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COMPREHENSIVE GAP ANALYSIS

PART 1 - REGIONAL WORKFORCE NEEDS ASSESSMENT

Greater Lima Region, Ohio, USA
(Allen, Auglaize, Hardin, Hancock, Mercer, Paulding, Putnam and Van Wert Counties)

August 2016

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This report examines the current and future regional workforce needs in the Greater Lima Region. This report has been produced as part of the development of a Collaborative Growth Plan for the region.

August 2016

PREPARED BY:

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COMPREHENSIVE GROWTH PLAN PROJECT HOSTED BY:

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1.0 INTRODUCTION

Communities throughout the United States and other industrialized countries are experiencing a number of notable shifts associated with what is being referred to as "Industry 4.0" or the Fourth Industrial Revolution. Broad economic changes that have occurred over the past forty years have fundamentally transformed the nature of many regions and many labor markets. As technologies ranging from the Internet of Things to Automation continue to shape the way that things are made and how consumers interact with producers, significant attention has been directed towards both the current and future condition of the global labor force. Much of the conversation regarding workforce needs and availability can be organized into two related topics – concerns over quantity and quality.

Many of these same communities have recently started to experience the impact of a significant demographic shift. The population generally associated with the post-World War II Baby Boom, those born between 1946 and 1965, are beginning to enter into retirement in increasing numbers. At the same time, subsequent generations, known as Generation X and the Millennial generation have proven to either be too small or are not yet ready to replace those mature workers that are exiting every segment of the economy, but are having their most notable impact on construction, manufacturing, and health care. This general demographic transition is also occurring during a period of renewed economic growth. This has prompted concerns by many economists and industry leaders that the availability of labor in key markets and industries may be limiting global growth potential. This is especially true in the rural communities of the Northeast and Midwest United States, where a twenty-year cycle of declining populations has both led to and is accelerated by a loss of key industries.

Similar concerns have been voiced by a number of industry and policy experts in the United States and Western Europe regarding the relative quality of those fewer candidates that may be seeking employment. Years of concerns regarding the state of elementary and secondary education in the United States and elsewhere have mirrored discussions regarding the erosion of so-called "employability" skills in younger populations. Similar conversations have focused on the failure of the post-secondary education institutions in a number of countries to effectively align training programs with specific employer needs. These concerns have again been exacerbated by the rapid retirement of older workers in many companies. As a consequence, a number of regions have had to contend with what is commonly referred to as a "skills gap."

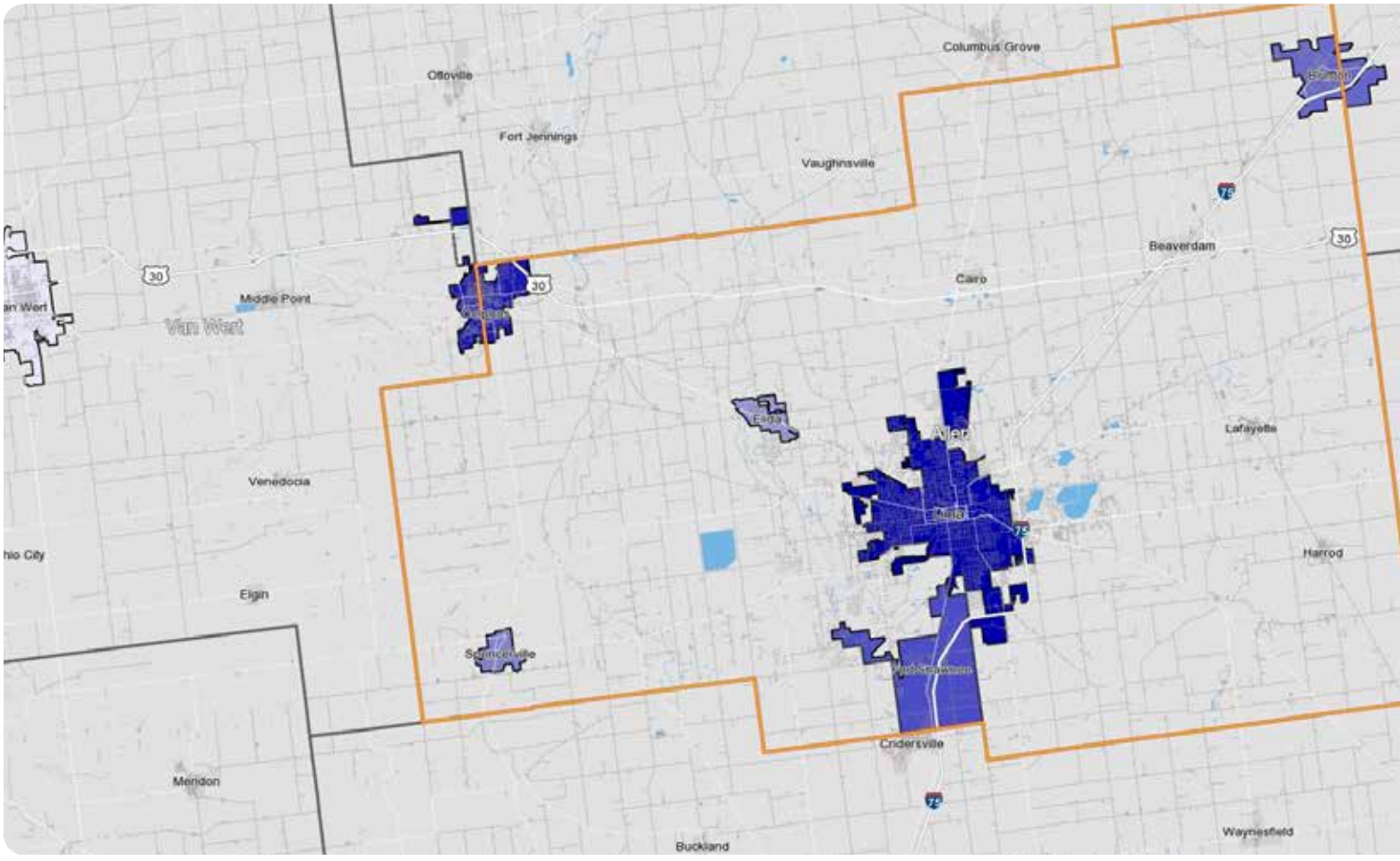
The Allen County, Ohio region, which is an eight-county region composed of Allen, Auglaize, Hancock, Hardin, Mercer, Paulding, Putnam and Van Wert Counties is similar to many of the communities where workforce needs have been noted as a significant concern. The region boasts a long and decorated history in agriculture, heavy manufacturing, oil and chemical production, and healthcare. Yet organizations such as the Allen Economic Development Group, the Mayor's Automotive Task Force, Allen County Ohio Means Jobs, and the West Central Ohio Manufacturing Consortium have and continue to hear concerns regarding the availability of skilled labor to meet the needs of the region's employers. These needs have become more acute in recent years and are reflective of many of a number of economic and demographic forces.

Shedding light on the workforce needs of the region's large employers is made all the more important given both the recent staffing changes at the Joint Systems Manufacturing Center and potential increased staffing needs as that facility and its lead tenant, General Dynamics Land Systems begins to ramp up production of the third-generation of the Abrams battle tank. The workforce demands of General Dynamics are not unlike those of other large manufacturers in the region such as Ford, Procter and Gamble, and Potash in that each firm has historically competed with each other over a common talent pool. As demands increase and the size of the pool potentially diminishes, however, concerns over the ability of the region to meet all of its workforce needs may intensify.

This represents one of the concerns that drew the attention of the United States Department of Defense, Office of Economic Adjustment in 2013, as it has awarded two phases of Defense Industry Adjustment funding totaling $3.4 million to Allen County and the surrounding region. Future iQ Partners has played a significant role in preparing a number of strategic analyses to support the region through the Allen County Defense Network and Task Force LIMA. The analysis presented here is an extension of these efforts. It provides a thorough and innovative study of the current and future workforce needs of a number of large regional manufacturers and suppliers and assesses the region's ability to meet those needs.

A number of prominent site selectors and industry experts have stated with increasing frequency that the regions that are poised for future economic growth are those that have addressed their workforce challenges. The analysis presented here provides a roadmap for the Greater Lima Region to both identify and meet those needs.

The following analysis proceeds in five sections. Section 2.0 will connect the analysis to Future iQ's perspective on the role that workforce availability and quality will play in the *Future of Manufacturing*. Sections 3.0 will present a brief demographic and workforce profile of the Greater Lima Region, building on the findings presented in the *Regional Asset Inventory and Readiness Analysis* (Future iQ, 2015) prepared in Phase I of this project. Sections 4.0 – 7.0 represent the heart of the workforce needs analysis. Section 4.0 begins this analysis presenting a regional analysis of recent hiring activity, with a specific focus on the region's manufacturers. Section 5.0 presents a unique forecast of anticipated hiring demand in the region and considers a number of potential growth scenarios. Section 6.0 presents the methodology and findings of a survey of the region's manufacturers and suppliers. This analysis is extended by matching the current workforce needs to forecasted needs and availability. Section 7.0 details a number of strategic recommendations for potential attraction, retention, and training strategies based on regional and national best practices. The analysis concludes by connecting the key findings of this study to the general strategies that will be incorporated into a regional Collaborative Growth Plan.



