



LOUISVILLE MANUFACTURING WORKFORCE DEVELOPMENT

STOPPING THE BRAIN DRAIN

November 19th 2018

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November 19, 2018

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To Whom It May Concern,

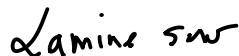
My team and I, current students at the College of Business at the University of Louisville, were tasked with examining and developing solutions to the "brain drain" in Louisville. The following report is our analysis of the problem and our proposed solution. We chose to research this problem because the manufacturing industry is essential to our city's economic growth. The assignment is a test of our ability to write professionally, with clear and concise evidence-driven work to persuade our readers of the seriousness of the problem and to consider our solution.

Thank you for the opportunity to share our view of a problem in our city and what we can do about it. Please consider our solution proposal to the manufacturing industries labor gap as well as Louisville's difficulty retaining workers.

Thank you in advance for reading our report.

Respectfully,

Lamine Sow



Jayna Winchester



Ben McDonough - Lily Arterburn - Logan Vaughn

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Executive Summary

Louisville, Kentucky is a logistical hub with a centralized national location. It is home to many successful industries that for years have fueled the growth of the city, such as the manufacturing industry. Employment in this industry has grown 30.2 percent since 2011, bringing the total to 83,300 jobs – [12.41 percent of jobs in the local economy](#). Still, every year college graduates leave the city in the hopes of starting their careers elsewhere. This retention issue along with Louisville’s aging population has led to a lack of skilled workers in Louisville’s workforce.



The Goal

As Louisville’s workforce continues to age and the younger workforce is proving to lack the skills necessary to work in manufacturing. The young workers who do have the necessary skills are moving to other cities around the USA. Louisville’s manufacturing industry employs nearly 83,300 people and has made an \$11 billion impact on the city. "Growing a talented workforce helps ensure manufacturing will continue to be the bedrock of our economy and competitiveness" [states Jay Timmons](#), President and CEO of The National Association of Manufacturers. It is important to promote Louisville’s unique attributes to provide a way the city can combat the skilled labor gap and retain individuals.

Key Features

This report highlights solutions that could solve some issues facing the manufacturing industry and the best features that Louisville has to offer the workforce:

- Implementing High School Manufacturing Program
- Public Transit Methods
- Louisville’s Low Cost of Living
- Louisville’s Parks and Recreational activities
- Louisville’s Food and Beverage Scene

So What?

Louisville’s manufacturing industry is an important part of the local economy. To stay out of the shadows of peer cities, Louisville should consider implementing manufacturing education programs, explore ways to create a more advanced public transportation system, and exploit the uniqueness that can be found through Louisville’s low cost of living, beautiful parks and amazing food and beverage scene.

EFFECTS OF THE MANUFACTURING INDUSTRY

Every job in manufacturing creates another 2.5 new jobs in local goods and services.

For every \$1 invested in manufacturing, another \$1.37 in additional value is created in other sectors.



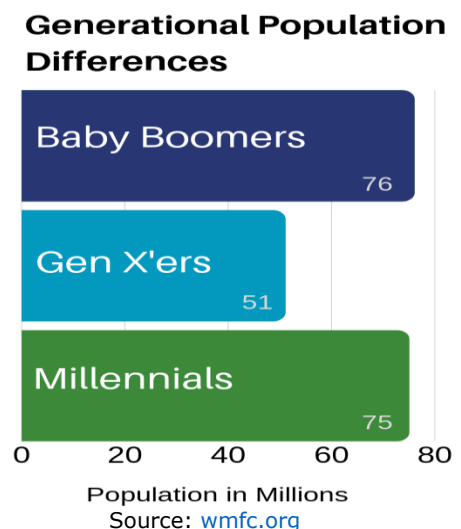
To Begin

Due to the city's location on the Ohio River and large population, Louisville has become a significant center for manufacturing. In 2017, Forbes named Louisville the #1 "American Boomtown for Manufacturing". Regional companies like GE, Louisville Slugger, and Ford are headquartered in the city because of its strategic location, abundance of water, government support, low cost of doing business, and skilled workforce.

The labor gap in the workforce and emigration of skilled individuals, an issue known as "brain drain", are leaving Louisville's manufacturing industry with a labor shortage. Implementing manufacturing training programs in Louisville and building a more advanced transportation system will increase the number of incoming workers retained in Louisville's manufacturing industry after graduation. Promoting the city's low cost of living and unique leisure activities will give these workers incentives to staying in Louisville.

The Problem

The first contributor to the manufacturing labor shortage is an age and skills gap in the workforce. The retiring Baby Boomer generation will leave 2.69 million jobs unfilled by 2028. The millennial generation is equal in size to the Baby Boomers and could fill the opening jobs. But the generation between Baby Boomers and Millennials is smaller by 25 million, creating a gap in the workforce. Many young professionals lack skills such as problem-solving and critical thinking. The manufacturing industry is advancing technologically, but employees are deficient in the skills needed to use this technology, causing a disconnect between the technology in use and the ability to implement it.



The second issue is the emigration of skilled workers out of Louisville to "up and coming" cities such as Denver, Austin, and Nashville. Since 2010, population growth in Louisville has declined due partially to young graduates' appeal to STEM jobs for companies like Apple, IBM, and Oracle.

The Solution

With the growing number of manufacturing-related jobs in Louisville, local high schools should implement programs to get high school students interested and involved in manufacturing careers. This could help close the skills gap and retain the incoming workforce in Louisville’s manufacturing industry.

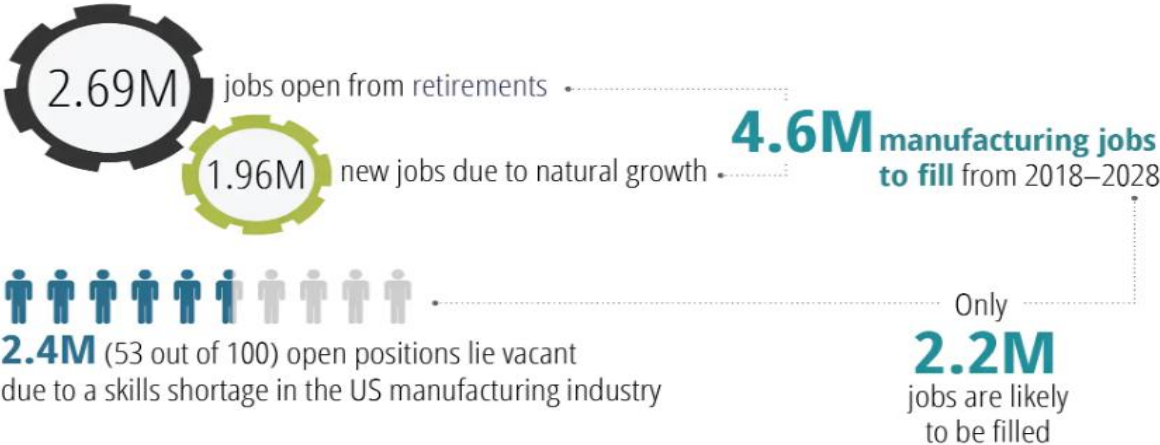
One appeal of up and coming cities, such as Denver, is an efficient public transportation system like a monorail or subway. Louisville lacks an advanced green transportation system. A better transportation system should be built to offer employees an affordable way to get to work while helping reduce pollution in the city. This move towards green transportation will help keep environment conscious workers in Louisville.

