

# The State of Manufacturing in Arizona – Policy Impact Summary

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Prepared For:



Prepared By:



Rounds Consulting Group

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## Executive Summary

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Following a decade of extensive policy reform and targeted business recruitment, Arizona's manufacturing industry has reached record levels of growth as new companies locate in the state and existing companies expand and hire additional workers. Today, manufacturing is a key sector and an essential economic driver in Arizona. For some context, the industry has been realizing the strongest job growth in over 30 years. Furthermore, there are now more manufacturing workers than there are construction workers.<sup>1</sup> Consider the additional following facts:

- *In 2019, manufacturers in Arizona produced approximately \$31.0B worth of economic output – accounting for 8.4% of the state's total GDP.*<sup>2</sup>
- *As of 2019, there were 177,300 manufacturing jobs in Arizona, equaling 6.0% of the state's total workforce.*<sup>3</sup>
- *The state's manufacturing jobs tend to be higher in wage and require highly skilled workers, producing higher levels of tax revenue for state and local government entities.*
- *Manufacturing jobs in Arizona earn an average annual salary of \$78,966, 47.6% above the statewide average earned by the total private workforce in 2019.*<sup>4</sup>

This economic strength was significantly impacted in early 2020 as COVID-19 related impacts spread to all industries. While some businesses have re-opened and some manufacturing has resumed, the business and economic shocks are still reverberating. Related issues include:

- *Employment in Arizona's manufacturing industry declined by approximately 4.6% (about 8,100 jobs) when the crisis began.*<sup>5</sup>
- *As of November 2020, the manufacturing industry in Arizona has recovered 29.6% (about 2,400 jobs) of the 8,100 lost manufacturing jobs.*<sup>6</sup>
- *Current economic conditions in the state remain favorable when compared to the rest of the country. However, public policy efforts will be required to help the industry recover the recently lost jobs and for business operations to return to normal profit levels.*

The pandemic has required business leaders and policymakers alike to rethink and reprioritize the flow of goods and services. The industry responded quickly to reorganize supply chains and delivery networks where possible, with some businesses retooling altogether to support the manufacture of essential medical equipment.

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<sup>1</sup> U.S. Bureau of Labor Statistics

<sup>2</sup> U.S. Bureau of Economic Analysis

<sup>3</sup> U.S. Bureau of Labor Statistics

<sup>4</sup> U.S. Bureau of Labor Statistics

<sup>5</sup> U.S. Bureau of Labor Statistics

<sup>6</sup> U.S. Bureau of Labor Statistics



The pandemic has created numerous unplanned challenges, such as:

- *Maintaining a workforce during extended shutdowns.*
- *Unlike some states, Arizona has not faced multiple or extended business closures. However, not all workers are able to return, particularly with the extended closure of schools and daycare facilities. This has an outsized impact on women.*
- *Apart from the widescale implementation of extensive health and safety protocols, many businesses have relied upon extensive retrofitting and installation of additional protective barriers.*
- *Businesses have also been impacted by other new costs for personal protection equipment, training and medical testing to safeguard employees.*

While the COVID-19 pandemic continues at the time of this publication, with significant impacts to the health sector and loss of lives, extensive research and development efforts by U.S. pharmaceutical companies have led to the approval and initial distribution of two vaccines. The prospect of mitigating the virus will allow the state's manufacturing sector to begin to turn its attention to recovery in 2021 and prosperity in 2022 and beyond. However, the work is never done. Consider the fact that the pandemic has also exposed other critical issues worth examining, including:

- *The reliance by the manufacturing industry on international supply chains.*
- *The role of public/private partnerships in emergency resource management.*
- *Maintaining a sufficient stockpile of goods, including healthcare and national security products.*
- *The growing demands to onshore more manufacturing.*

With the aforementioned information in mind, this report provides a high-level policy and "SWOT" analysis (Strengths, Weaknesses, Opportunities, and Threats) related to Arizona's manufacturing industry. This will be a critical part of policy planning in 2021 and 2022 as the economy moves out of the COVID-19 recession and into the remainder of the decade. The analysis includes the following items:

- *Estimates of the economic numbers related to the state's manufacturing industry.*
- *A brief review of occupational areas that may require special policy consideration.*
- *Context related to the new jobs and additional tax revenues generated with industry support and enhancement.*

A new concept is introduced in addition to the general estimates for industry-related economic and fiscal impacts: "The Opportunity Index." The index is a combination of: a) longer-term benefits from maintaining and expanding manufacturing in the state's current core areas, and b) improving wages and job counts in manufacturing occupations that are currently smaller in the number of employees but have exceptional wage enhancement opportunities.

The purpose of identifying the potential for economic gains is to estimate the related fiscal benefits that will be realized. This directly allows for a return on investment (ROI) calculation when compared to various policy ideas that may come with a cost to the state. Government entities need to incorporate more business concepts, like making investment decisions based on ROI, into their decision-making process.

