest in helping spur innovation"*  
- Brian Krzanich, CEO of Intel

Economic growth requires continued entrepreneurial innovation and expansion.<sup>viii</sup> Places that foster innovation and creativity can adapt faster to the new economy and sustain growth. Makerspaces have proven to be an ideal environment for encouraging entrepreneurship.

Makerspaces help individuals turn ideas into marketable products and establish viable businesses. In many cases, entrepreneurs use makerspace tools to rapidly create prototypes that can be made in bulk elsewhere. Through online financing platforms such as Kickstarter, Etsy or Custommade.com, makers are able to get the funding required to invest in bulk manufacturing and access to markets to sell their newly developed products.

### SQUARE INC.

Square is a point-of-sale, mobile payment and financial services company created by Jack Dorsey and Jim McKelvey in San Francisco. The inspiration came to Dorsey in 2008 when McKelvey was unable to complete a \$2,000 sale of faucets and fittings because he could not accept credit cards.<sup>ix</sup> When they took the idea for the mobile payment system to Silicon Valley, no one would back them.<sup>x</sup> Then McKelvey built a prototype of the iconic card reader at a makerspace in San Francisco and had over \$600 million from venture capital firms.

By 2014, Square processed an average of 37 million transactions per month.<sup>xi</sup> In November 2015, Square went public valued at \$2.9 billion, more than all but the largest U.S. banks.<sup>xii</sup> Square now has more than 1,000 employees.<sup>xiii</sup>



### MAKER DRIVEN BUSINESSES

#### ETSY

- 1.6 million sellers
- 24 million active shoppers
- Revenue growth from \$300 million in 2010 to \$1.93 billion by end of 2014<sup>xiv</sup>

#### KICKSTARTER

- \$2,298,810,485 total dollars
- Pledged to Kickstarter projects
- 10,624,764 total backers
- 103,303 successfully funded projects<sup>xv</sup>

Many makerspaces also offer co-working spaces where businesses and individuals can rent office space. The appeal to small business is the access professional services such as conference rooms,

teleconference facilities, printing, and other services, while sharing costs. Co-working in a makerspace adds a dimension of community, bringing together individuals who typically might not associate into close contact. People working in a different industry can bring a contrasting view that aids creative thought.

Businesses thrive in co-working spaces. Research by property leasing firm Regus<sup>xvi</sup> on 2,600 small businesses in Britain found 80 per cent said a shared workspace was more cost effective than a fixed office. Seventy per cent said meeting other entrepreneurs was a major advantage, 63 per cent said it provided more inspiration than a traditional office, and 61 per cent said it offered a more creative environment.



*Ruckus, a makerspace in Indianapolis was developed to address industrial blight. Key components of a co-working space includes high speed internet, comfy chairs, and work tables, as well as woodworking, metalworking, laser-cutting, printing, and sewing equipment*

## Custom Manufacturing

*"Today's D.I.Y. is tomorrow's Made in America."  
- U.S. President Barack Obama*

Increasingly, buyers seek products personalized to fit their individual needs. The change in consumer demand from generic to customized products is having an effect on small and large manufacturers. Makerspaces help them adapt by making them more nimble, creative and efficient.



## SMALL MANUFACTURERS

For small manufacturers, makerspaces provide affordable access to high tech equipment and a collaborative working environment. They reduce barriers to entry, facilitate learning, prototyping, manufacturing and commercialization of products. It has lowered the cost of production to a level where small manufacturers can compete with big business by providing quality items at competitive prices. Niche items lack the economies of scale of large manufacturers but they serve a market and foster a more intimate connection between communities and makers of these products.