2.0 HOW THE WORKFORCE IMPACTS THE FUTURE OF MANUFACTURING

In May 2016, Future iQ Partners published a foresight analysis entitled *The Future of Manufacturing: Building the Future Through Agility and Innovation*. This analysis was prompted by a growing consensus among industry experts and analysts that the global manufacturing sector stands on the cusp of a series of disruptive changes. Future iQ's team of experts examined many of these trends through the lens of their collective experience in areas of manufacturing, environmental, and regional development. The importance of manufacturing drives the vitality of many of the regions where the firm has been engaged and it is anticipated that its importance will only intensify over the next thirty years.

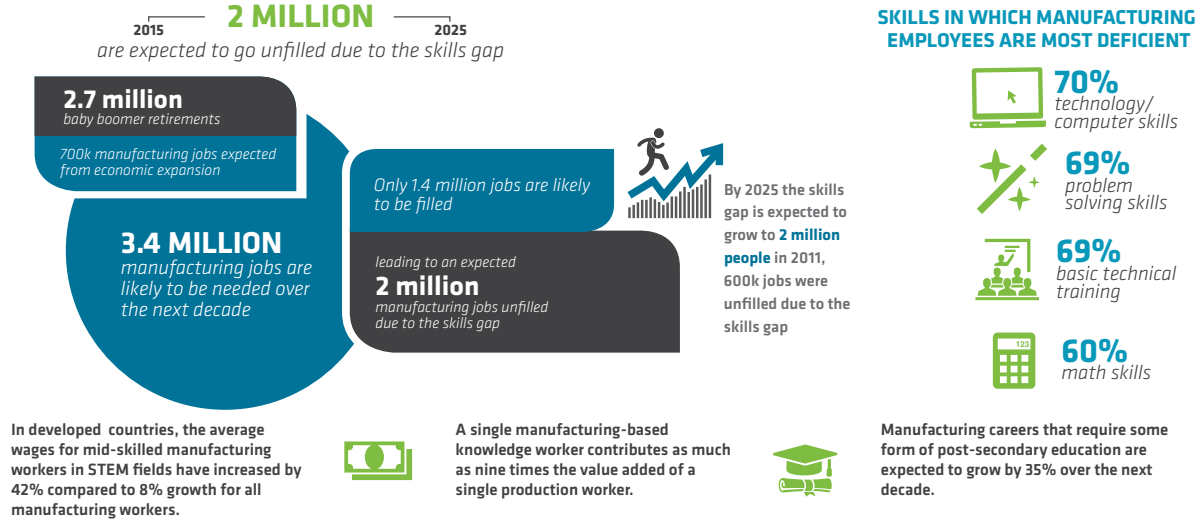
The key drivers that we believe will most strongly affect the profile of manufacturing in the future includes innovations in key processes such as agile manufacturing, additive manufacturing, and customized production, the increasing role of technology including automation and the Internet of Things, and the expansion of localized production into a global value chain. Many of these advances are dependent on advances in materials science, such as the development of new nano-materials and innovations in infrastructure including distributed networks and multimodal logistics. Many of these key drivers will influence both what is produced in the future as well as where.

The workforce of the future will also play a key role in determining who wins and who loses in the global market. The nexus of global population growth has shifted over the past seventy years from the United States and Europe first to the east and countries such as China and India and more recently into Western Africa. As these disparate growth patterns have occurred and intensified, shares of human capital have also been affected. In response, regions such as those around Allen County and their employer base have experienced initial concerns regarding production being outsourced to more labor-rich and lower wage markets. This has fueled tremendous manufacturing output growth in China and other more recently industrialized countries. This has also fueled those concerns regarding the quality and quantity of the workforce that will serve as the focus of this analysis.

The principal impact of the workforce shifts of the past and future have been felt in changes in productivity, which is simply measured as the value of manufacturing output per employee.

Manufacturing productivity in the United States has reached six years of historic highs, reaching back to 2010 and has increased nearly exponentially since 1960. At the same time, manufacturing employment has decreased by more than 5.5 million workers since 1990 (-31 percent). This inversion has been caused by

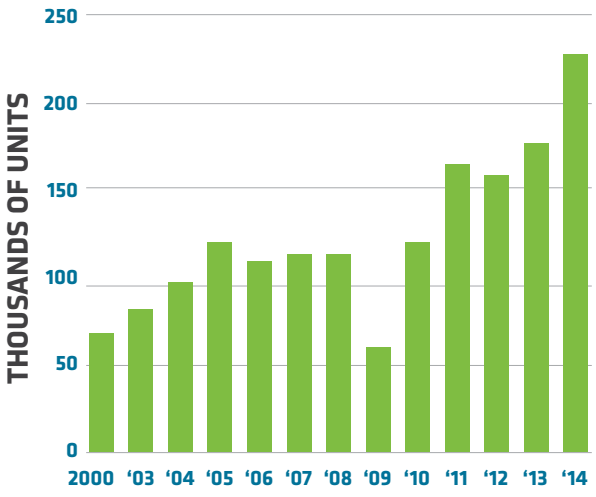
Figure 1: The Impact of the Skills Gap



Source: Deliotte and Manufacturing Institute. 2015. The skills gap in U.S. manufacturing 2015 and beyond. Deloitte analysis based on data from U.S. Bureau of Labor Statistics and Gallup Survey; Manpower Group. 2013. The Future of the Manufacturing Workforce – Report One: Technology and the Workforce

a number of factors including a shift from high-volume to high-value producers, the introduction of new scheduling models such as Lean Manufacturing, and the adoption of new technologies. The most prominent among these have been the introduction of computer and information technology into the manufacturing environment and the rapid introduction of automation technologies at all scales.

Figure 2: Estimated Worldwide Annual Supply of Industrial Robots



Source: International Federation of Robotics. 2015.

The impact of the growing use of automation and other new technologies in manufacturing is a topic of some debate as to whether they will increase or replace the demand for labor. What most experts agree on, however, is the fact that the introduction of new technologies will create the demand for new skills and will task communities with training a 21st Century workforce. Many communities have launched initiatives similar to LINK Lima in an effort to breed awareness of these new opportunities. The successful communities of the future will be able to capitalize on this potential by harnessing a nimble and flexible education and workforce development ecosystem.

The final, and potentially most significant impact is the role that the future of manufacturing may have on encouraging more manufacturing workers to become innovators and entrepreneurs. Significant advances in additive manufacturing and 3D modeling have brought design and prototyping capabilities into basements, garages, and classrooms. A new generation of innovators can now create new products and new solutions that were previously the domain of fabrication and machine shops. As this technology continues to filter into schools and community-based "maker spaces," manufacturing workers with key experience and understanding of processes will be able to connect to the tinkerer culture of the region's past in building the next generation of ideas and firms.

Taken as a whole, the impact of the changes predicted by the *Future of Manufacturing* and other similar foresight analyses suggests that the workforce of the future will be relatively smaller, more productive, and will require a higher skill level than their predecessors. We are already seeing a number of these transitions occurring in the Greater Lima Region and throughout the United States as employers are experiencing significant difficulty in finding those workers that meet their specific skills needs. The analysis presented here will largely confirm these anecdotal claims and extend the conversation by examining the implications of the region's workforce profile on future manufacturing and economic growth.

3.0 REGIONAL DEMOGRAPHIC AND WORKFORCE PROFILE UPDATE

The first step in assessing the workforce needs of employers in the Greater Lima Region is to gain a better understanding of the underlying dynamics impacting both the quantity and quality of current and prospective employees. The region has experienced a number of significant demographic and economic shifts over the past thirty years. The impact of each of these has substantially shaped the region's workforce profile.

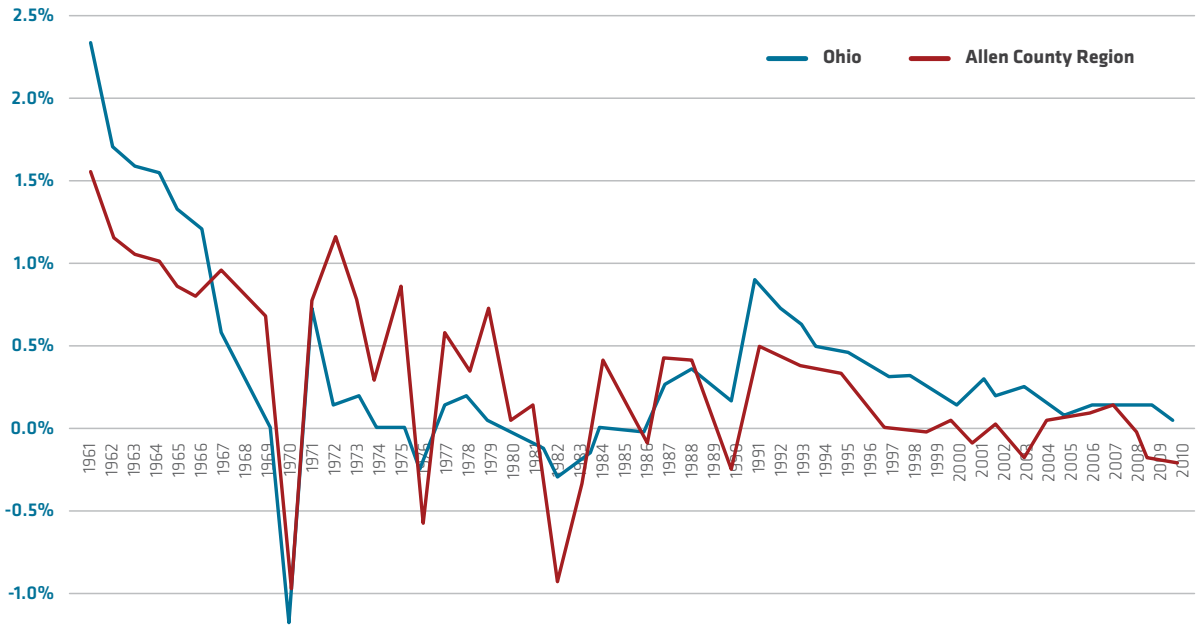
The analysis presented here represents an expansion and update to the *Regional Asset Inventory* and Readiness Analysis published last spring. The previous analysis presented a comprehensive profile of the key demographic and economic indicators impacting the region's economic vitality. The following discussion will highlight a few key factors that both define the region and have a more significant impact on workforce availability and needs.