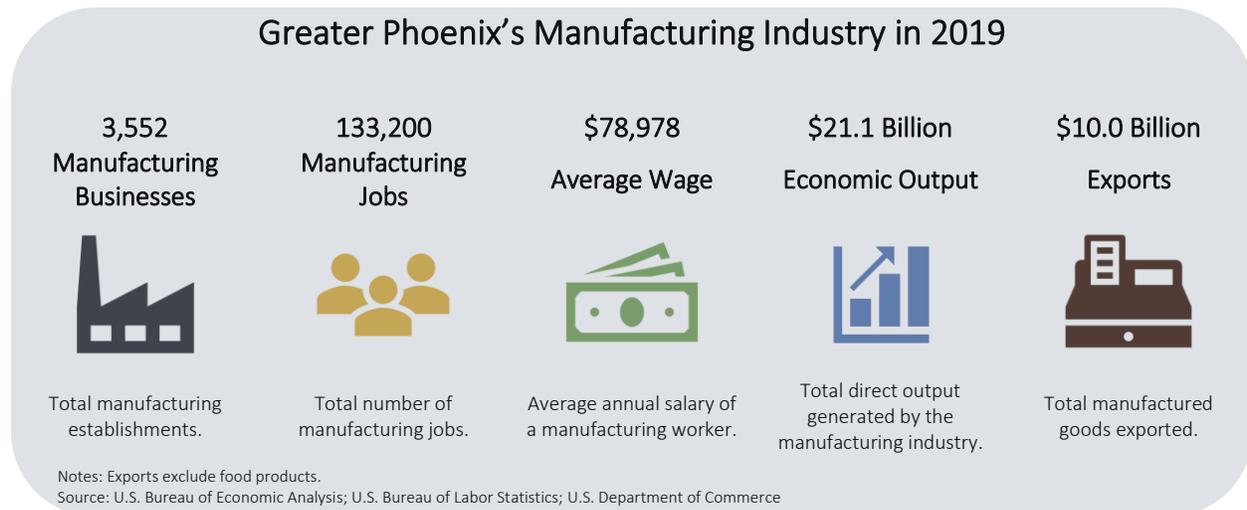
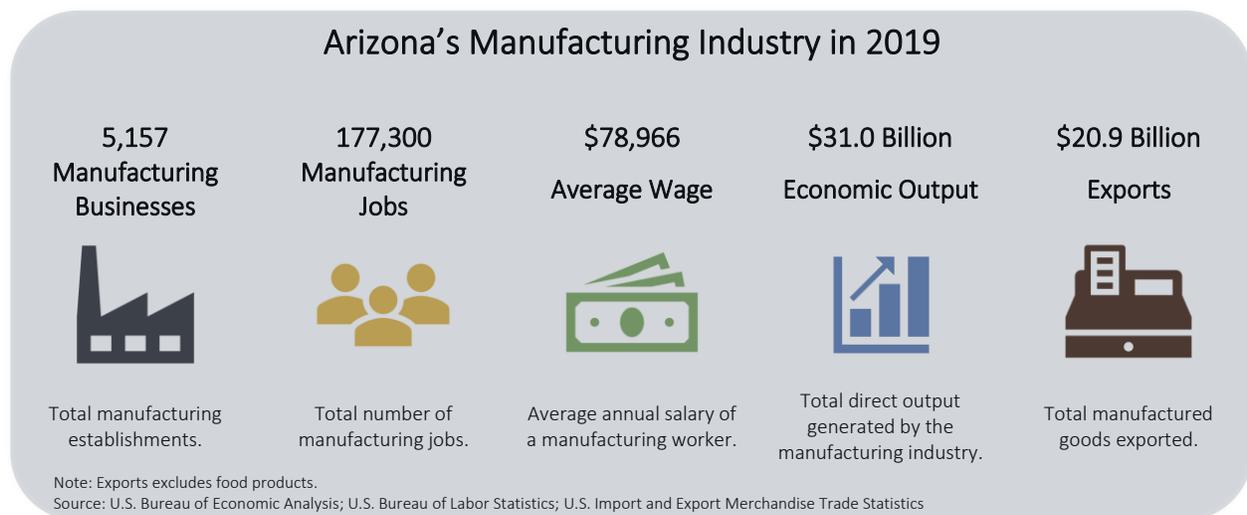
Finally, this brief analysis concludes with a series of recommended "next steps" to identify, with more specificity, where policy enhancements will yield the best return for state taxpayers.



# Arizona Manufacturing: A Key Economic Driver

Manufacturing has a large footprint on Arizona's economy and, as a base sector industry, it plays a vital role in supporting local economic activity and jobs in every other industry. A base sector industry is an export industry that depends on external demand for products and services and generates sales by exporting to consumers outside of the local area. This injects new monies into the local economy and allows it to operate more efficiently.

Manufacturers in Arizona exported approximately \$20.9B worth of goods in 2019.<sup>7</sup> The inflow of monies generated by these exports had a significant impact on the health of the state's economy. A robust manufacturing sector also helps the state and local regions be more resilient to downturns as the economic base becomes more diversified with high wage job development. Summary data for both the state-as-a-whole and the Greater Phoenix region is displayed below.



<sup>7</sup> U.S. Census Bureau, U.S. Import and Export Merchandise Trade Statistics.



## Manufacturing Trends

Over the last decade, following the economic fallout of the 2008 Great Recession, manufacturing in Arizona has experienced strong growth. Exports increased by 51.5% between 2010 and 2019 in Arizona.<sup>8</sup> Manufacturing output (the total value of goods produced) in the state increased 39.6% over the last decade.<sup>9</sup> In Arizona, the manufacturing industry added 28,000 new jobs, a 18.7% increase, between 2010 and 2019.<sup>10</sup>

In 2019, manufacturing output in the state increased approximately 6.5% to \$31.0B from \$29.1B in 2018.<sup>11</sup> Arizona's manufacturing exports were up 7.1% and the manufacturing industry added 5,900 new manufacturing jobs (3.4%) in 2019 from 2018.<sup>12</sup> However, in the first quarter of 2020, the world's economy came to a near complete halt in an effort to mitigate the spread of the coronavirus.

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*The state's growth was not by accident. Arizona's response to the Great Recession was to enact a series of policy changes that would help reposition the economy and recover jobs while restoring fiscal stability.*

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Key economic and public policy activities included:

- *Placing a moratorium on new regulations.*
- *Implementing a multi-year effort to reform the tax structure to encourage direct capital investment.*
- *Retooling the state's economic development programs.*
- *Workforce investment, with a focus on increasing educational attainment after high school.*

In particular, Arizona lowered its corporate income tax rate from an uncompetitive 6.968%. Now at 4.9%, Arizona's corporate tax rate remains one of the most competitive in the nation. In addition, the state enacted a multi-year reduction in business property taxes to encourage investment. Residential property taxes also remain low in Arizona compared to other competitor states in the region, which helps with business attraction.

Other policy changes included lowering taxes on income earned from export products. More recent changes include the exemption of electricity from TPT (sales) taxes. Arizona also reset its economic development strategy, starting with the replacement of an outmoded and overburdened Arizona Department of Commerce with a more modern Arizona Commerce Authority, complete with private sector leadership and updated policy tools.

Furthermore, the state made significant enhancements to the R&D tax credit, allowing companies conducting qualified research and development in conjunction with public universities to take advantage

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<sup>8</sup> U.S. Census Bureau

<sup>9</sup> U.S. Bureau of Economic Analysis

<sup>10</sup> U.S. Bureau of Labor Statistics

<sup>11</sup> U.S. Bureau of Economic Analysis

<sup>12</sup> U.S. Census Bureau; U.S. Bureau of Labor Statistics



of one of the most competitive tax credits in the nation. The state's Qualified Facility Tax Credit program was created to benefit manufacturers investing and creating jobs in Arizona. The state also maintained its Angel Investment tax credit program, especially important to startups, and has worked to grow its in-state venture capital network.

At the same time, Arizona enacted a series of education reforms to enhance the skills of residents and grow the availability of skilled workers while setting higher expectations for results. Of note, the state authorized nearly \$1B additional bonding capacity for state universities to enhance their research infrastructure and attract new research leaders.

The state also raised academic standards, launched a statewide attainment goal to encourage students to continue their education past high school, and has directed dollars to reward high performing schools. When all is combined, Arizona manufacturers currently enjoy:

- *75% reduction in real and personal property taxes for Arizona Foreign Trade Zone users.*
- *Refundable tax credits for manufacturers creating jobs and investing in Arizona.*
- *100% sales factor that reduces corporate tax liability for high wage and fiscal benefit exporters.*
- *One of the nation's most competitive R&D tax credits.*
- *Rapid expansion of university research infrastructure.*
- *Stable state funding for Arizona's K-12 students*
- *Robust career and technical education (CTE) programs and workforce system-industry collaboration.*
- *Additional depreciation, reducing the taxable value of an asset.*
- *TPT exemptions (sales tax) on purchases of manufacturing machinery, equipment and electricity used in the manufacturing process.*

At the federal level, the passage of the 2020 United States-Mexico-Canada Agreement (USMCA) presents new opportunities for Arizona manufacturing.