Louisville has unique activities to offer young people in the city. It is home to part of the Kentucky Bourbon Trail and local breweries. There are several parks offering a variety of outdoors activities, and there are ski resorts a short drive away. Louisville should promote these activities to young adults, as these are some of the things that draw them to other cities.

Louisville has the advantage against up and coming cities when it comes to cost of living. It is one of the most affordable metropolitan cities in the U.S. for Millennials. Louisville should use this as marketing towards students about to graduate and enter the workforce, educating them on the affordability of Louisville compared to competing cities.

The Labor Gap

While most manufactures expect jobs to grow, they are currently facing with one of the tightest labor markets in recent history. The number of open jobs exceeds the number of people looking for work. This labor gap has been an ongoing challenge in recent years, [reports Deloitte](#). Baby Boomers are retiring and the young workers who can do their jobs aren’t entering the workforce at a sufficient rate. The skills gap may leave an estimated 2.4 million positions unfilled between 2018 and 2028.



The Age Gap: A Retiring Workforce

The manufacturing industry is feeling the labor shortage as nearly 10,000 Baby Boomers reach retirement each day, and it's only going to continue. Only 80% of the more than 76 million Baby Boomers, are currently still in the labor workforce. That number is expected to drop to 40% by 2022. The 2.69 million job openings resulting from retirement will contribute to an estimated 4.6 million manufacturing jobs to fill from 2018 to 2028, only 1.96 million will be from natural growth of the industry. Baby Boomer retirements complete the top three causes of today's skills shortages, [according to manufacturing executives](#). The top contributor to the labor shortage changed from a retiring generation in 2015 to a "shifting skill set due to the introduction of new advanced technology and automation," in 2018.

The Skills Gap: A Skills Deficient Workforce

Other than jobs being left by the retiring Baby Boomers, the other contributing factor to the labor gap in the Louisville manufacturing industry is the growing skills gap. The shortage of skills in the workforce negatively affect manufacturing's production growth, productivity, and ability to expand globally.

The Widening Skill Gap

It has been reported that high school graduates lack a proficiency in math and science. However, in [The Manufacturing Institute and Deloitte's third Skills Gap study](#), it was reported that executives found young professionals also lacked skills in problem-solving, basic technical training, and teamwork.

Freshmen and seniors at about 200 colleges in the U.S. take the College Learning Assessment

Plus, or CLA+ every year to measure how their critical thinking skills improve while in college. "At least a third of seniors were unable to make a cohesive argument, assess the quality of evidence in a document or interpret data in a table", [The Wall Street Journal](#) found from the exam results between 2013 and 2016. Despite the acceptance of technology at a younger age among younger generations, 70% of manufacturing executives find their employees are deficient in technology skills.

Skills in which manufacturing employees are most deficient



Note: Percentage indicates the percentage of executives who did not opt for "Extremely sufficient" or "Sufficient"
Source: [Deloitte and Manufacturing Institute Skills Gap Study](#)

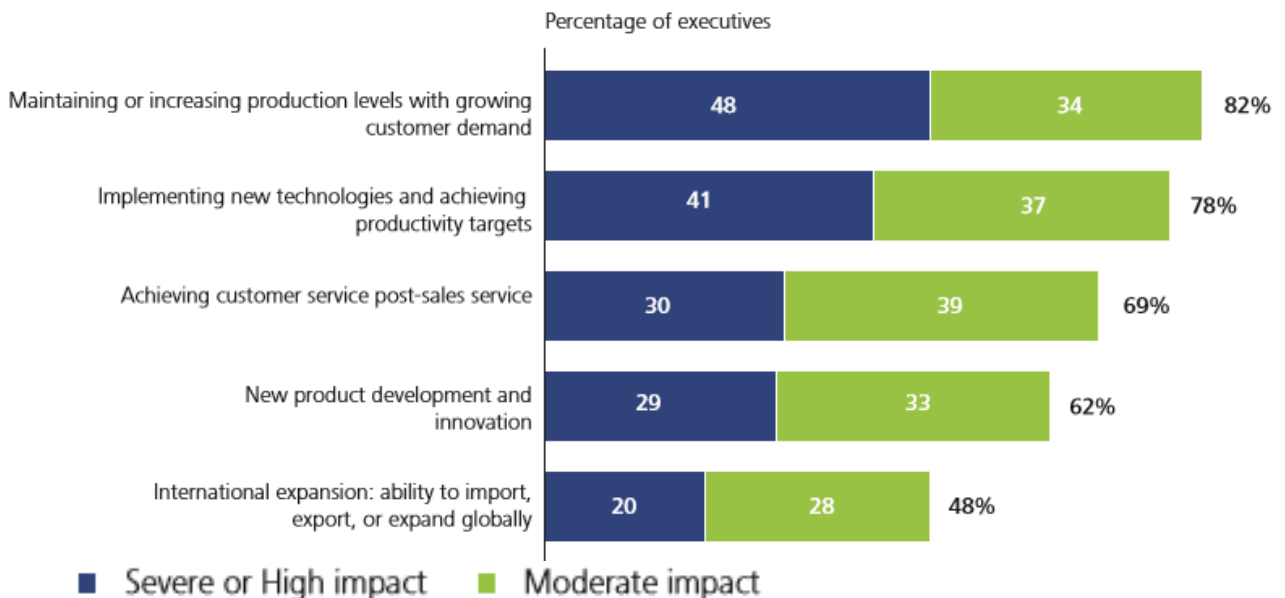
The Effects of Deficiency

The skills gap is apparent here because manufacturing is increasingly becoming dependent on technology as it automates processes and improves efficiency. The industry requires employees that can implement and troubleshoot these technologies. [Vijay Gurbaxani, professor of business and computer science at the University of California, stated that](#) "the chief competitive resource that we all have today is know-how". [Ben Fried, CIO of Google Inc. agreed, saying](#) "there is an enormous gap" between the available capabilities and the skills required to make them work. This lack of "know-how" negatively affects manufacturing's production growth according to 82% of executives surveyed. Another 78% believe that it negatively affects productivity, while 20% believe it severely impacts a manufacturing company's ability to expand globally.

" The chief competitive resource that we all have today is know-how "

Vijay Gurbaxani
University of California

Which business areas will be affected most due to skills shortage?