3.1 HISTORIC POPULATION GROWTH

The first and most significant narrative that has driven recent conversations about the workforce of the future is the role that shifts in centers of population growth in the United States and elsewhere have played in driving disparate levels of economic growth. A number of significant migrations have occurred in the years following World War II, with more recent population growth shifting towards the southeast and southwest. While the Greater Lima Region benefitted from a number of these trends historically, more recent population growth has started to slow significantly.

The chart in Figure 3 depicts year-over-year population growth patterns for Ohio and the eight-county Greater Lima Region from 1960-2010. There have been a number of annual fluctuations that have occurred over the past fifty years. The Greater Lima Region experienced a more significant growth period in the early-to-mid-1970's than the state, as a whole. Statewide population growth has far outpaced regional population growth since 1990.

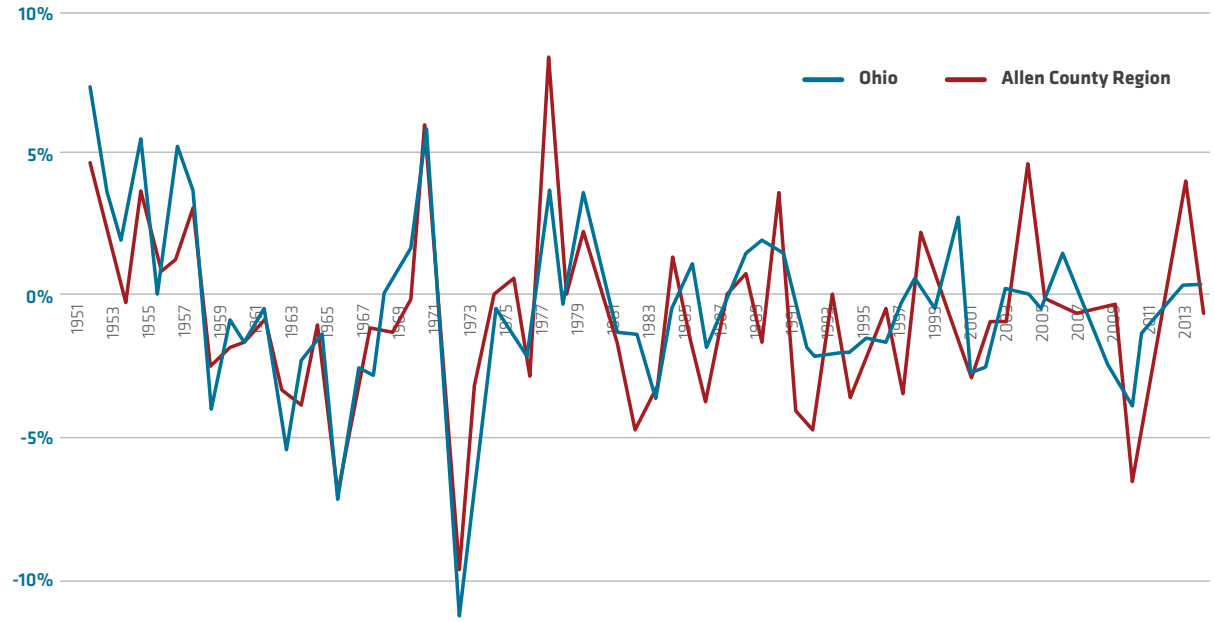
Figure 3: Historical Population Growth: 1961-2010 Year-to-Year Percentage Change



Source: Ohio Department of Development

One trend that is especially interesting in the analysis of annualized growth trends is the correlation that exists between population declines and economic recession. The areas of punctuated population loss in the Greater Lima Region are closely tied to noted economic downturns. Much of this is related to the confluence of national and regional economic trends. For example, the region lost nearly 5,000 residents during the recession of 1982-1983. Similarly, the more current downturn is closely related to the recession of 2007-2009. As employment opportunities move elsewhere, so to do the workers seeking

Figure 4: Historical Birth Rates: 1961-2014 Year-to-Year Percentage Change



Source: Ohio Department of Development

them. This is as true within the regional labor market as it is nationally. Anecdotally, we can connect the periods of high population loss in the Greater Lima Region to a number of economic events. The period of population loss that occurred in the early 1970's can be linked to the combination of manufacturing deindustrialization that struck the region beginning in the 1960's and continuing with the impact of the rise of foreign competition in the petroleum industry. Two subsequent periods of deindustrialization occurred in the early 1980's and 1990's. The most recent period of population loss has been driven primarily by changes in population composition and represent the legacy of these earlier periods of loss.

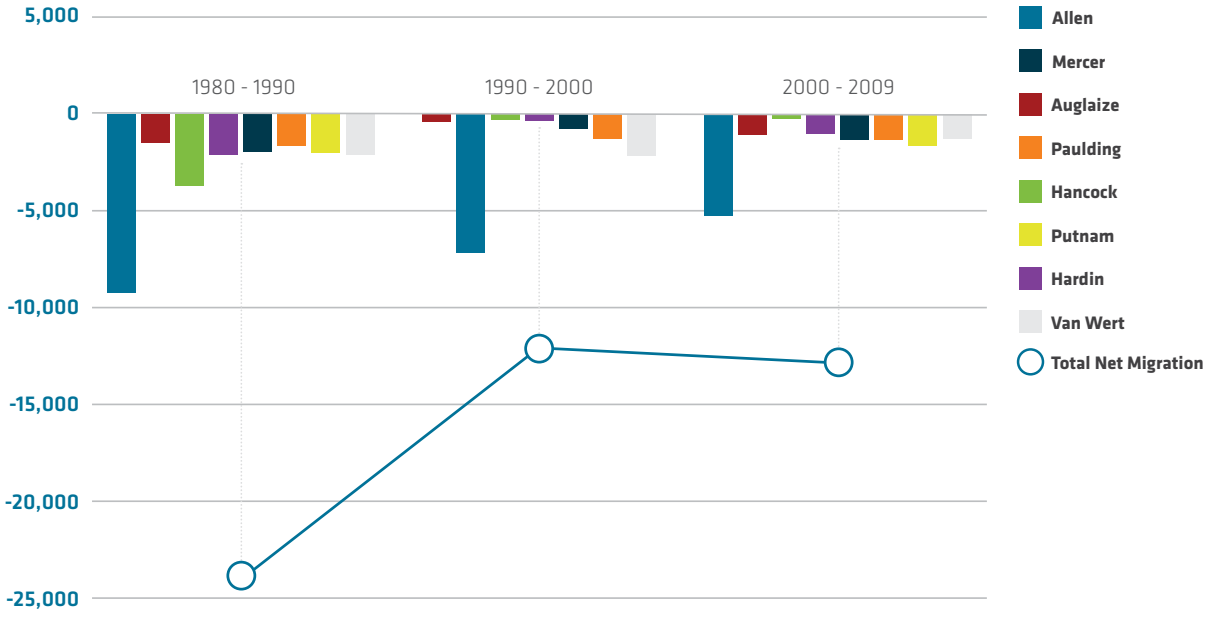
The region's population reached an estimated high in 2007 at 384,262 residents. This represents growth of roughly 55,000 residents, or 16.6 percent since 1960. This growth trend has not been sustained over the past eight years, however, as the region's population was estimated at 380,104 in 2015, or 1.1 percent below its historical high. The population is expected to further decline over the next twenty-five years, reaching an estimated 368,510 residents in 2040. This represents a decrease of four percent from the region's historic high. This is owed to a number of factors, including a significant negative trend in the region's annualized birth rate, as illustrated in Figure 4.

Birth rates in the region have fluctuated wildly over the past sixty years, with regional trends generally following statewide trends until the 1990's. The most recent estimate of 4,742 births in 2014 is slightly more than half of the annual birth rates experienced during the Baby Boom of the late 1940's and 1950's. This is of particular regional

concern as this supports the hypothesis that a significant share of recent population growth can be attributed to the aging of the local population. If the region's population continues to stagnate or decline slightly, employers' concerns regarding labor availability will only increase.

as determined by changes in federal income tax filing status and exemptions. Over the course of the thirty-year period between 1980 and 2009, the Greater Lima Region lost nearly 49,000 residents, with much of this loss occurring in the 1980's.