## Prop 208 and the Threat to State Competitiveness

Arizona is facing a new threat with the recent passage of Proposition 208 (Prop 208). Approved by Arizona voters in the 2020 general election, Prop 208 increases income taxes on individuals with incomes over \$250,000, including small business owners who often reinvest their profits to help with future expansion. This should be of particular concern to manufacturers whose supply chains include small businesses. The measure reverses a multi-year effort to reduce individual income tax rates and runs counter to the federal priorities to reduce taxes and encourage American competitiveness per the landmark 2017 tax relief package.

Furthermore, the COVID-19 pandemic has encouraged more workers to work remotely, and this new measure will make it difficult to domicile high wage earners who can reside elsewhere. The full impact of Prop 208 on businesses and their corporate structures is yet to be seen, but companies have already announced their intentions to locate outside of Arizona as a result of its passage. Policymakers will be wise to review the state's competitive position in light of this development to determine how to ensure Arizona remains an attractive option for additional business investment and high wage earners.



To expedite our recovery post-COVID, Arizona policymakers must maintain a focus on encouraging higher wage job creation and improving education and public sector efficiency. This ensures that the state’s economy continues to grow and diversify, and remains competitive within the region.

## COVID-19 Impacts on a Vital Industry

The COVID-19 pandemic has indeed impacted the manufacturing industry. The full or partial manufacturing plant closures have caused economic disruptions such as supply chain “bottlenecks,” layoffs, and manufactured goods shortages. According to a survey conducted by the National Association of Manufacturers, approximately 80% of manufacturers expect that the COVID-19 outbreak will have a financial impact on their businesses.<sup>13</sup> The same survey found that approximately 53% of manufacturers expect operational changes and 36% face supply chain disruptions.

Uncertainty surrounding the duration and extent of the COVID-19 pandemic makes it challenging to predict how a recovery could unfold in the manufacturing industry. The supply chain disruptions, decline in demand, and revenue shortfalls resulting from the pandemic could shutter many manufacturing businesses. Targeted federal and local government assistance should be considered to help mitigate the negative impacts and strengthen the manufacturing industry’s ability to recover in Arizona.