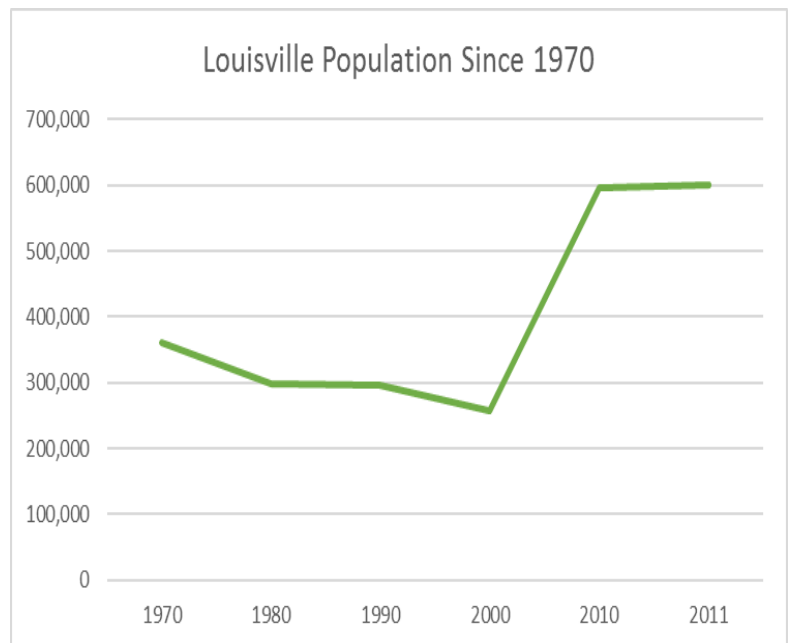
Note: "Severe impact" and "High impact" responses have been summed together.
Source: [Deloitte and Manufacturing Institute Skills Gap Study](#)

Louisville Retention Issues

Louisville has many industries for students to enter when they graduate from UofL. Food and beverage, advanced manufacturing, and the health care industry are the lifeblood of the Louisville economy. However, in the past decade we have seen waves of graduates from UofL leave for other up & coming cities like: Denver, Austin, and Nashville.

The Aging Population of Louisville

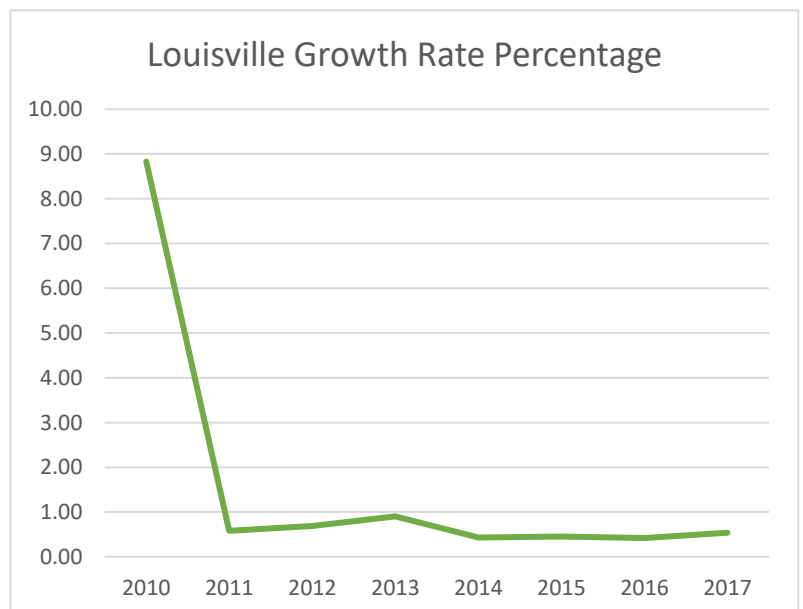
[The median age in Louisville has increased from 35.6 years old in 2000 to 37 years old in 2016.](#) While these numbers are normal for the rate of growth and population numbers that Louisville has currently, the data is misconstrued. In 2010 the city absorbed the rest of Jefferson County into its population numbers. [This is shown by the 2010 census showing an 8% increase in growth rate.](#) This addition of Jefferson County hid the fact that Louisville had been losing its population for the past 30 years.



Source: [US Census Bureau](#)

Louisville Growth Rate

The growth rate in Louisville has become stagnant in the past decade. In 2010 there was an 8% increase because of the addition of the surrounding suburbs. Since then there has been an average growth rate of 0.57%.

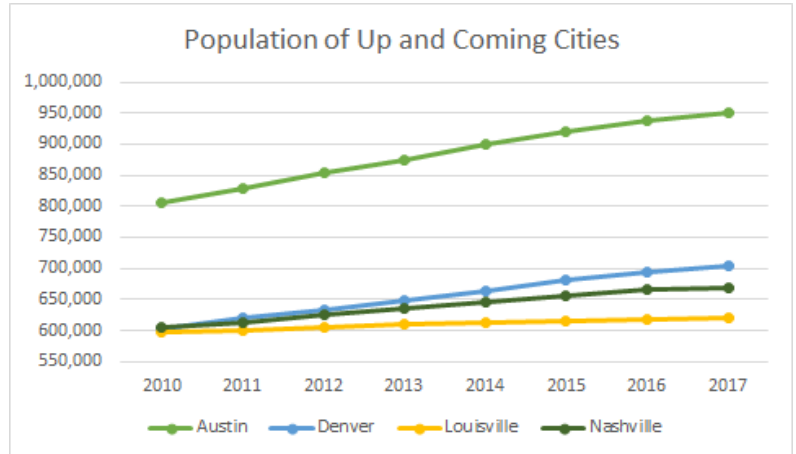


Up and Coming Cities

To understand why college graduates are leaving Louisville, it's important to understand why the cities they are moving to are up and coming.

Austin

With a population growth of 23.28% between 2010 and 2017 it's easy to see why Austin is becoming one of the largest growing cities in America. [Forbes](#) reports that since 2000 Austin has seen employment growth increase by 53%. [Forbes](#) also reported that the number of STEM jobs in the city has increased by 35% since 2001. Companies like Apple, IBM and Dell have helped Austin become the economic center of Texas.



Average Growth Rate Since 2010

Austin	Denver	Louisville	Nashville
2.34%	2.07%	1.61%	1.37%

Source: [US Census Bureau](#)

Denver

There are a few factors that contribute to Denver's 17.5% population increase since 2010. While the legalization of Marijuana has positively impacted the population growth, it's the technology industry in Denver that has driven the population up. With companies like Oracle, IBM, Lockheed Martin, and a good atmosphere for tech start-ups, Denver is a haven for graduating STEM students.

Nashville

The Nashville area has grown significantly since the turn of the century. Between 2000 and 2017 the Nashville region has seen a population increase of over 45%. While it does not have the same kind of tech environment that Denver and Austin have, Nashville has provided a lower cost of living while providing the same amenities as other large cities. The healthcare industry in Nashville provides the [highest number of jobs within the city](#).

Why these cities?

What differentiates most of these cities from Louisville is the growing tech industry. Big tech companies like Apple, IBM, and Oracle have set up offices in Denver and Austin. Louisville's economic strength stems from advanced manufacturing and the food and beverage industry not big tech.