### DODOcase

In response to the growing tablet market with Amazon's development of Kindle, Craig Dalton and Patrick Buckley founded DODOcase in 2009. They saw a market for an elegant, low-tech protective wrap for the devices. With no experience in manufacturing, they accessed a makerspace in San Francisco to develop a prototype. They then secured funding from Shopify and were able to manufacture cases in bulk. The DODOcase was a hit and generated \$1 million in sales in 90 days.<sup>xvii</sup>

For the second generation DODOcase, Buckley applied the learnings from the makerspace to improve the design and manufacturing processes and reduce material costs.<sup>xvii</sup> DODOcases are handmade in San Francisco by artisans that includes woodworkers, bookbinders, sewers and silk screeners with skills developed in a makerspace and are some of the popular iPad, iPhone and Kindle covers. As of the end of 2014, DODOcase had 25 employees operating out of its 10,000 square-foot manufacturing facility.<sup>xvii</sup>

## LARGE MANUFACTURERS

Large manufacturers are increasingly accessing makerspaces to create products more rapidly and incorporate ideas from customers. Companies are moving some research and development from the corporate environment to makerspaces to keep pace with the speed of innovation. Manufacturers that do not risk being losing market share to by new products or innovations on existing products.

### FORD'S USE OF MAKERSPACE TO GENERATE INNOVATION <sup>xviii</sup>

In 2012, Ford collaborated with TechShop to open a makerspace (TechShop Detroit) adjacent to its Dearborn product development campus. Bill Coughlin, the CEO of Ford Global Technology, supported the idea to foster innovation. "We wanted a place where any staff member who wanted could come and make a prototype," Coughlin said. "It's very easy to kill off a paper-based idea, but far less so with a prototype."<sup>xix</sup>



To motivate creativity and innovation, Ford created a program that provides employee-inventors a three-month free membership to TechShop Detroit and compensation for filed patents. In its first year, about 2,000 employees earned incentive memberships and Ford recorded a 55 per cent increase in patentable ideas. <sup>xx</sup>

## Education and Makerspaces

*“Learning is active process. We learn by doing. Only knowledge that is used sticks in your mind  
- Dale Carnegie*

There is growing awareness in educational institutions of the need more active hands-on learning. The success of cities in the future will depend on the ideas and skills of their citizens. In an ever more competitive world where occupations that incorporate science, technology, engineering and mathematics skills are better paid, makerspaces are a way of providing students with hands-on learning. Studies consistently show students who perform hands-on learning in class, demonstrate a better understanding of STEM concepts.

A study by the University of Washington and University of Maine<sup>xxi</sup> performed a meta-analysis of 225 studies comparing exam scores of undergraduate STEM courses with traditional lecturing versus active learning. They found active learning increases examination scores by about six per cent, and students in classes with traditional lectures were 1.5 times more likely to fail than students in active learning classes.

There are numerous theories why active-learning students perform better. Active learning reinforces critical material, concepts and skills, provides students’ opportunities to think about, talk about, and process course material. It also allows students to collaborate through group work with fellow students.

Some U.S. schools have made active learning a core element of the curriculum. High Tech High, a charter school in San Diego, was developed in response to concerns that students be prepared to work in the tech industry. The curriculum is virtually textbook-free<sup>xxii</sup> and incorporates school-to-work strategies, including internships and fieldwork such as designing and making toys. One project, the Holy Cows, has students team with local engineers to build robots. The Holy Cows have competed in the FIRST Robotics World Championship eight times and won top prize in 2013. High Tech High has

seen 86 per cent of its graduates go to university, versus 59 per cent nationally. More than 30 per cent of its alumni enter math or science fields versus 17 per cent nationally. <sup>xxiii</sup>

With access to high tech equipment, open spaces and knowledge sharing, makerspaces are an ideal environment to provide students the hands-on learning they will need to succeed in tomorrow's workforce. Makerspaces worldwide are developing partnerships with educational institutions and the private sector to provide students opportunities to bring their creations and innovations to market.

In 2014, GE Appliances joined Local Motors (open source hardware innovator), MakerBot (manufacturer of 3D printers) and the University of Louisville to open FirstBuild, a makerspace and state of the art micro factory on the university's campus.