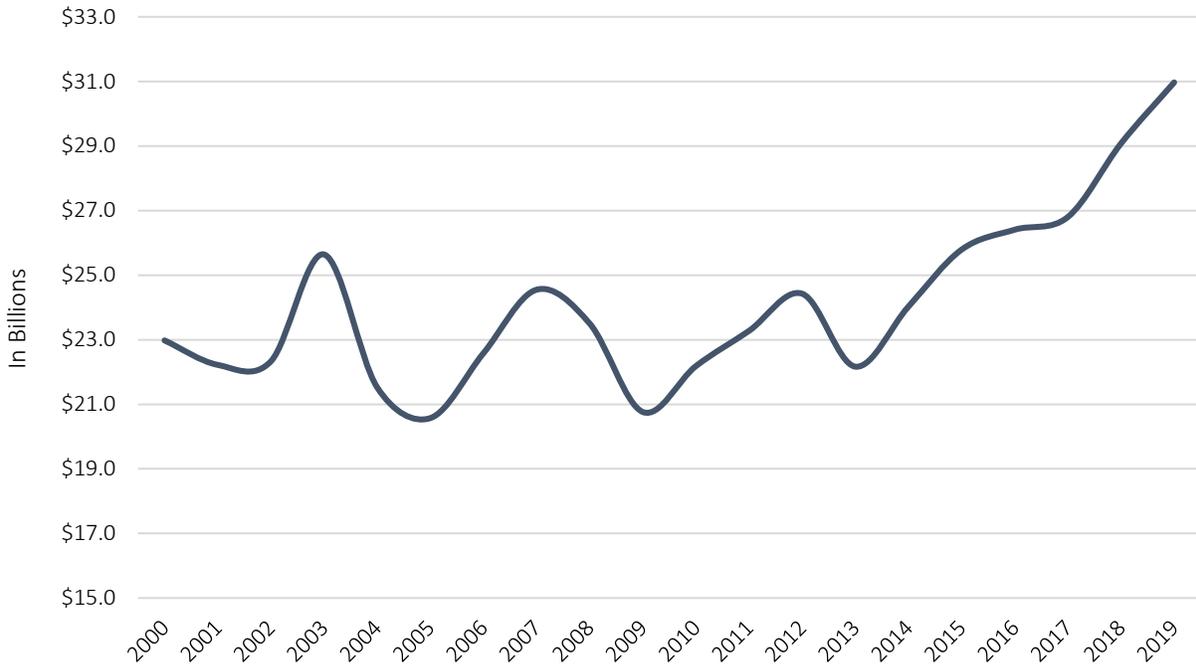


Source: U.S. Census Bureau

<sup>13</sup> <https://www.nam.org/coronasurvey/>

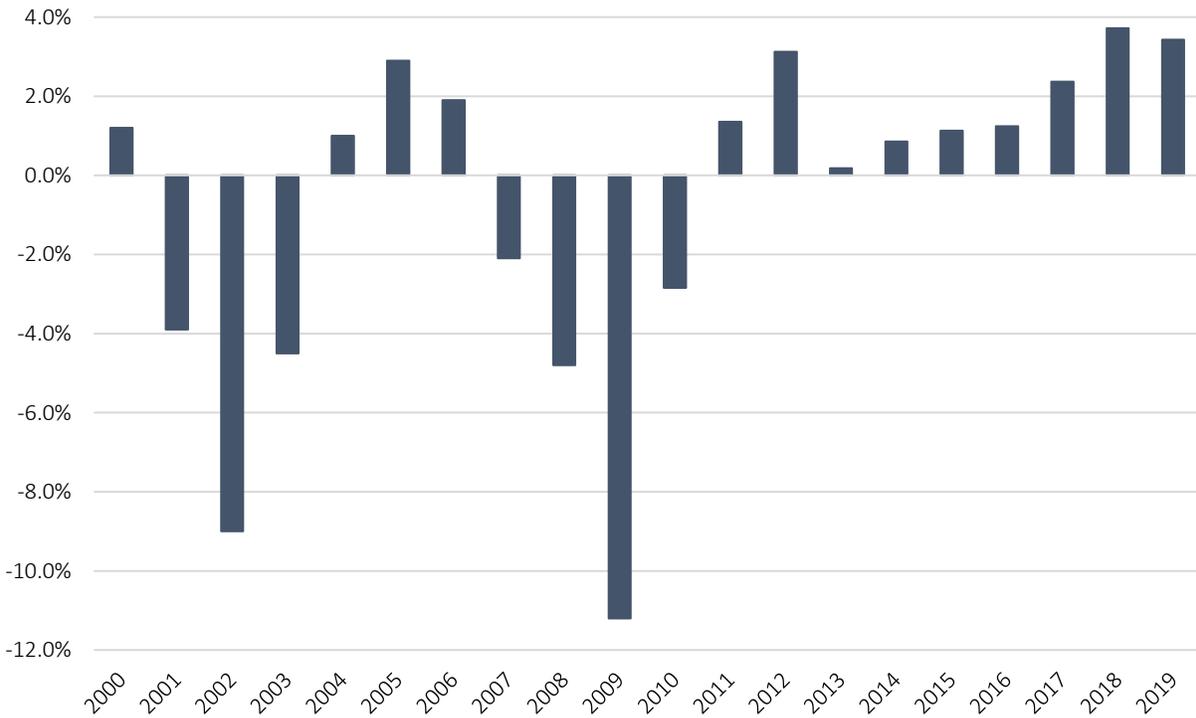


### Arizona Manufacturing Output



Source: U.S. Bureau of Economic Analysis

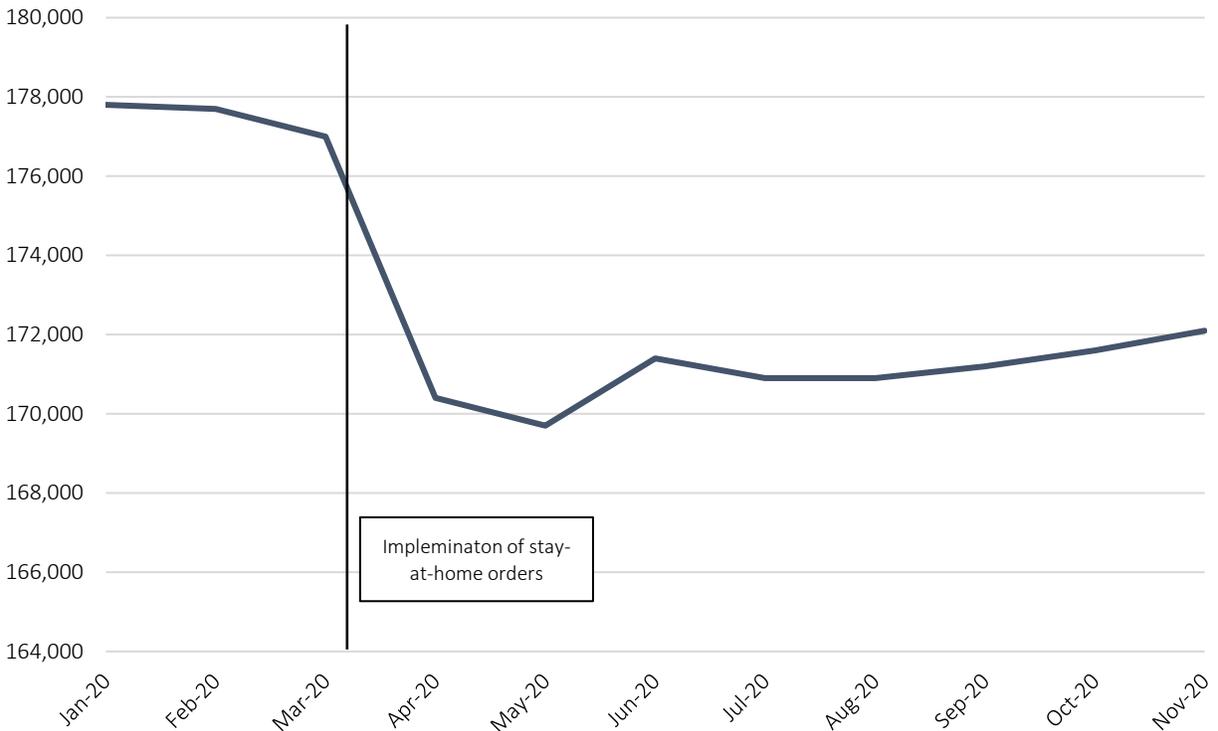
### Manufacturing Employment Growth in Arizona



Source: U.S. Bureau of Labor Statistics



Manufacturing Employment in Arizona - 2020



Source: U.S. Bureau of Labor Statistics

## Manufacturing’s Economic Reach

As noted, the manufacturing industry in Arizona generated \$31.0B in economic output in 2019.<sup>14</sup> However, that does not fully capture manufacturing’s role in the local economy. Manufacturing is one of the industries that generates significant economic activity well beyond primary manufacturing operations. For example, for every dollar of manufacturing value that is added, another \$3.60 of value-add is generated elsewhere in the local economy.<sup>15</sup>

Furthermore, for every job created by manufacturers, another 1.5 to 3.5 jobs (or more) are created in the local economy.<sup>16</sup> These jobs are created in supplier industries as well as in every other industry as a result of the “multiplier effect.”

The basis for multiplier effects is the interdependencies between industries, how one industry impacts other sectors, and the ripple effect resulting from the cycle of spending and re-spending within the regional economy. This increased demand in supplier industries and increased demand in the other industries supported by spending generates additional (secondary) jobs.

<sup>14</sup> According to the U.S. Bureau of Economic Analysis

<sup>15</sup> The Manufacturers Alliance for Productivity and Innovation Foundation

<sup>16</sup> IMPLAN



For perspective, an economic and fiscal impact model (model methodology summarized in the Appendix) was used to estimate the secondary jobs that are created for every 1,000 direct manufacturing jobs in the computer and electrical product manufacturing industry. In this example, each 1,000 direct manufacturing jobs creates another 1,542 secondary jobs in every other industry (for a total of 2,542 jobs).

The following table displays these secondary jobs by industry. This example produces an employment multiplier of 2.54 (the sum of the initial manufacturing job plus the additional 1.54 jobs that each manufacturing job creates).

Case Study: Jobs Created for Every 1,000 Manufacturing Jobs in Select Sub-Industries	
Industry	Number of Jobs
Total – Direct Jobs	1,000
Manufacturing	1,000
Total – Secondary Jobs	1,542
Agriculture, forestry, fishing and hunting	117
Mining, quarrying, and oil and gas extraction	35
Utilities	3
Construction	22
Manufacturing	398
Wholesale trade	10
Retail trade	185
Transportation and warehousing	111
Information	90
Finance and insurance	46
Real estate and rental and leasing	17
Professional, scientific, and technical services	20
Management of companies and enterprises	13
Admin. support and waste management and remediation services	46
Educational services	30
Health care and social assistance	122
Arts, entertainment, and recreation	77
Accommodation and food services	74
Other services	110
Public administration	15
Total – Direct & Secondary Jobs Created	2,542

Note: May not sum to total due to rounding.

Source: IMPLAN; Rounds Consulting Group, Inc.