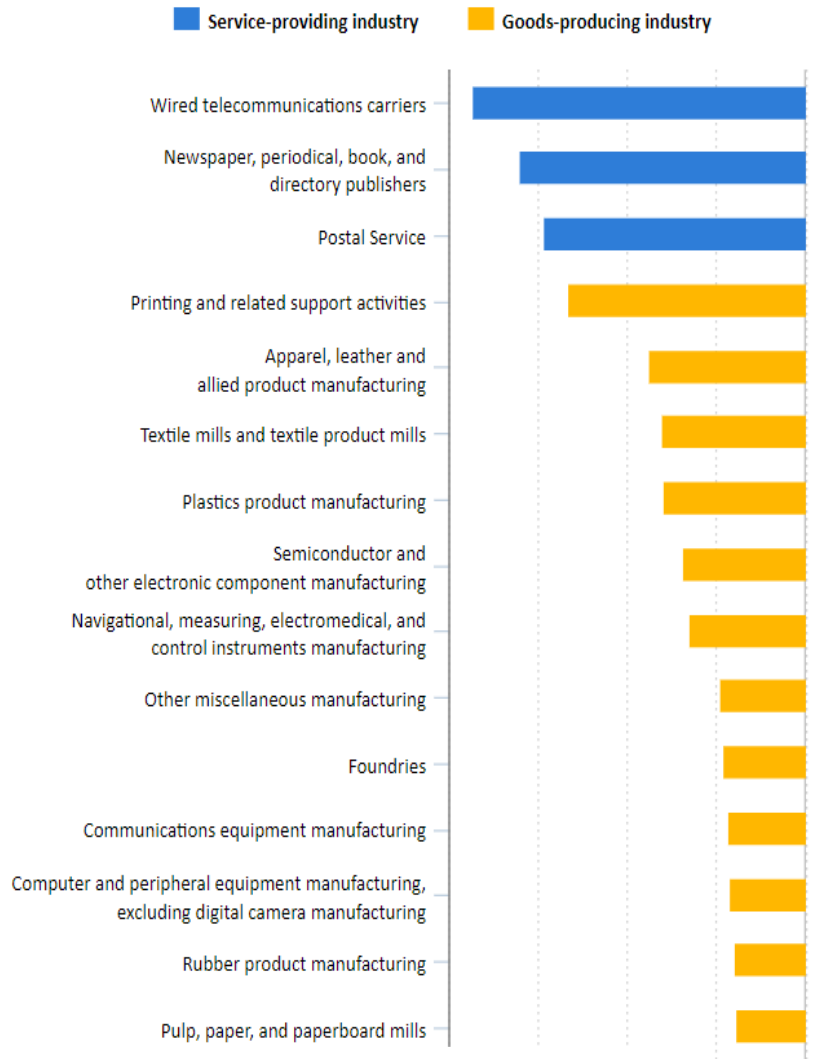
What interests graduates?

Some of the fastest growing industries in the US are all based on computer sciences: Data and IT security, gaming, and computer systems design. There is a need for jobs in both the tech and advanced manufacturing industries. However, we are seeing more graduates shying away from manufacturing because of the potential growth in the tech industry. The graph on the right shows a projection of the potential manufacturing job loss in the next decade.

Why is there no interest?

The first reason is a preconceived notion that Millennials have about the work that happens in advanced manufacturing. Many students believe that manufacturing is a dirty and dangerous job that does not have a lot of room for growth and does not provide many benefits.

The second reason perpetuates the first, there are not many programs to teach youth about advanced manufacturing. The [National Defense Industrial Association](#) reported that 75% of students in elementary and high school do not have the proper coursework to understand and succeed in the manufacturing industry.



Source: [Bureau of Labor Statistics](#)

Training Programs

Kentuckian Works

[KentuckianaWorks Foundation](#) is an organization established, in 2005, to help adults in Louisville's region to raise their educational achievement. The Foundation offers several training focuses:

- Code Louisville
- Kentucky Manufacturing Career Center
- Kentuckian Builds
- Project Case
- Kentucky Career Center



KentuckianaWorks is an opportunity to close the skills gap by creating new skilled workers from the current workforce in Louisville. The city should promote this opportunity to increase the skill level of the workforce.

Manufacturing Skills in High School

Local high schools should aim to introduce a manufacturing program in order to combat Louisville's aging and skills deficient workforce. In 2017, [Forbes magazine](#) ranked Louisville as the number one U.S. city where "manufacturing is thriving". The Louisville area has 1,600 manufacturing companies employing around 83,000 people and providing an [\\$11 billion-dollar impact on the local economy](#). Yet many manufacturing companies in Louisville report having trouble finding the skilled workers that they are looking for. One reason for the shortage of skilled workers is that public misperceptions of advanced manufacturing have led many young people entering the workforce to choose other career paths. "If we want to attract today's youth to manufacturing careers, we need to change their perceptions about what the manufacturing industry is like and show them what great career opportunities exist in the industry", states Michele Nash-Hoff of [industryweek.com](#).

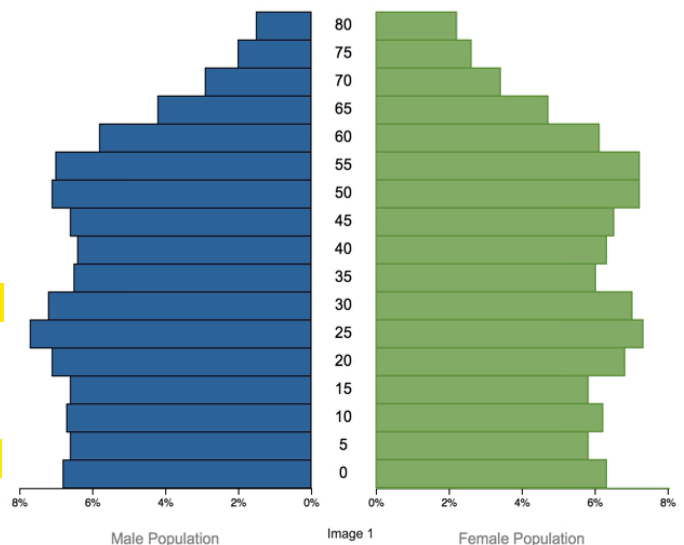
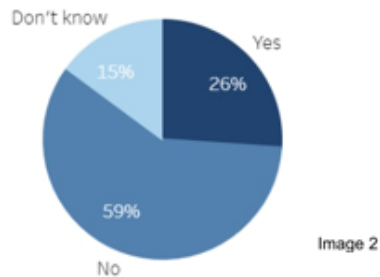


Image 1 Source: [Louisville Population Pyramid 2018](#)

Does your organization work with local education and training providers to assess local skills gaps that can be addressed through their programs?



Source: [Bridge the Talent Gap](#)

The average age for a Louisville citizen is [38.3 years old](#) (refer to image 1). As the workforce population ages many companies are going to have trouble finding the skilled workers that they need, especially in the manufacturing sector. In 2016, a local grassroots effort called Bridging the Talent Gap or BTG for short, developed a [survey](#) for certain industries in Louisville. This survey was aimed at investigating the educational skill gaps that employers are experiencing in the workplace. One question drawn from the survey (image 2), shows 74% of responding

companies either don't partner with local education and training providers or don't know if they do. This is a big issue that not only affects the manufacturing industry but many other industries in Louisville.

Louisville's manufacturing-related jobs [have grown by 30% since 2011 and the share of manufacturing jobs in the local economy is more than 12%](#). This is an indication that the manufacturing industry is continuing to grow in the region, and something should be done to prepare workers, particularly young workers, to fill the skills gap and take advantage of this growing industry.

Manufacturing Education Initiative of Louisville

One solution to help fix this issue is to develop and implement a manufacturing program.

MEIL, or the Manufacturing Education Initiative of Louisville was created to be applied in local high schools in the Louisville Metro area. The



MEIL would give manufacturers a voice in education, build student awareness of manufacturing career pathways, and provide students with 21st century manufacturing skills.

program's goal is to change the image of manufacturing and prepare Louisville's high school students for careers in advanced manufacturing. By implementing this program into local high schools in Louisville, students at the junior and senior level could be educated with relevant, hands-on knowledge and skills. MEIL would give manufacturers a voice in education, build student awareness of manufacturing career pathways, and provide students with

21st century manufacturing skills, which can lead to industry credentials. Students graduating from the MEIL program could be capable of successfully transitioning to the manufacturing workforce immediately upon high school graduation. Not to mention receiving a competitive wage and the potential to receive post-graduation secondary education scholarships (See Image 3 for Wages).