Figure 5: Net Migration Patterns by Decade: 1980-2009



Source: Internal Revenue Service

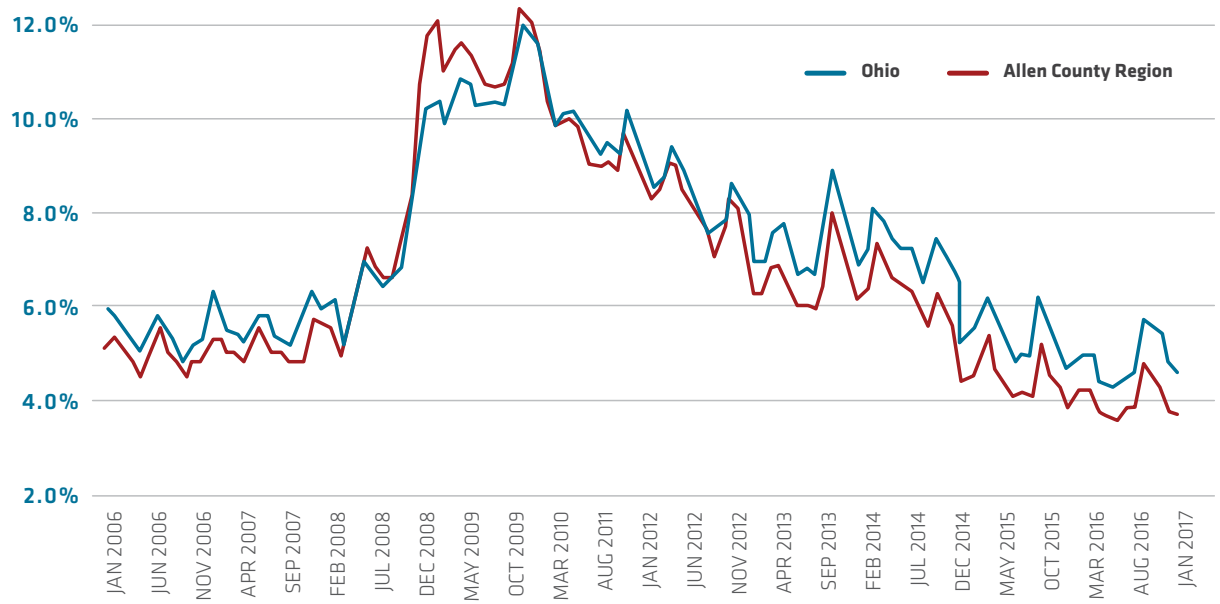
The final demographic trend that is especially salient in the current analysis of workforce needs is the recent migration patterns of residents in the region. The chart in Figure 5 represents three ten-year periods of migration,

The lion's share of this out-migration has occurred in Allen County, which lost more than 17,000 residents over this period, but only 714 in the 2000's. This suggests that the legacy of the deindustrialization of the 1980's and 1990's has subsided, but that the impact is longer lasting. This is especially true when drawing correlations between out-migration patterns and birth rates as a large share of the filing population in the 1980's and 1990's were residents under the age of 35 (38 percent). The slowing pace of out-migration does not necessarily imply that this trend is reversing, but rather that there may be some potential for the region to attract new residents with improving employment opportunities.

3.2 WORKFORCE AND EMPLOYMENT TRENDS

There are a number of notable workforce and employment trends that have closely mirrored the demographic patterns presented above. The region's workforce has been in a state of transition over the course of the past decade as the region first reacted to the impact of the recession of 2007-2009 and later to the broad demographic trends previously discussed. This has resulted in a substantial decline in the region's unemployment rate, among other key metrics during a period of more moderate economic growth. This same story, which will be discussed in this section, is being told in a number of regions in the Northeast and Midwest United States.

Figure 6: Historical Unemployment Rates: 2006-2016



Source: United States Bureau of Labor Statistics

Figure 6 presents the historical monthly trends in the unemployment rates of Ohio and the Greater Lima Region from January 2006 to May 2016. This ten-year period was selected to both identify the impact of the recession of 2007-2009, and to track the region's recovery since. Three significant conclusions can be drawn from this trend data. First, we see that there is some seasonal variation in the unemployment rate. This is common in most regions in the northern United States as a number of industries either have defined production schedules, such as food processing, or are weather-dependent, as is the case in certain aspects of the construction industry. The unemployment rate tends to peak in early winter and then gradually decline throughout the year.

Second, we see that the recession of 2007-2009 had a significant impact on the regional labor market. The unemployment rate peaked at 12.3 percent in March 2010 and eclipsed the state unemployment rate throughout much of the recession. As the national economy began to improve in the second half of 2010 the regional-state relationship returned to normal. The Greater Lima Region's unemployment rate has consistent remained below the state's unemployment rate for the past seven years.

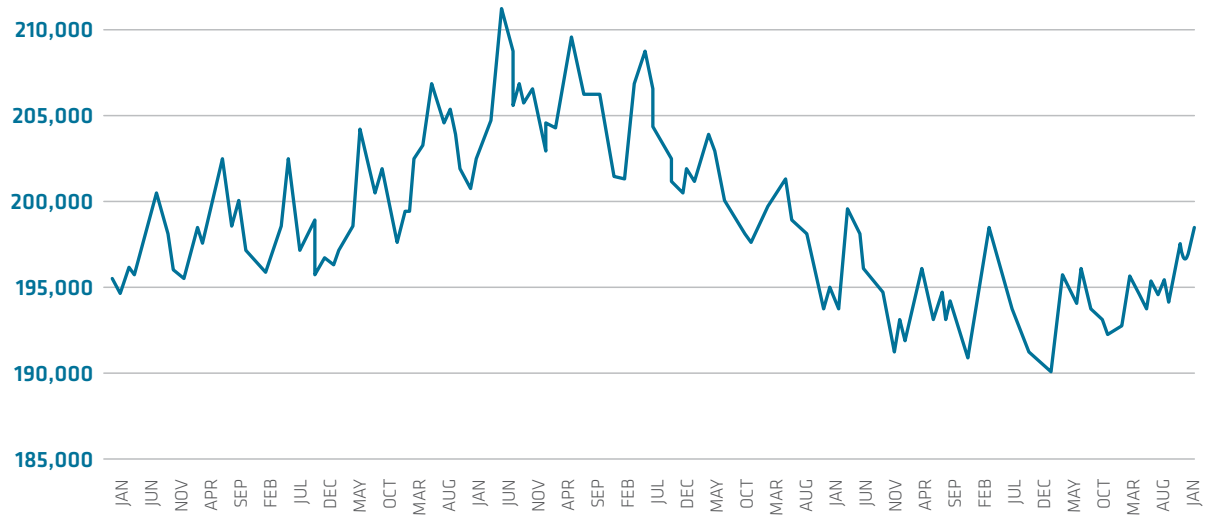
Third, we see that the unemployment rate has declined most significantly over the past two years. The May 2016 unemployment rate of 3.7 percent marks a resumption of the historically low unemployment of the late-1990's. The cause for this marked improvement is twofold. First, the number of individuals employed has increased by 17,273 since the peak unemployment rate in March 2010. Conversely, the region's labor force has decreased by 5.2 percent, or more than 17,000 individuals since the recent historic high in June 2007. This decline has occurred as a consequence of an aging population and a period of out-migration associated with the recession.

The impact of a low unemployment labor market has been felt by the region's employers for much of the past two years. It is presumed that any region whose unemployment rate is below five percent experiences full employment. We can then conclude in general economic terms that the region is experiencing a long-term labor shortage. The analysis that follows will detail specific implications and the impact on the region's manufacturing base and other related industries.

workers from the labor force, but demographic trends over the past six years have been far more impactful. The region's labor force stabilized between 191,000 and 193,000 individuals before resuming a more significantly positive growth rate in recent months.

One other important aspect of the region's workforce needs to be considered as it bears specific implications for the manufacturing sector. We have already suggested

Figure 7: Historical Labor Force Growth: 2001-2016

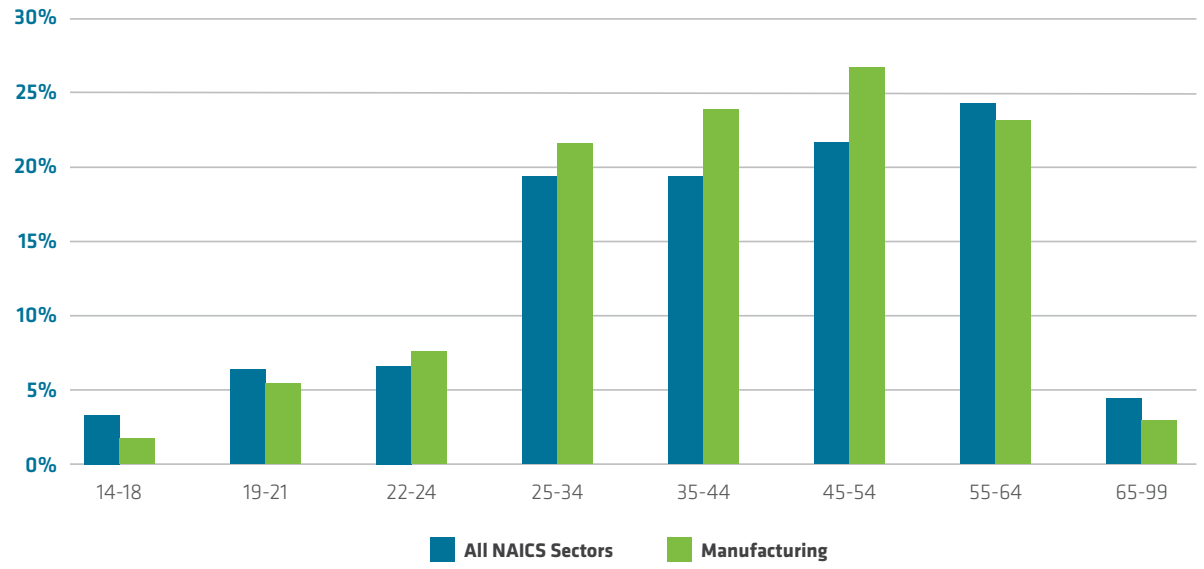


Source: United States Bureau of Labor Statistics

This same pattern can be observed in the region's labor force growth. Figure 7 depicts monthly changes in the region's labor force since 2001. We can see that the region's labor force fluctuates based on seasonal patterns, reaching annual high marks during the summer months. We also see that the region's labor force peaked in July 2006, reaching just over 211,000 individuals. The recession of 2007-2009 stripped a significant share of

that the region's population has aged significantly over the past thirty years, facilitating a period of population stagnation. This change can also be observed in the region's workforce. The chart in Figure 8 illustrates this trend by considering the percentage of the workforce in various age cohorts across all industry sectors and in manufacturing specifically.