In its first year, students worked with FirstBuild on 32 projects. The access to state-of-the-art manufacturing equipment and real-life experiences helped facilitate more than 100 personal projects by local makers, start-ups and entrepreneurs as they developed a new model of successful public/private partnerships." <sup>xxiv</sup>

At FirstBuild, members of the public and students collaborate with designers and engineers in-house and through Local Motors' online community to rapidly develop innovative products for GE Appliances that are available on FirstBuild's website. If it has wide appeal will move in to GE's manufacturing facilities for mass production. In its first year, FirstBuild generated more than 800 ideas and introduced eight new products to the GE Appliances line including the Easy Load Oven Drawer.



#### THE EASY LOAD OVEN DRAWER

This Easy Load Oven Drawer has an upper oven that slides out, similar to a cabinet drawer, which improves stability compared to a traditional oven rack and gives cooks better access to food. This makes cooking tasks easier to complete.

"With the entire oven drawer rolling out, people don't have to bend over and reach in to remove what they're baking. You simply hold the handle of the top oven door, pull it down to peek inside or fully slide out the drawer to access your food." <sup>xxv</sup>

## Diversification of Industries

*"If you look at history, innovation doesn't come just from giving people incentives; it comes from creating environments where their ideas can connect"*

*– Steven Johnson*

Makerspaces provide an environment where artists, engineers and entrepreneurs from various backgrounds come together to share ideas and knowledge and take risks at low costs. This environment breeds a wealth of innovation that is helping cities diversify their core industries. There are no limits to the types of ideas and businesses that emerge from makerspaces regardless of where the makerspace is located, whether it's in an area known for oil and gas or auto-manufacturing or any other industry.



## MAKEFASHION

The fashion industry is undergoing a disruptive change. In recent years, the industry has begun incorporating wearable technology into fashion. Wearable technology is clothing and accessories that incorporate computer and advanced electronic technologies.

Calgary has become a leader in designing wearable technologies, specifically in fashion technology. In a city whose core industry is oil and gas, an entirely unrelated industry, wearable technology, is beginning to emerge. Initiated in 2012 by three entrepreneurs, through the fashion show MakeFashion, Calgarians are introducing the world to this new technology. MakeFashion is teaming fashion designers with engineers to produce some of the most exciting wearable technology garments the world has seen.

From illuminated wedding dresses, to samurai-inspired armor, MakeFashion strives to tell the story of technology through fashion, art, music and performance. In 2015, MakeFashion presented 10

shows worldwide including San Francisco, Shenzhen, Xiamen, Shanghai, New York CE Week and the Toronto Electric Runway. Designs have garnered attention from Intel, Microsoft, Atmel and fashion giant Li & Fung.

Wearable technology is forecast to become a huge market. Juniper Research forecasts global retail revenue from smart wearable devices will grow from \$4.5 billion in 2014 to \$53 billion by 2019.<sup>xxvi</sup> If Calgarians embrace the fashion technology sector in their backyard, Calgary may one day be named in the same sentence as New York and Paris when it comes to fashion capitals.

[CLICK HERE](#) for more information on MakeFashion.



# Makerspaces in Calgary

The makerspace movement has reached Calgary. Currently, Calgary has two thriving small-scale makerspaces. However, their presence indicates there is a demand for shared workspaces in Calgary. One factor that could contribute to success of a maker movement is Calgary's highly educated labour force. According to the 2011 National Household Survey, Calgary has the second highest level of educational attainment of population aged 25 – 64 of major Canadian cities at 69.6 per cent, after only Ottawa.<sup>xxvii</sup> This talented workforce includes people with the ability to create, such as engineers, tradesmen and artists. Calgary is also renowned for its entrepreneurial spirit. In 2015, among major Canadian cities, Calgary has the highest number of small businesses (fewer than 50 employees) per 1,000 population at 39.4.<sup>xxviii</sup>

The addition of a large-scale makerspace could employ the skilled labour force and make a small step to alleviate of the real estate glut. It also has the potential to diversify the economy and help Calgary become a global innovation leader.

[CLICK HERE](#) for more information on Calgary Makerspace.