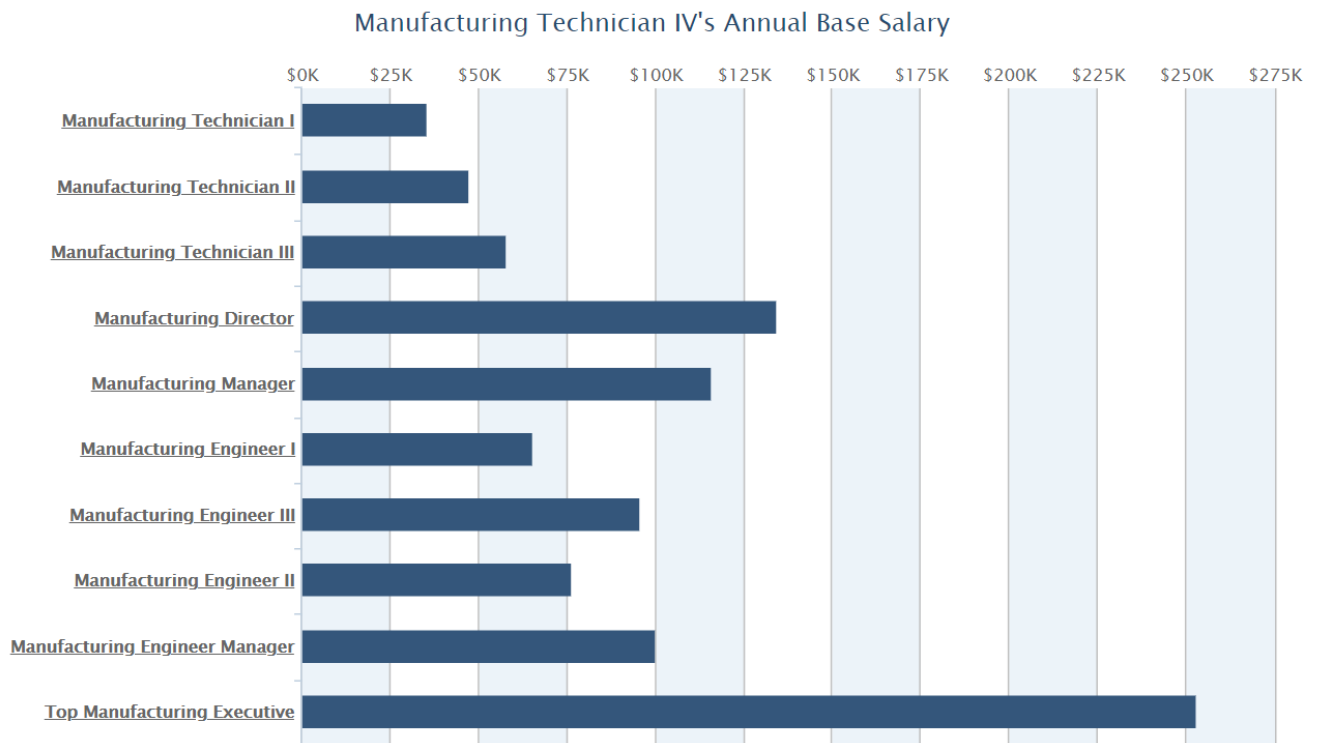


Image 3 Source: [salary.com](https://www.salary.com) & [ottomotors.com](https://www.ottomotors.com)

Programs like MEIL have been implemented into 36 different schools across 21 states, impacting more than 6,500 students annually with 70% of graduates pursuing a postsecondary education in manufacturing or engineering. A program such as MEIL could not only help combat Louisville's aging workforce but simultaneously close the skills gap in the manufacturing industry. This program needs to be brought to the attention of Louisville's Metro Council in order to begin the implementing this program into local high schools that seek participation. It is time for Louisville to act in closing the skilled labor gap due to the aging workforce by introducing MEIL. There's no better way to prepare for the future than by starting now.

Retention Methods

Green Transportation

Green transportation is a way to increase density in a city and Louisville plans to make a move on that direction, [says Louisville Mayor](#). It is hard for employees to live in Louisville without a car. Having a car is expensive considering the maintenance, gas, and insurance. In an [envirogadget.com](#) article about why green transportation is important,



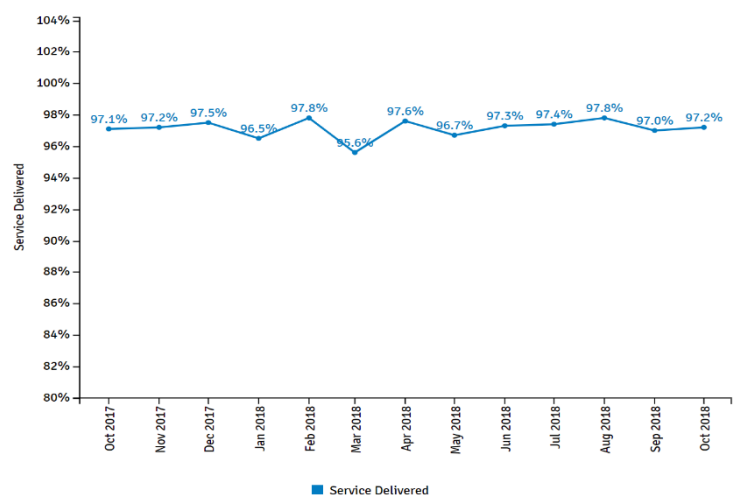
Anny writes, "Overall, the survey's findings demonstrate that encouraging alternative transportation such as carpools, providing pre-tax benefits to workers who commute using alternatives to single-occupancy vehicles, and allowing employees to telecommute all improve worker retention." Most of the manufacturing firms around Louisville are in industrial parks where there are few places of residence. One way to retain people in Louisville is to improve public transportation. For example, New York City has one of the largest public transportation systems in the US. Buses and subways allow people to traverse the city at a moment's notice. This why many people prefer to live in New York because they do not need a car to get to their work quicker and having a car over there is harder than not having it.

Improvement of TARC

TARC has a bad reputation of poor time management and lacking important destinations in Louisville. This unreliability keeps some workers from getting jobs in certain areas of the city. New York City is the largest city in the U.S., and yet it still manages to [keep above a 95% efficiency when it comes to their public transportation](#). TARC does not have the same efficiency numbers because of a lack of bus drivers. To improve transportation in Louisville we must reform TARC to be more efficient.

Service Delivered

Service Delivered measures the percentage of scheduled buses that are actually provided during peak hours.