Figure 8: Manufacturing Workforce Age Distribution: 3rd Quarter 2015



Source: Quarterly Workforce Indicators, United States Census Bureau

The first finding that can be taken from this chart suggests that the region's workforce is relatively older than would be expected. This is especially true of the larger concentration of the regional workforce over the age of 45. We assume that most workers experience their prime working years between the ages of 25 and 45. This is especially true of more physically-demanding industries and occupations such as manufacturing. We see that 51.3 percent of all workers are over the age of 45 and 53.5 percent of manufacturing workers. Conversely, only 16.4 percent of all workers in the region are under the age of 25 and only 14.7 percent of manufacturing workers. This suggests that employers may be having difficulty attracting younger workers in multiple industries due to a perception that certain positions are only for the old.

This also suggests that manufacturers among firms in a number of other "traditional" industry sectors will have to contend with large numbers of retirements over the course of the next fifteen years. As these workers leave the workforce, it is uncertain that there will be sufficient numbers of younger workers with needed experience to replace them. We are already seeing this pattern in a number of skilled and semi-skilled occupations. It is anticipated that these challenges will only become more pronounced as the composition of the region's workforce continues to change. We will next consider the issue of regional workforce growth.

3.3 FORECASTING THE GREATER LIMA REGION'S WORKFORCE

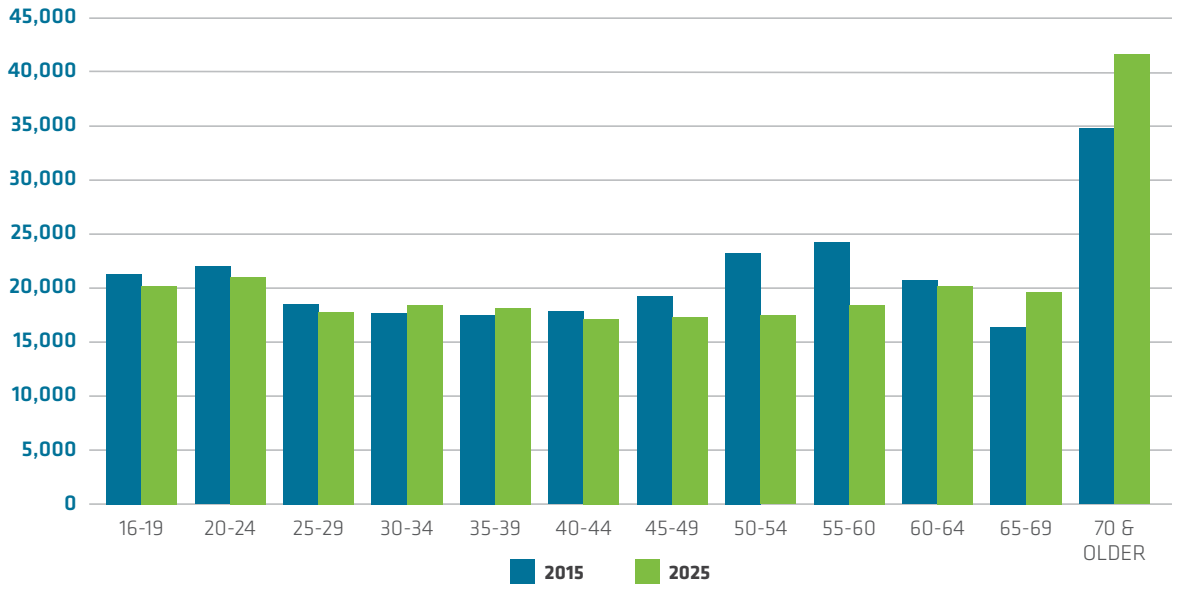
The narrative that has been presented to this point in the analysis suggests that two prominent trends – slow population growth and population out-migration both contribute to the current constraints observed in the region's labor force. We have also considered how the shape of the region's age curve, which bends strongly towards those over the age of 45 has already concentrated workers at the upper end of the experience and compensation curves in a number of key industry sectors. All of these trends are expected to continue barring any notable change to the region's population.

Taken as a whole, the various demographic trends that are affecting the region's labor force and its ability to meet the needs of employers suggest that the region will continue to experience labor supply constraints for the foreseeable future. This conclusion belies a number of more nuanced arguments regarding both the composition and availability of potential workers in the future. For example, we know that not every individual who is of a labor force-eligible age, generally considered between the ages of 16 and 64 actively participates in the labor market for a number of reasons ranging from disability to education and incarceration. Similarly, we know that no labor market experiences a zero percent unemployment rate in the long-run. As such, we can develop a more

sophisticated forecast of the region's labor force-eligible population to provide a baseline estimate of workforce supply.

There are two basic assumptions that underlie this forecast. The first is that the region's population is expected to change due to three principal factors – births, deaths, and net migration. These factors have been forecasted and incorporated into population projections developed by the Ohio Development Services Agency. For example, these projections forecast that the region's population will decline by approximately 3.8 percent between 2015 and 2040. Projected population data for age cohorts between 16 and 99 serve as the baseline for this analysis. The chart in Figure 9 presents a comparison of the age profiles of the current and projected population in 2025.

Figure 9: Population Composition by Age Cohort – 2015 and 2025



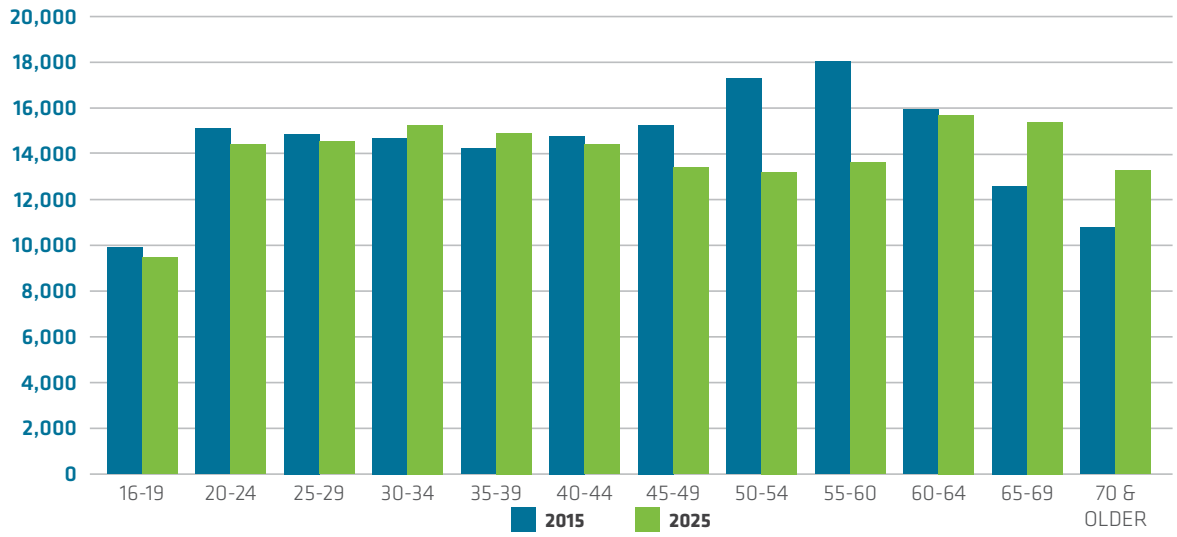
Source: Ohio Development Services Agency

The impact of the region's aging population is quite clear in these results. We see that the region's younger population between the ages of 16 and 24 ages in the forecast, but decreases as a share of this population leaves the region for education and employment opportunities. In the meantime, the region's over-45-year-old population also ages and declines, with a share of this population leaving the region for other retirement destinations. As a whole, we see that the region's population ages significantly over the course of the next decade.