## ARCHELOFT

Founded in April 2015 by Shannon and Maria Elena Hoover, ARCHEloft is in downtown Calgary. It is home to many of the artists, designers and engineers of the MakeFashion show. It is a wearable design makerspace with fashion/design a central theme for the space. The facility has 2,400 square feet of open space with a 3D printer, laser cutter, fashion garments and wearable technologies.

Six businesses have launched from ARCHEloft and five more use ARCHEloft to grow their customer base and production capability through collaboration with members and use of shared tools. Some – like Torch Motorcycles, a designer of motorcycles for women – outgrew the space and moved into a larger retail location. Including MakeFashion events, ARCHEloft has participated in the creation of 20 full-time positions, 10 part-time positions and more than 40 event-based jobs.

[CLICK HERE](#) for more information on ARCHEloft.

## MEET LAURA DEMPSEY



By Shannon Hoover, Founder of ARCHEloft

I met Laura at our first MakeFashion designers meeting. I was explaining to the group why wearable tech was the next big thing, why we should be getting involved, and how the world was going to change. Afterward Laura approached me and said the technology was beyond her and she felt she couldn't contribute. I assured her I'd take personal responsibility to demystify the tech, and help her with any problems. She asked for assistance perhaps three times during the project, and each time quickly resolved her issue. In the end, she developed an amazing piece that augmented the movement of a dancer on the runway. Four years later, we still show it.

Last fall in Xiamen, China, we opened for Fashion Week. Laura was about to debut her latest piece for an audience on the other side of the world. A model walked to see Laura soldering away at her piece of wearable technology and exclaimed, "You never see women doing that sort of thing." We both recalled our first conversation and remarked on what a crazy and enlightening journey it has been.

[CLICK HERE](#) to view motion sensitive dress created by Laura Dempsey.

## Protospace

Protospace is Calgary's first Makerspace located in the northeast quadrant of the city. Due to its success in attracting new members, Protospace in 2016, expanded from a 2,500 square foot facility to now occupying 6,500 square feet.<sup>xxix</sup> It is community-based, member-driven makerspace, offering workshop space, education, community, and shared tools for projects. Although, there is no staff, members learn skills in making things through talking to the community and sharing ideas with other members. Protospace has about 140 members and provides access to technology such as 3D printers, laser cutters, CNC routers, plasma cutters, metal working tools and woodworking tools.<sup>xxx</sup>

[CLICK HERE](#) for more information on Protospace.

## Calgary Makerspace (Future Makerspace in Downtown Calgary)

The Calgary Makerspace team was formed by members of similar projects coming together to develop a world-class facility in the heart of the city. They share a vision to develop the maker ecosystem and improve Calgary's economy, diversity and culture. Calgary Makerspace will be a social enterprise that blends social and financial return on investment and builds a long-term institution with a sustainable benefit to Calgarians.

Calgary Makerspace will be a publicly accessible 25,000-plus square foot facility with a well-equipped workshop providing shared tools and equipment to enable entrepreneurs, artists, students, makers, hobbyists, engineers and businesses. It will have education facilities, co-working space, prototyping services, advice and coaching, supply chain services and will seek to collaborate with other facilities and institutions to provide opportunities for all stakeholders.

[CLICK HERE](#) for more information on Calgary Makerspace.

# Conclusion

The makerspace movement is a decade old yet it is already having a demonstrable economic impact. Makerspaces are hubs of innovation and entrepreneurship. These two factors help explain why cities that support the makerspace movement are likely to adapt faster to the new economy and sustain economic growth.

Makerspaces help achieve growth and diversity by providing innovators and entrepreneurs affordable access to tools, a knowledgeable community, and a low-cost, low-risk environment to create and innovate. Society is also embracing the movement that aligns with *Building on our Energy, a 10-year economic Strategy for Calgary*.

Manufacturers (large and small) are employing makerspaces to meet consumer demand of ever more personalized and customizable products. Educational institutions are using them to provide students the hands-on learning needed to gain knowledge and develop specialized workforce skills. Individuals are using them for workforce training or to help them become innovators and entrepreneurs.

Finally, makerspaces are helping cities diversify their economies to become more adaptable to the ever-changing global landscape.

# End Notes

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