Using the Railroad for Transportation

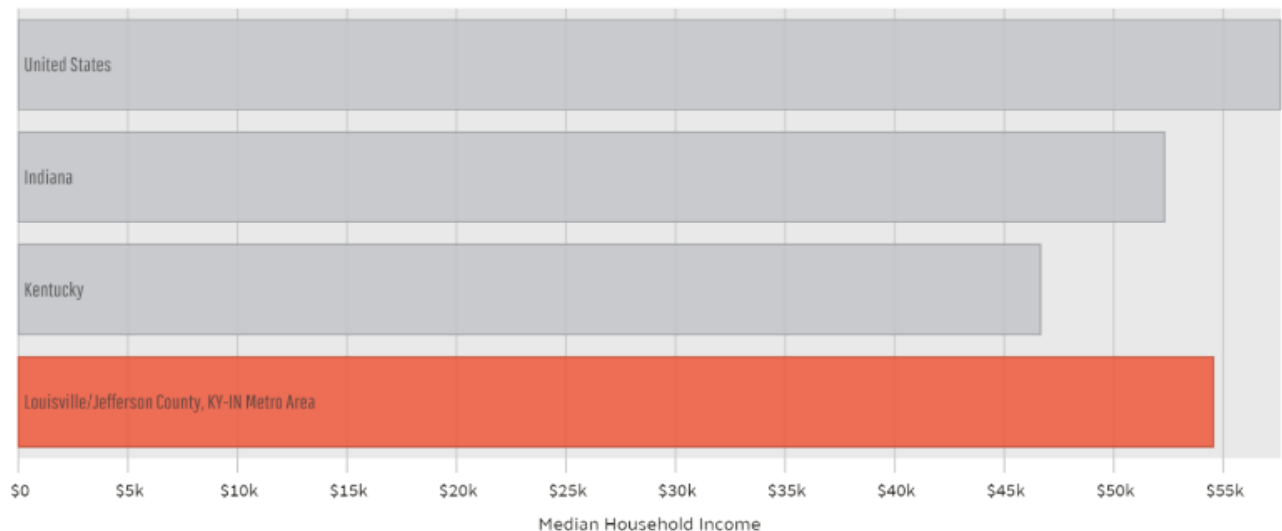
Louisville has railroad crossings all over the city that are only used for transportation of goods. Major railroad carriers like CSX use these tracks exclusively but there are opportunities to use these tracks for public transportation. The use of trains will make Louisville's public transit more efficient and it will give workers in the city an easier commute. Louisville could use the track already present or build new track specifically for public transit. Railroad transportation is the faster way to commute. The improved commute time will give employees more time to enjoy the other amenities in the Louisville area.

Offering Competitive Wages

Louisville's average household income has increased between 2013 and 2016. This improvement was possible because of the growing number of businesses in the City. Data USA found that Jefferson county has the higher median household income compared to the overall states of Kentucky and Indiana. This improvement of income can attract more workers in Louisville.

Median Household Income in Louisville/Jefferson County, Ky-in Metro Area

The closest comparable data for the metropolitan statistical area of Louisville/Jefferson County, KY-IN Metro Area is from the state of Kentucky.

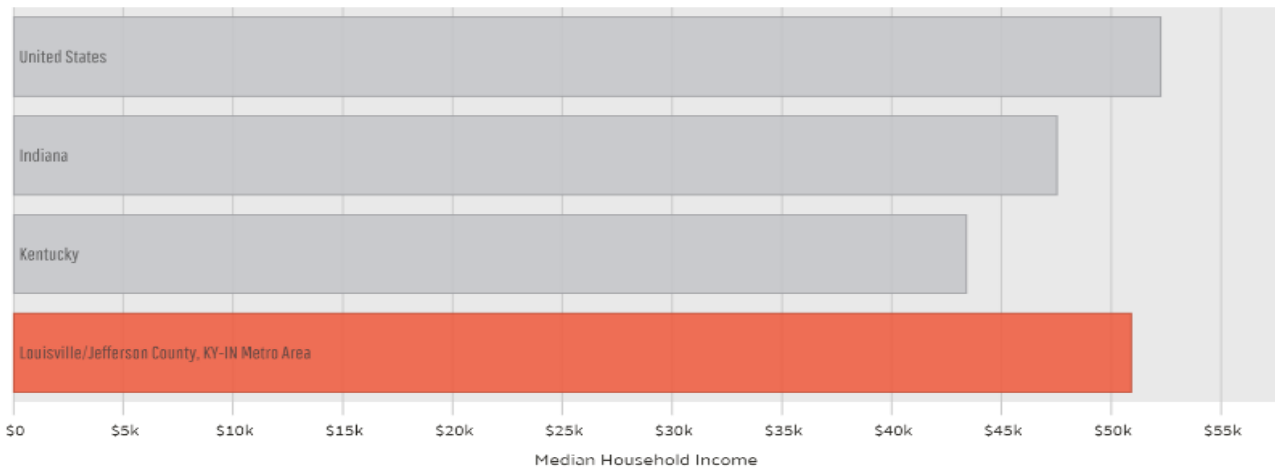


Dataset: ACS 1-year Estimate
Source: Census Bureau

DATAUSA:

Median Household Income in Louisville/Jefferson County, Ky-in Metro Area

The closest comparable data for the metropolitan statistical area of Louisville/Jefferson County, KY-IN Metro Area is from the state of Kentucky.



Dataset: ACS 1-year Estimate
Source: Census Bureau

DATAUSA:

Reduce the Pollution in the City

Louisville is ranked #21 by Business Insider in an article "[The 25 Most Dangerously Polluted Cities in the US](#)", April, 2018. The level of pollution may affect employees' choice of which cities they want to live. Louisville has many factories and heavy airline traffic, both adding pollution to the environment. James Bruggers in his 2015 article, "[Heart attack risk in Louisville air pollution](#)", in Courier-Journal wrote: "A study out of the especially sooty Salt Lake City area has linked poor air quality with deaths from an especially dangerous type of heart attack, even at pollution levels deemed acceptable by the U.S. Environmental Protection Agency." The study has implications for Louisville as it struggles with the same type of pollution. The city is working to reduce the pollution by offering no property taxes on pollution control equipment and taxes motor vehicles. This will be an incentive for young professionals who desire a green lifestyle and low taxes.

State Property Tax Rates Per \$100 Valuation, 2017

Selected Class of Property	State Rate	Local Taxation Permitted
Real Estate	\$0.1220	Yes
Manufacturing Machinery	\$0.1500	No
Pollution Control Equipment	\$0.1500	No
Inventories:		
Raw Materials	\$0.0500	No
Goods in Process	\$0.0500	No
Finished Goods	\$0.0500	Yes
Goods-In-Transit	Exempt	Limited
Motor Vehicles	\$0.4500	Yes
Other Tangible Personal Property	\$0.4500	Yes

Source: Kentucky Department of Revenue.