The second factor that bears consideration is the fact that labor force participation, as measured by the sum of those employed and actively unemployed varies over time and by age cohort. Expectations regarding workforce engagement have changed considerably over the past thirty years among the young and the old. It was once assumed that most young adults would engage in the workforce after the age of 18. This has changed as the expectation that young adults pursue some form of post-secondary education has increased. Similarly, changes in the physical demands of most jobs has lengthened the effective working life of most individuals. As such, we have noticed a gradual decline in the labor force participation rate of young adults (from 72 percent in 1980 to less than 67 percent in 2015) and a related increase in the labor force participation rate of those over the age of 70 (from 48 percent to 60 percent). It is important to note that these rates are highly dependent on the willingness of individuals in each of these age cohorts to actively pursue and accept employment.

The United States Bureau of Labor Statistics has forecast labor force participation rates for all age cohorts from 2005 to 2045. These estimates range from a high of 67.1 percent for 16-19 year-olds in 2010 to 60.4 percent to workers over 70 in 2040. These estimates were incorporated into the forecast model by balancing these estimates by expectations of the current and future composition of the region's workforce. The impact is displayed in Figure 10.

Figure 10: Forecasted Workforce Composition by Age Cohort – 2015 and 2025

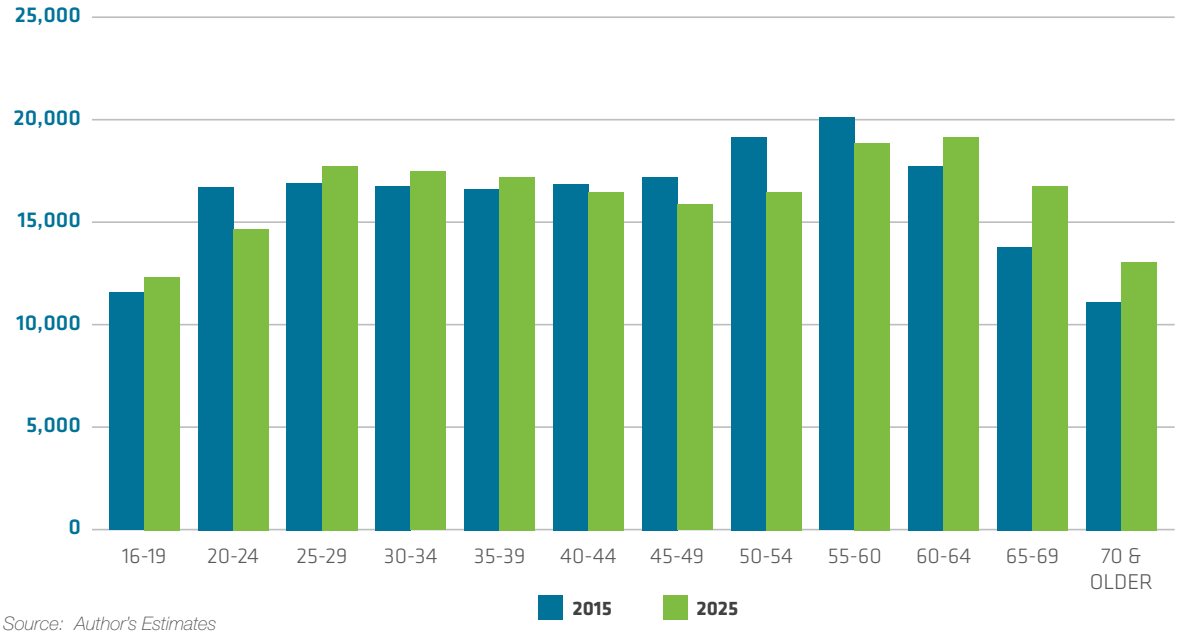


Source: United States Bureau of Labor Statistics and Author's Estimates

We again see the significant role that the aging of the region's population plays on workforce availability. The sum of the region's workforce decreases from a model estimate of 156,575 in 2015 to an estimated 150,126 in 2025. This owes to both of the patterns that we have outlined above with fewer young people engaging in the labor market and larger numbers of older workers engaging for longer. This is tempered at both ends of the age spectrum by lower expectations of availability. This moves the labor force curve closer to a fairly normal distribution in 2015. However, as the population continues to age, the distribution of the labor force curve "hollows out" in 2025, with more workers engaged in the 30-39-year-old age cohorts and fewer during the prime working ages of 45-60. This represents the near-term impact of the Generation X population on the workforce.

Two final considerations that need to be taken into account when developing an accurate forecast of the region's workforce are the role of multiple job holders and the unemployment rate. We know that some portion of the workforce is employed by more than one employer or in more than one job. For example, a young person may work in a retail store during the day and in a restaurant at night. They would effectively be double-counted in any estimate of employment. Similarly, we know that every labor market has an unemployment rate of some level. These two considerations have opposing impacts on workforce availability. For the purposes of this forecast, a baseline estimate of 1.08 jobs per worker and a 3.5 percent unemployment have been assumed and further forecast to account for demographic and economic trends.

Figure 11: Available Labor Force Composition by Age Cohort – 2015 and 2025



Source: Author's Estimates

Taking each of these factors into consideration, we can estimate the effective size of the available regional labor force from 2015 to 2040. The chart in Figure 11 presents the estimates for 2015 and 2025.

We find that the total available regional labor force decreases from 192,843 to 189,777 between 2015 and 2025. This represents a decrease of 2.1 percent, which exceeds the projected population loss of 1.6 percent over the same period. It is also important to note that these estimates do not represent levels of regional employment. We shall see that there are a number of other key considerations at play in the development of a regional supply and demand forecast.

3.3 REGIONAL WAGE AND INCOME GROWTH CHARACTERISTICS

The final aspect of the region's demographic and workforce profile that deserves specific notice given its potential impact on the ability for the region's employers to meet their workforce needs are recent trends in wage and income growth. Income growth was one of the key factors noted in the *Regional Asset Inventory* and Readiness Analysis as a primary concern for the region. The Greater Lima Region has long prided itself as being the source of well-paying, family-supporting jobs in manufacturing and other industries. One of the more significant impacts of the recession of 2007-2009 has been a relative stagnation of wage growth in a number of manufacturing communities.

Figure 12: Average Annual Wages by Industry Sector

Industry Sector	2015 Annualized Average Wage	Real Percentage Change: 2005-2015
All NAICS Sectors	$40,304	-6.1%
Agriculture, Forestry, Fishing and Hunting	$20,821	-2.8%
Mining, Quarrying, and Oil and Gas Extraction	$34,798	-68.7%
Utilities	$51,411	-0.2%
Construction	$52,236	9.9%
Manufacturing	$53,189	-9.9%
Wholesale Trade	$52,675	3.0%
Retail Trade	$25,930	-3.6%
Transportation and Warehousing	$39,612	-15.6%
Information	$34,772	-8.1%
Finance and Insurance	$47,978	6.8%
Real Estate and Rental and Leasing	$28,977	-11.6%
Professional, Scientific, and Technical Services	$54,753	14.5%
Management of Companies and Enterprises	$80,953	52.9%
Administrative and Support and Waste Management and Remediation Services	$27,133	-4.8%
Educational Services	$38,167	-3.9%
Health Care and Social Assistance	$34,517	-20.2%
Arts, Entertainment, and Recreation	$16,776	-0.5%
Accommodation and Food Services	$14,787	7.3%
Other Services (except Public Administration)	$23,485	4.5%
Public Administration	$37,427	-7.9%

Source: Quarterly Workforce Indicators, United States Census Bureau

Figure 12 presents annual wages and ten-year real wage growth by industry sector for the Greater Lima Region. The results here present a profile that is not dissimilar to that of other manufacturing communities. Real (inflation-adjusted) wages across all industries decreased by 6.1 percent since 2005. Real manufacturing wages decreased by 9.9 percent. Wage growth in other prominent industry sectors have exhibited similar trends with one notable exception. Wage decline in the Mining, Quarrying, and Oil and Gas Extraction industry sector have been offset by increases in the Management of Companies and Enterprises sector due to a reclassification of certain employment.

There are a number of positive conclusions that can also be gleaned from these wage estimates. A number of industry sectors with a significant presence in Allen County and the surrounding region pay wages that are higher than the all industries average. This disparity is present in the manufacturing, wholesale trade, and professional and technical services, among other industry sectors. This is important as the presence of higher-than-average wages may represent a recruiting advantage to manufacturers and related firms.

An alternate means of considering the issue of income growth in the Greater Lima Region is to analyze trends in per capita personal income. Analysis of this type frequently complements discussions of wage growth as personal income includes a variety of non-wage sources, such as investment dividends or pension benefits.

Figure 13: Per Capita Personal Income Growth: 2004-2014

	Per Capita Personal Income	2004-2014 Nominal Growth	2004-2014 Real Growth
Ohio	$42,236	33.1%	6.2%
Greater Lima Region	$39,360	38.8%	10.7%

Source: United States Bureau of Economic Analysis

Figure 13 presents the most recent (2014) per capita personal income estimates for Ohio and the Greater Lima Region. It also presents growth estimates in nominal and real terms over a ten-year period. The first point to make in this analysis is that per capita personal income in both regions is well below the national average of $47,469. This finding is not surprising given marked differences in industry composition between the region and national averages. This disparity has also been offset by a relatively lower cost of living in the Greater Lima Region.

We also see that personal income growth in the Greater Lima Region has been significantly higher than the state in both nominal and real terms. The 10.7 percent real growth rate also eclipses the national growth rate of 8.6 percent. This suggests that the relative prosperity gap that affected the perception of the region in the past may be lessening.