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*As wages increase and more local suppliers are utilized, the multiplier value increases. High wage, local input driven manufacturing operations can realize employment multipliers in excess of 4.0.*

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## Sector Focus and Advancing the Industry

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While Arizona maintains a strong manufacturing presence, there exists room to enhance future growth. Identifying and understanding areas of improvement is crucial in guiding targeted development efforts and determining how resources should be allocated.

The following section examines several areas in which the manufacturing sector in Arizona could improve. These include advancing workforce productivity and raising wages relative to other metro areas that are considered competitors with the Phoenix Metro Area (Phoenix MSA), as well as adjusting public policies that can hinder future manufacturing development.

### Select Opportunities

Arizona and the Phoenix MSA are among national leaders in population, employment, and income growth.<sup>17</sup> Numerous factors have contributed to this growth. These include a competitive cost of living relative to other metro areas, quality educational systems, employment opportunities, a temperate climate, and a pro-business political environment compared to other areas, among many other factors.

These factors present advantages for conducting business in Arizona and, as a result, economic growth has extended to all parts of the economy. However, by themselves, these advantages can only support economic growth to a certain level and are not sufficient to sustain *quality* economic growth.

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*Arizona has reached the point in which focus should be shifted from how much the Arizona economy is growing to how well the Arizona economy is growing.*

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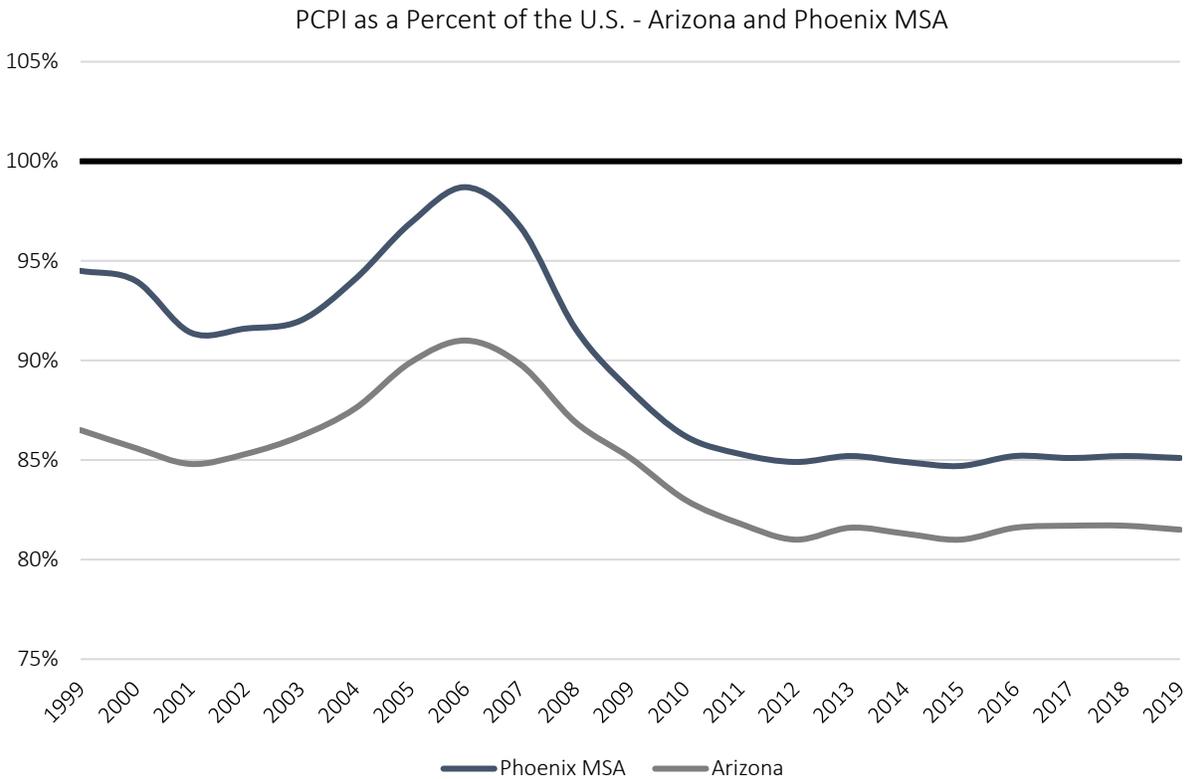
One of the best approaches to calculate quality growth is to tabulate per capita personal income (PCPI) for a state or region and compare the statistic to that of the U.S. If the number is moving up over time (as a percent of the U.S.), then the local economy is improving in relative terms. If the statistic is declining, then the local economy is lagging.

As of 2019, PCPI as a percent of the nation in the Phoenix MSA is at 85.1% while PCPI for Arizona is at 81.5% (see chart below). The critical indicator is the performance of PCPI levels over time. PCPI as a percent of the U.S. declined in 2011 and has remained stagnant.

While this may be considered a negative finding, Arizona and the Phoenix MSA's performance in other key economic categories indicates a stable economic base that has all the pieces needed for strong future growth.

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<sup>17</sup> U.S. Census Bureau; U.S. Bureau of Labor Statistics; U.S. Bureau of Economic Analysis



Source: U.S. Bureau of Economic Analysis

While Arizona is already well-positioned in manufacturing and has strong growth potential, there are areas that need to be addressed for Arizona's manufacturing industry to remain competitive. One of these areas is the performance of the wages within the manufacturing industry. Compared to other metro areas, and adjusted for cost of living, manufacturing wages in the Phoenix MSA are lagging behind those in competitor metros.

As one example, the chart below displays the average annual wage levels in the manufacturing industry for the Phoenix MSA as well as select competitor metro areas, adjusted for the cost of living. Wages in the Phoenix MSA have underperformed the Denver or Dallas MSAs over the last 15 years.