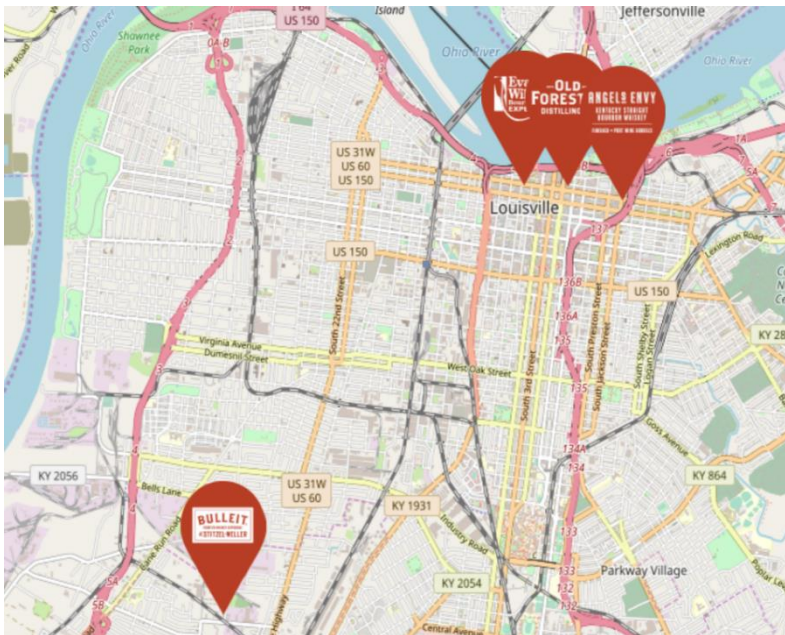
Louisville's Activities

While there are students in Louisville are acquiring degrees that could be used in the manufacturing field, many are moving to up and coming cities, Denver being number one. In his 2016 article [Denver's Appeal to Millennials? Jobs, Mountains and, Yes, Weed](#), John Hanc, writer for The New York Times, explains that young people are attracted to Denver for reasons including its unique beverage industry and access to skiing and hiking. Denver may have the mountains, but there are many activities to be done in and near Louisville that young people may not know about.

Beverage

Kentucky is famous for its bourbon, and Louisville homes four distilleries that are a part of the Kentucky Bourbon Trail:

- Bulleit
- Evan Williams
- Old Forester
- Angels Envy



The [Kentucky Bourbon Trail](#) and Louisville's unique breweries offer unique experiences. Local universities should offer courses educating students on the local bourbon and brewery industries, encouraging them to remain in Louisville by making them feel connected to the local history and culture.

Louisville is home to several unique local breweries, including:



Outdoors

Hiking and Water

Access to outdoors activities is a big appeal to young people. [Statista](#) ranks Louisville as one of the cities with the most parkland per resident. Louisville's [Parklands of Floyds Fork](#) is a system of 5 parks, offering a variety of activities such as:

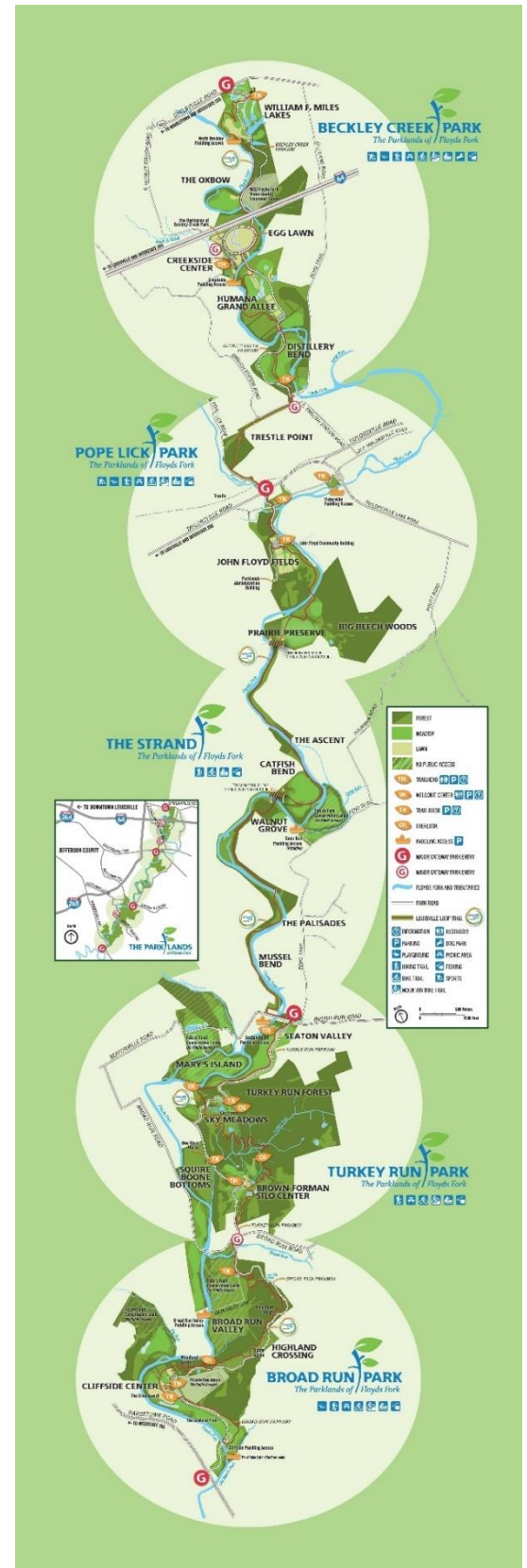
- Walking and Hiking
- Fishing
- Canoeing and Paddling
- Mountain Biking and Cycling
- Playgrounds
- Dog Parks
- Sports

70.76 Acres of Parkland per 1000 Residents

Snow Sports

Being an hour from the mountains Denver has an appealing access to snow sports such skiing and snowboarding, but Louisville is less than 80 miles from two resorts. [Paoli Peaks](#) and [Perfect North](#) offer trails for skiing, snowboarding, and snow tubing.