The connection between wage and income growth and workforce needs is clear. As employers may continue to experience difficulty finding qualified candidates, they will be forced to pay a higher premium for both new workers as well as to retained their most valued employees. This will further increase the prosperity of the region so long as the labor market continues to meet employers' needs.

3.4 IMPLICATIONS

In conclusion, the key trends to consider in this section are:

- The Greater Lima Region's population has stagnated in recent years, with periods of population decline connected to significant economic shocks.
- The region's birth and migration rates have both stabilized, but are slightly negative. This suggests that the region may have some difficulty developing a suitable pipeline of young talent.
- The Greater Lima Region's unemployment rate has declined more rapidly than the state or national rate over the past four years, suggesting that the region is currently experiencing some level of labor market constraint.
- Wages in the region have declined slightly over the past decade, though this is expected to recover as younger workers increase their earnings potential with education and experience.
- The region will experience a significant wave of industry retirements over the next fifteen years. This trend will especially impact the construction, manufacturing, and transportation industries. Firms in these sectors need to anticipate and prepare in advance in order to ensure that suitable replacement workers are available.

The preceding analysis presents a general picture of the current and prospective supply of workers in the Greater Lima Region. We will revisit a few of these topics in coming sections. Next, we will turn our attention to consider the current hiring needs of the region's employer base.

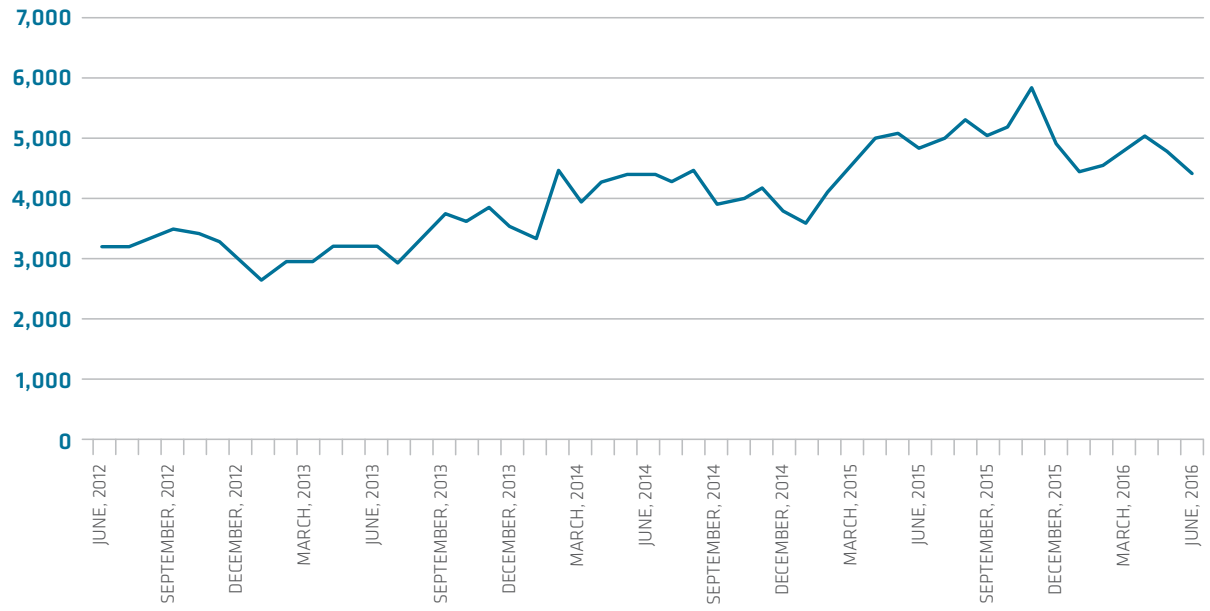
4.0 OCCUPATION SUPPLY AND DEMAND PROFILES

The demographic and workforce trends recently observed in the region suggest that employers may be experiencing difficulty in finding qualified candidates due to a slowly shrinking labor force, caused both by relatively slow population growth and the more rapid aging of the region's population. Hiring demand in the region has generally responded to these changes in availability. However, we also know that hiring demand has increased significantly even as the unemployment rate has decreased. We will examine the shape of these dynamics by considering both regional and manufacturing hiring patterns.

Hiring throughout the Greater Lima Region has grown at a relatively steady pace since the end of the recession of 2007-2009. Hiring activity can be measured by proxy through examining the volume of job openings posted through a variety of online means. This is possible largely because many companies started using online portals such as https://jobseeker.ohiomeansjobs.monster.com/ as early as the mid-1990's, but in larger numbers over the past decade. This has significantly increased the ability to effectively connect employers and jobseekers and also gives analysts the opportunity to measure the volume of labor market activity in real-time.

The chart in Figure 14 presents a monthly count of job openings posted in the Greater Lima Region between June 2012 and June 2016. As you can see, there have been a number of punctuated spikes in the first quarter of each of the past three years. This indicates that there is a certain degree of seasonality in hiring patterns in the region. This closely correlates with the unemployment trends that were previously discussed.

Figure 14: Historical Job Openings Volume: June 2012-June 2016



Source: Help Wanted Online, The Conference Board

Posting volume reached a high point in August 2015 at 5,274 openings, and currently stands at 4,437 openings. The current volume represents a 38.3 percent increase since June 2012. This reflects for a significant increase in hiring volume as well as an increase in the utilization of online job postings.

4.1 HIRING DEMAND BY EMPLOYER

Hiring demand has also been consistently distributed across the region. Over the course of the most recent quarter, the bulk of hiring activity has occurred in Allen County (5,080 openings) and Hancock County (3,332 openings). This again tracks with population and employment patterns. The distribution of employers is also largely centered in these two counties, though employers throughout the region remain active.

Figure 15: Current Openings by Employer: March 30, 2016 – June 30, 2016

Advertiser	2016	2015	Year to Year Difference
Blanchard Valley Health System	435	221	214
MERCY HEALTH	222	160	62
Crown Equipment Corporation	197	200	-3
Pizza Hut	122	0	122
Lowe's	95	68	27
Roehl	86	19	67
Manpower	82	64	18
The University of Findlay	73	68	5
Bob Evans Farms, Inc.	73	55	18
Trilogy Health Services	69	102	-33
Charles River Laboratories	64	37	27
Ortho-Clinical Diagnostics, Inc.	63	1	62
Findlay City Schools	62	61	1
StaffMark, LLC.	62	68	-6
Sears Holdings Corporation	60	32	28
U.S. Xpress	55	34	21
CRST Dedicated Services	54	9	45
The Dannon Company	53	10	43

Source: Help Wanted Online, The Conference Board

Figure 15 presents those employers with a minimum of 50 current openings over the past three months in the Greater Lima Region. One immediate trend becomes clear. The health care sector demonstrates the largest and most pressing demand. This is again consistent with similar trends observed nationally as the challenges presented by an aging population in a number of communities have prompted significant hiring.

Moving past the presence of more than 700 health-care related openings among large employers, we see that two industry sectors closely tied to the region's manufacturing base are also quite active. A number of manufacturers, led by Crown Equipment Corporation, Bob Evans Farms, and the Dannon Company have demonstrated significant hiring needs. Crown Equipment leads the way, accounting for nearly 200 open positions and more than half of all current manufacturing vacancies. We will consider manufacturing needs more fully in the next section of this analysis.

Another industry sector that is of vital importance to the region's manufacturers and other major industries is the trucking and logistics industry. There has been significant concern regarding the availability and growing demands for semi-truck and tractor-trailer drivers nationally extending before the recession of 2007-2009 due to declining interest in working arrangements and greater competition in other industry sectors. These concerns have been amplified by a rapidly aging workforce. The current average age of an operating truck driver in the United States is 49.6 years old. Three national concerns with a regional presence – Roehl, U.S. Xpress, and CRST Dedicated Services – account for 185 total openings, or only ten percent of the openings across the industry sector. Meeting these demands will also prove critical as many of the region's manufacturers are dependent on a variety of shipping modes to meet the needs of customers in widespread and diverse markets. This conclusion will be reinforced in the supply chains needs and opportunities analysis that will accompany this report.

Figure 16: Current Job Openings by Occupationa Title: March 30, 2016 to June 30, 2016

Occupation Title	2016	2015	Year to Year Difference
Heavy and Tractor-Trailer Truck Drivers	1,999	2,550	-551
Registered Nurses	359	229	130
Retail Salespersons	265	268	-3
First-Line Supervisors of Production and Operating Workers	229	269	-40
Helpers--Production Workers	192	207	-15
First-Line Supervisors of Retail Sales Workers	189	236	-47
Maintenance and Repair Workers, General	171	291	-120
Industrial Engineers	167	251	-84
Nursing Assistants	164	104	60
Licensed Practical and Licensed Vocational Nurses	155	104	51
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	145	187	-42
First-Line Supervisors of Food Preparation and Serving Workers	135	189	-54
Laborers and Freight, Stock, and Material Movers, Hand	127	133	-6
Light Truck or Delivery Services Drivers	124	137	-13
Security Guards	118	108	10
Combined Food Preparation and Serving Workers, Including Fast Food	114	85	29
First-Line Supervisors of Mechanics, Installers, and Repairers	103	107	-4
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	101	135	-34
Computer User Support Specialists	97	95	2
Customer Service Representatives	96	259	-163
Home Health Aides	93	112	-19
Driver/Sales Workers	90	94	-4

Source: Help Wanted Online, The Conference Board

4.2 HIRING DEMAND BY OCCUPATION

Detailing the list of employers and industries that are actively experiencing workforce needs is useful to facilitate economic development activities as most of these strategies are based at the firm level. However, this analysis provides little strategic value for the education or workforce practitioner. This is because both training and employment are determined at the level of the individual job seeker. The easiest way to translate these demands and the associated skills required is though analysis of the most prominent occupations. Figure 16 details those occupations that included at least 90 openings in the most recent quarter.