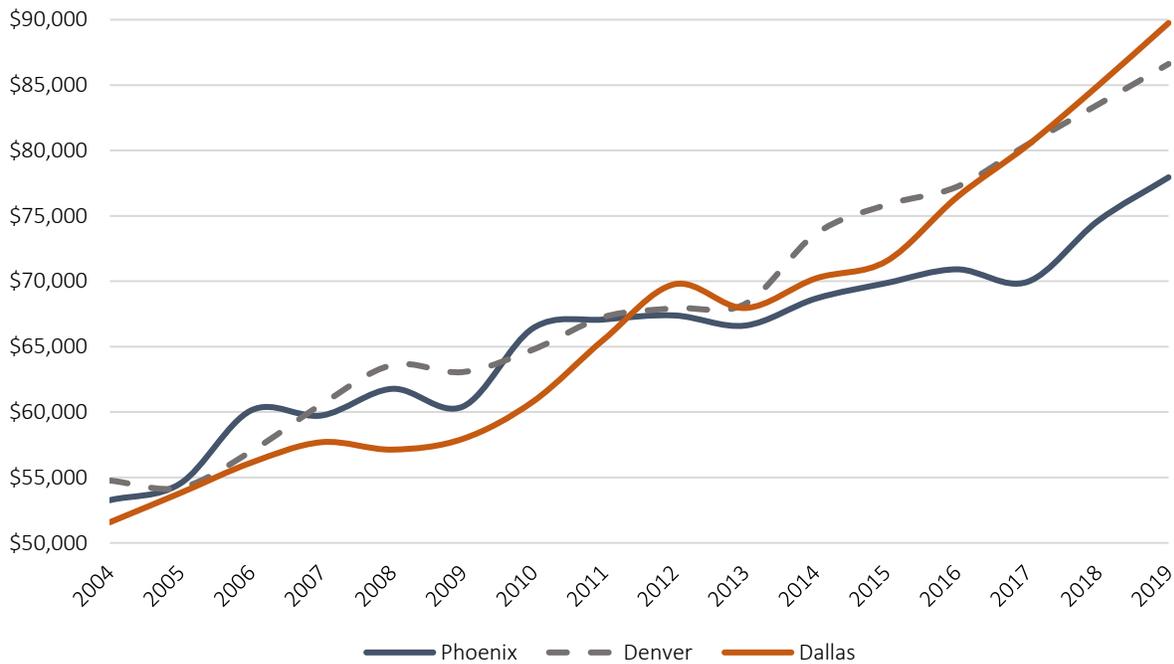
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*The best economic situation is to already perform at a high level, but still have room to improve. This is the case with not just manufacturing in Arizona, but in all industries in the state.*

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Manufacturing Industry Wage Level by Example Metro Area



Note: Figures are adjusted for cost of living.  
Source: U.S. Bureau of Labor Statistics; ACCRA

From 2004 to 2019, manufacturing wages in the Phoenix MSA grew at an annual rate of 2.6% while those in the Denver and Dallas MSAs grew 3.1% and 3.8% per year, respectively. Addressing the performance of manufacturing wages in the Phoenix MSA is crucial for policymakers and economic development officials. Low wages hinder the region’s ability to attract and retain a talented and skilled workforce.

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*The state’s workforce development, education, and other economic initiatives to produce a highly skilled workforce will be irrelevant if the workers do not find local jobs and remain in Arizona.*

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A focus on improving wages in the manufacturing industry will have significant impacts throughout the economy and enhance the ability to further attract businesses and talent.

A key decision for policymakers is where to allocate investment resources. The brief economic opportunity analysis that follows includes a review of the employment and wage levels for several manufacturing occupations, providing a guide for identifying those occupations that hold the greatest potential for growth and provide the best opportunity for a positive return investment (ROI).



## Industry Growth Spurs Wage Growth

The opportunity for wage growth in the ten largest manufacturing occupations and the economic impacts that occur as a result of manufacturing workers becoming more productive and raising their wages is calculated below.

The following charts display the Phoenix MSA's manufacturing occupations (the occupations listed were chosen to maintain simplicity and do not represent an exhaustive list of all manufacturing occupations). The employment level (bar chart) and the wage for each occupation at the 50<sup>th</sup> (median) and 75<sup>th</sup> percentile levels are included. Note: The full Opportunity Index mathematically combines the various data points and displays a targeted benefit range. These additional calculations were beyond the scope of this initial review.

The following chart provides a unique visual on current wage performance and future wage growth opportunities. For some occupations, the gap between the median wages and those in the 75<sup>th</sup> percentile is large, and for others it is narrower.

Higher current employment levels may indicate there is enough infrastructure in place to accommodate industry expansion, while occupations with upward wage mobility but low current employment levels may require additional investment from public entities in order to expand (subsidies for new buildings, infrastructure expansion, etc.).

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*Short-term opportunities exist in areas with higher employment levels, while in the longer-term, the occupations with the greatest upward wage mobility should be considered additional targets for further development.*

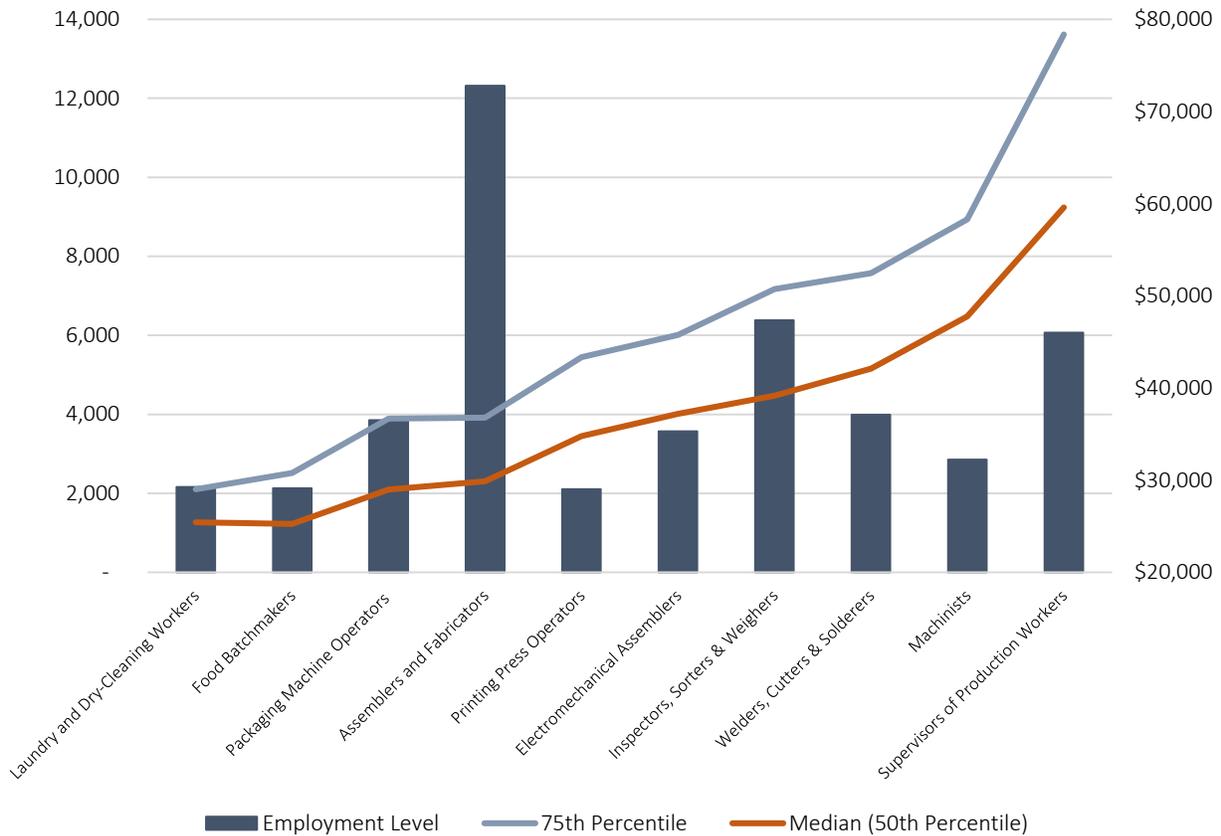
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Additionally, when the gap between the median wage and the upper-end example is large, it could mean the region is not fully taking advantage of opportunities for individuals to further move up the income ladder. This could mean additional certification or training is needed, or some other requirement is needed on behalf of the worker to reach this wage level.