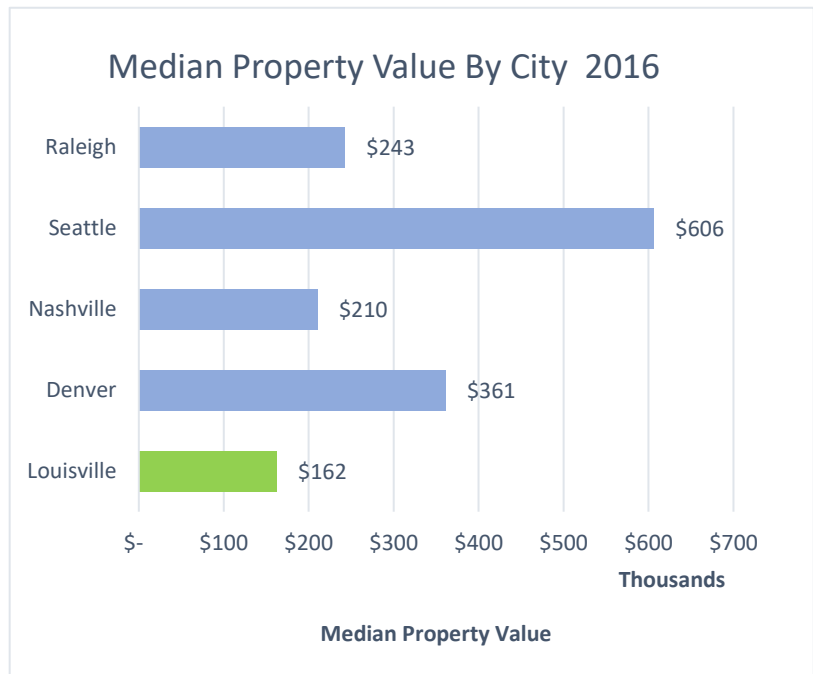
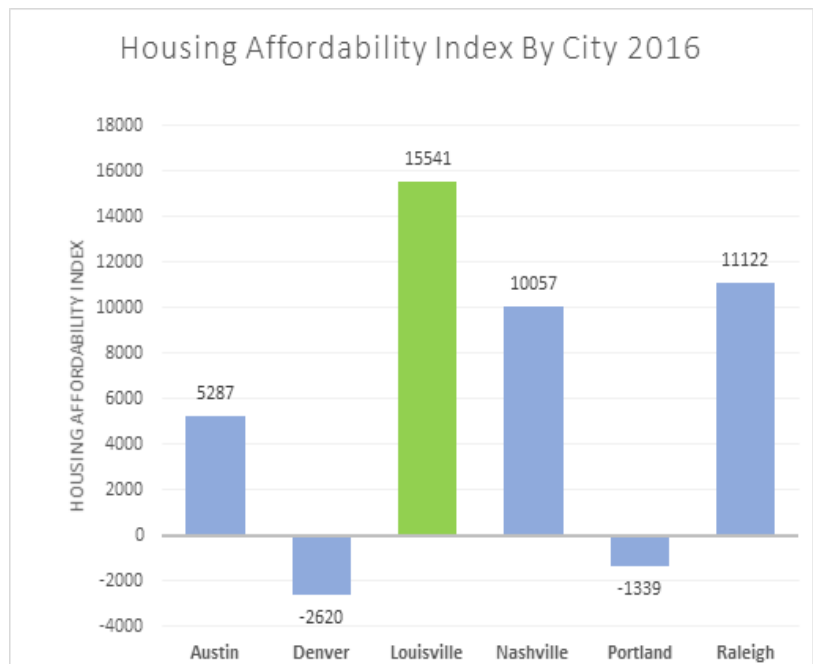
Young people do not have to leave Louisville to find the outdoor activities that they desire. We should give students and young graduates information about these options, and even offer events geared toward this age group held at places such as the local parks. If we promote young people's awareness of the outdoor activities, they have access to living in Louisville, we can retain some of these people in our city and workforce.



Louisville's Cost of Living

Up and coming cities like Denver, Nashville, Austin, Portland, and Raleigh may seem appealing to young adults, but a [Statista survey](#) shows that Louisville is one of the most affordable metro areas in the U.S. Louisville's housing affordability index is the best, at 15,541. Denver sits in the negatives, as the average millennial would need to earn \$2,620 more annually to afford a house. Statistics from [Data USA](#) show that the median property value in Louisville is significantly lower than that in other metropolitan areas, at \$162,000, opposed to Denver's \$361,000.

While students in Louisville may be obtaining degrees that could be used in the manufacturing industry, many are moving away after graduating to popular cities, particularly Denver with its 1.54% population growth rate, while Louisville has a 0.31% growth rate. Louisville is a much more affordable option for the young workforce, and we should be promoting Louisville's cost of living in order to retain some of the workforce being lost to competing cities.

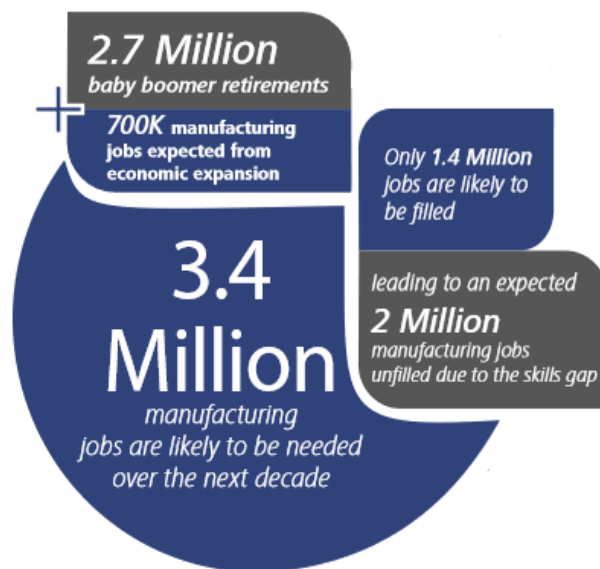


To Review

The brain drain from Louisville's workforce, created by the age and skills gap in the workforce and emigration of skilled individuals, is leaving Louisville's manufacturing industry with a labor shortage. Implementing manufacturing programs in Louisville's high schools and promoting skills training programs for the current workforce will help to fill the labor gap. Promoting the city's low cost of living, unique leisure activities, and advancement towards a greener city through an advanced transportation system will give these workers incentives to staying in Louisville, retaining more young skilled professionals in Louisville's manufacturing industry after graduation.

The Problem

As Baby Boomers retire, they expose one of the largest problems in Louisville's manufacturing industry: there are not enough young workers entering the workforce. This retiring generation is projected to leave 2.4 million positions unfilled between 2018 and 2028. The number positions left



Source: [Deloitte and Manufacturing Institute Skills Gap Study](#)

by retiring Baby Boomers is too large to fill by the skilled workers remaining in the city. The amount of skilled workers in Louisville is low because high school graduates are lacking essential manufacturing skills creating a skills gap.

Louisville's population has quickly become smaller and older in the past decade. The median age has risen from 35.6 years old to 37 years old since 2000. The growth rate has become stagnant and college graduates are leaving Louisville for up and coming cities like: Austin, Denver and Nashville. Millennials have a preconceived notion that manufacturing is a low

pay, low skill, back breaking industry, however it is a high paying industry and becoming more reliant on technology. Yet, the misconception pushes them towards the fast-growing tech companies which are in the aforementioned up and coming cities. This preconceived notion and a lack of education about manufacturing are a reason why there is a retention problem in Louisville.

The Solution

To solve the retention issue and labor gap, Louisville high schools should implement manufacturing programs within their curriculum. MEIL, Manufacturing Education Initiative of Louisville, will help change the image of manufacturing and educate high schools' students about job opportunities in advanced manufacturing. Similar programs have been implemented in 36 other states. This will give high school students hands on knowledge and skills needed in the manufacturing industry. Similar programs see about 6,500 students annually with 70% of graduates pursuing a postsecondary education in manufacturing or engineering.

Improving public transportation will also lead to a higher retention rate of college graduates and improve the living situation of workers in the city. TARC is an inefficient public transit system, with poor time management, constantly late busses, and a lack availability from their bus drivers. Reforming TARC will improve its efficiency, change public opinion about public transit, and help the city push for more green initiatives like "Move Louisville". The addition of a public train system will make it easier for workers living in the city to reach jobs that would be previously inconvenient to reach by car or bus.



Source: <https://www.ridetarc.org/>

To peak college graduate interest in Louisville the city should promote its affordability and leisure activity options. There are numerous reasons why students should live in Louisville: a low cost of living compared to the previously mentioned up and coming cities, an unrivaled food and beverage industry, and various outdoor activities for students to enjoy. These activities will help retain students once they graduate from the University of Louisville and other local universities.

Louisville should push for and fund educational reforms in high schools that will interest students in the manufacturing industry early in their careers. The city should implement a more advanced public transportation system such as a monorail. Local universities should hold activities and events in Louisville's local parks and educate students on the Louisville's unique culture. Manufacturing is the heart of the Louisville economy. Following through with these solutions will help minimize the labor gap, improve graduate retention, and give a more positive view of the manufacturing industry in Louisville.