Overall, public policy should target manufacturing occupations that include those with a strong current base (bar graph) and those with the most upward mobility (line graph), in addition to future growth potential, among other factors. The development of a similar Opportunity Index analysis of the full list of manufacturing occupations should be considered.



Example Manufacturing Occupation Wage Opportunity and Employment Levels - Phoenix MSA (2019)



Source: U.S. Bureau of Labor Statistics

After identifying the industries or occupations with the greatest growth opportunity, the next step would be to conduct an in-depth analysis that considers the employment projections for that industry or occupation, the entry requirements for employment, and other metrics, to determine the requirements for advancement.

This analysis will provide further insight into the “on-the-ground” steps a worker would take and the role public policies can play to incentivize workers to climb the occupational wage ladder through workforce development.

Targeted investments in enhancing Arizona’s manufacturing workforce wages will produce a high return on investment (ROI) for the state and generate significant economic impacts (analyzed in the following section). The short analysis and concepts briefly covered in this report are meant to start a discussion on *where* those investments should be made in order to capture the highest growth potential.



## Enhanced Economic Reach Opportunity

To provide perspective on the impacts of enhancing wages, 100 employees from the Inspector, Sorter, and Weigher occupation were modeled (model methodology summarized in the Appendix). The model estimates the impacts of the workers earning the median wage (50<sup>th</sup> percentile) of \$39,180 and, as a result of workforce development efforts, begin earning the 75<sup>th</sup> percentile wage of \$50,720.

Approximately \$38.6M in economic output is generated and, as a result of the multiplier effect, another 97 secondary jobs are created in the local economy by the 100 Inspector, Sorter, and Weigher employees who are earning the median wage.

Assuming the wages of the 100 manufacturing employees increase to the 75<sup>th</sup> percentile level (\$50,720), the economic output generated by these 100 employees increases to \$50.0M. The number of jobs supported by the 100 employees increases to 125. The amount of annual tax revenues generated by these 100 employees also increases by \$139,500 from \$627,900 to \$767,400.

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*The “gap” is the net-new tax revenue that could be used for industry enhancement policy. This is the basic structure of a broader ROI analysis.*

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The economic and fiscal impacts of the modeled example are summarized in the following table:

Wage Opportunity - Economic and Fiscal Impact		
	50th Percentile	75th Percentile
Secondary Jobs	97	125
Total Wages	\$9,046,700	\$11,711,400
Total Economic Output	\$38,582,000	\$49,945,900
Total Tax Revenues	\$627,900	\$767,400

Source: IMPLAN; Rounds Consulting Group, Inc.

These figures reflect benefits derived from a very limited example. If all manufacturing occupations could advance further up the wage ladder, the economic impact on the state would total in the billions of dollars.



## Call to Action – Conclusion

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Areas of strength in the state’s manufacturing industry include the fact that employment is of large scale and high wage. This translates into significant levels of tax revenue for state and local governments to use for basic government functions, as well as for the continued development of the industry.

While Arizona’s manufacturing position is strong, average wages in the various occupations are lagging behind metro competitors. This depresses the economic and fiscal impacts that are attributable to the industry.

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*These same competitor statistics are consistent among most of the state’s industries and identify incredible opportunities. With well-designed public policy to enhance Arizona’s manufacturing industry, the already strong industry can become even more robust.*

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While the COVID-19 pandemic is a public health emergency and has caused significant business and social disruptions, if carefully managed it will not pose a long-term threat to the state’s economy. A bigger threat is to do nothing while our economic development competitors aggressively promote high-wage job creation in their states and respective metro areas.

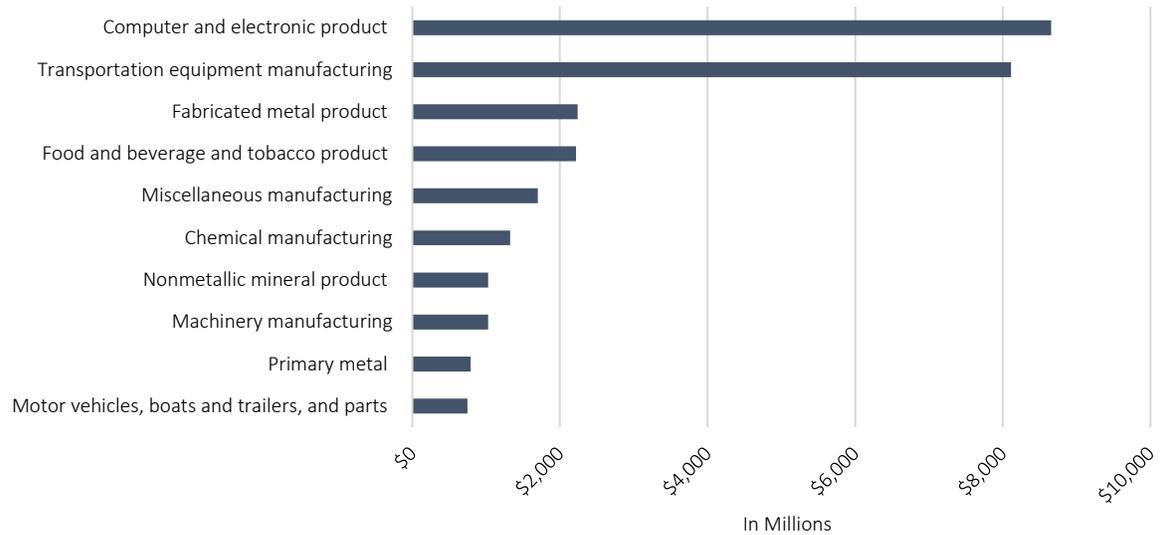
### Final Points for Consideration

- Manufacturing is a major driver in Arizona’s economy and warrants ongoing policy focus.
- COVID-19 recovery packages should enhance the competitive position within the region by focusing on quality jobs and protecting manufacturing supply chains.
- Onshoring/nearshoring presents new opportunities to grow the manufacturing industry.
- Additional manufacturing growth will depend on increasing the availability of skilled labor, requiring policymakers to continue efforts to improve educational outcomes in P-20, and grow the number of residents with postsecondary education credentials.
- Other infrastructure should be enhanced, including physical infrastructure to support the transportation of goods, emergency management plans, and strategic stockpiles of essential goods.



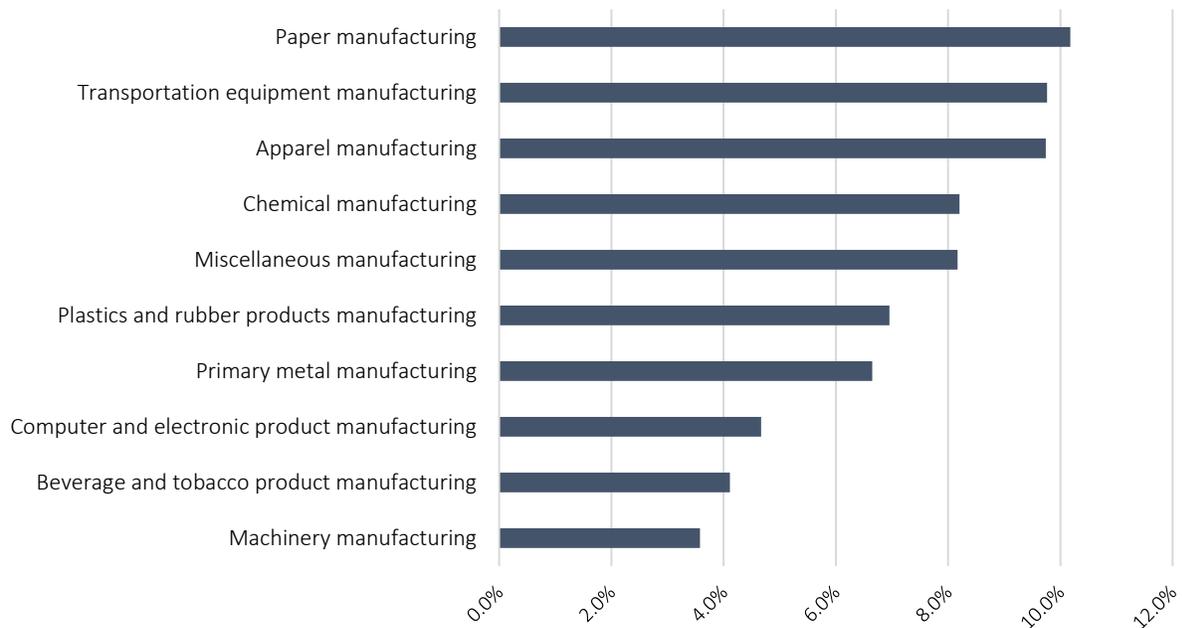
## Appendix A: Additional Manufacturing Facts

Top 10 Arizona Manufacturing Sectors by Value of Goods Produced in 2019



Source: U.S. Bureau of Economic Analysis

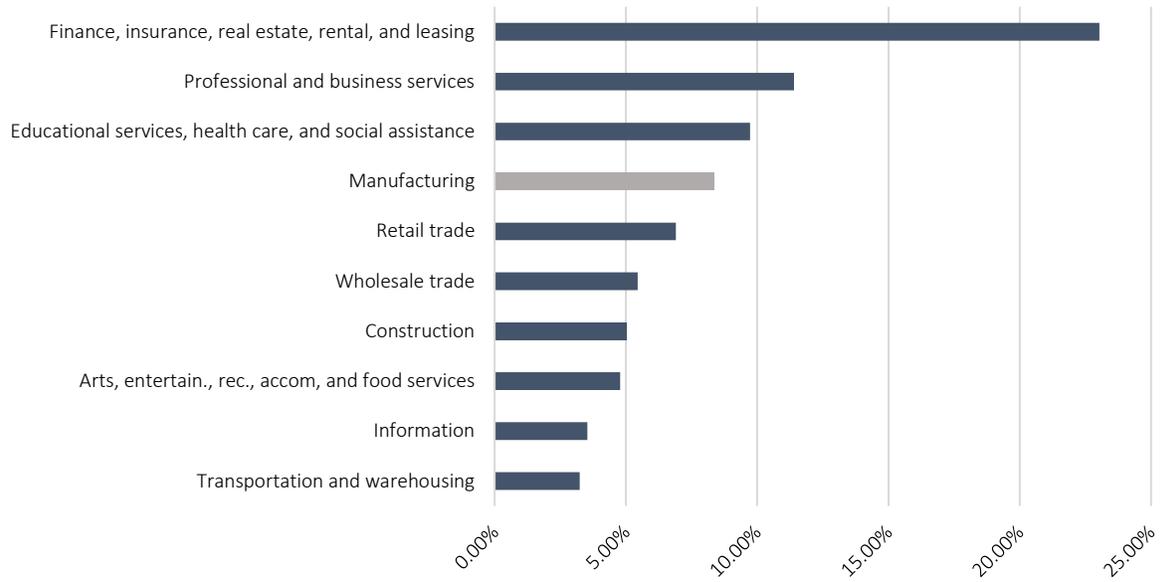
Employment Growth of Arizona Manufacturing Sub-Industries 2018-2019



Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages



### Top 10 Industries as Percent of Arizona GDP, 2019



Source: U.S. Bureau of Economic Analysis



## Appendix B: Impact Model Methodology

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RCG developed an economic and fiscal impact model to analyze the impact of manufacturing jobs in Arizona. The model estimates the economic activity and multiplier effects in terms of output, earnings, employment, and local tax revenues.

*Output* captures the level of economic activity, or the total value of goods and services produced, in the broader region similar to how statistics like GDP capture economic volume in individual states and across the country.

*Earnings* simply represent income to employees, and *employment* is the job count on an annualized basis. The economic activity is then converted into *tax revenues* in each of the relevant categories affected.

The economic effects occurring as a direct consequence of the initial activity create additional effects in the economy. This relationship is known as the “multiplier” effect. The basis for multiplier effects is the interdependencies between industries, how one industry impacts other sectors and the cycle of spending and re-spending within the regional economy.

The value of output and the number of jobs can be increased to the extent that monies continue to recirculate within an economy. For example, output and employment are influenced by a number of economic conditions including: 1) the extent the business supplier network is local, 2) if wages are relatively high due to productivity enhancement vs. regulatory influences, and 3) the extent a community or larger region can provide services to employees that receive a paycheck and can spend locally, among others. These conditions effectively increase the value of the multipliers.

*Direct* effects, or impacts, are the results of the development’s primary activity. The multiplier effects, or secondary effects, are measured as either indirect or induced based on their source.

*Indirect* impacts capture additional effects as a result of increased demand in the supplier industries which supply services or products to the direct businesses. *Induced* impacts capture additional effects generated as a result of the increased spending in the economy made by the households of both the direct and indirect employees.

*Tax revenues* (fiscal impacts) are expressed as either primary or secondary based on their source. *Primary revenues* can be estimated by definable sources such as sales taxes calculated from a manufacturing facility’s utility use, lease, and equipment purchases. *Secondary revenues* are generated by the wages, residency, and spending of those direct, indirect, and induced employees that manufacturing supports. For example, these secondary revenues would include sales tax revenues generated when employees of supplier businesses spend their incomes on local goods and services.