A number of notable trends are again apparent in the data presented here. First, we see that there is a wide variety of occupations that are currently in demand. This is especially true of the demand for Heavy and Tractor-Truck Drivers, whose 1,999 openings represents nearly one-fifth of all job openings during this period. This mirrors state and national trends.

Second, the significance of employment demands in the health services industry sector are also clear. The region's employers posted more than 500 combined nursing positions (registered nurse or licensed practical nurse) during the most recent quarter. This is coupled with demand for an additional 155 nursing assistants. This also mirrors national trends. Demand in this area

is especially significant given the increasing importance of healthcare access in the region and the fact that the average age that a nurse leaves active care nationally is 53 years-old. This suggests that demand for nursing talent will continue to increase in the coming years.

Finally, the importance of manufacturing employment in the region is again made clear. We will discuss specific demands in this industry sector in the coming section, but it is important to highlight two particular occupations – supervisory workers and industrial engineers. Employers nationally have highlighted the demand for stronger leadership development through the National Association of Manufacturers and others. The importance of skilled leadership in all aspects of the industry is essential to groom the next generation of manufacturing talent. There are currently 342 openings for supervisors of production and maintenance workers in the Greater Lima Region.

The second specific area of manufacturing hiring demand that may require innovative solutions is the demand for Industrial Engineers. The 167 regional openings occurred at the same time that a new class of prospective engineers graduated from the region's colleges and universities. It is clear that the supply of engineers out of universities such as the University of Northern Ohio, the University of Toledo, and the Ohio State University is insufficient to meet regional and state demand as 120 of the listed positions have been open more than ninety days. Access to a sufficient pool of engineering talent is crucial in several industry sectors. Finding engineering talent with specific industry experience is noted as especially challenging.

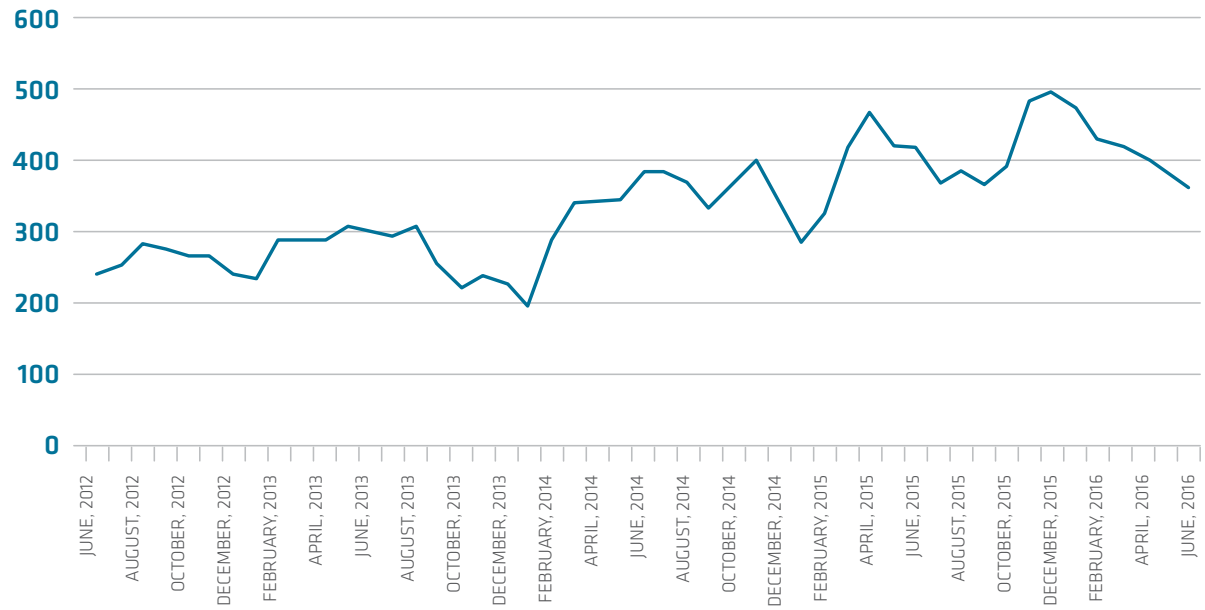
In sum, we see that current hiring demand in the Greater Lima Region is not restricted to a single industry sector or single occupation. The demands on a shrinking labor market have increased significantly over the past four years across every industry sector. We will now focus on the impact of hiring pressures in the region's manufacturing sector in more specific detail.

4.3 HIRING DEMANDS IN MANUFACTURING INDUSTRIES

The region's manufacturing base has been the focus of much of the analysis conducted by Future iQ Partners as part of the Allen County Defense Initiative. This comes largely due to the focus of industry readjustment work on the Joint Systems Manufacturing Center and related suppliers. However, the specific focus on manufacturing beyond the aims of the project is well-founded given the relative importance of the industry sector in the region as well as its future role in supporting further regional innovation.

Manufacturing employment in the eight-county region represents 28,576, or more than one-quarter of all employment. We have already demonstrated that average annual wages are significantly higher than the all industries average. This would seemingly provide employers with an advantage in attracting skilled talent. The experiences of many manufacturers in the region, as demonstrated by survey responses and other anecdotal information have not proven this advantage. We shall see that hiring demand among the region's manufacturers is not restricted to a single firm or occupation. Rather, current and future demand is as diverse as the industry sector itself.

Figure 17: Historical Manufacturing Job Openings Volume: June 2012 – June 2016



Source: Help Wanted Online, The Conference Board

Figure 17 demonstrates that industry sector hiring activity has increased significantly over the past four years, though manufacturing demand demonstrates more seasonal variability than regional demand in full. This is primarily due to the hiring needs of the region's food processing industry sector. The region's manufacturing hiring demands tend to peak in early fall and early spring.

Total hiring demand has increased from a low of 197 positions in January 2014 to a current level of 368 open positions in June 2016. This represents 8.3 percent of the Greater Lima Region's total openings. We would expect to see a sectoral demand that is more than three-times greater to reflect its relative share of regional employment. However, the relatively slack hiring activity is understood contextually as most manufacturers in the region have reported operating at or near peak capacity. This, coupled with national estimates of historically-high labor productivity suggests that most employers are hiring at the edges rather than adding significant numbers of new employees. These hiring demands will only increase as industry activity increases, such as activity related to the development of the next-generation Abrams platform by General Dynamics Land Systems.

Figure 18: Hiring Demand by Manufacturer: June 2016

Advertiser	2016	2015	Year to Year Difference
Crown Equipment Corporation	47	32	15
Manpower	35	28	7
Adecco	34	16	18
StaffMark, LLC.	34	33	1
Spherion	24	10	14
Advanced Drainage Systems, Inc.	17	9	8
Minute Men Staffing Services	17	0	17
Time Staffing	16	5	11
Kelly Services	15	11	4
Bob Evans Farms, Inc.	13	13	0
The Dannon Company	13	2	11
International Paper	10	6	4
Trinity Industries, Inc.	10	16	-6
Whirlpool	10	15	-5
Taylor Corporation	9	0	9
MetoKote Corporation	8	1	7
Aerotek	7	8	-1
LAKEVIEW FARMS	7	2	5
Ford Motor Company	7	5	2
Filtech Inc	6	0	6
BENCHMARK NATIONAL CORP	6	1	5
Midway Products	6	4	2
UnitedRecruiters, LLC	5	1	4
Ball Aerospace	5	5	0
Federal Mogul	5	13	-8
Westaff, Inc.	5	3	2
Norfolk Southern	5	0	5

Source: Help Wanted Online, The Conference Board

Figure 18 details current hiring demand for all firms with at least five active openings. The first point to restate is that Crown Equipment Corporation currently has the most pressing hiring need in the region. The second item of note is that a number of regional manufacturers utilize staffing agencies to fill most of their entry-level and skilled talent needs. As such, it is unsurprising to see national firms such as Manpower, Adecco, and Spherion among those with the most manufacturing openings.

The general profile of hiring activity presented here again suggests that many of the region's manufacturers are hiring to maintain relatively stable production activity. This is consistent with national hiring activity as hiring in most manufacturing sectors has stabilized over the past year and a half. There are a number of important caveats that we must consider.

First, it is important to note that not all employers recruit for every position online. For example, many small firms are more hesitant to use an online portal to recruit for a highly technical position. Other firms may choose to fill leadership positions through more personal means or with boutique staffing agencies. Another common practice is for firms to partner with local education and workforce development partners to fill certain positions through specialized recruitments.

Similarly, a number of the region's largest manufacturing firms, such as Procter and Gamble and Potash are

subsidiaries of multi-national concerns that have centralized their recruitment activities. As such, open positions may be attributed to the location of the hiring office rather than the specific worksite. Procter and Gamble, for example is currently listing 151 openings throughout their North American operations. This has become more common nationally, which further complicates our analysis.

Figure 19: Manufacturing Hiring Demand by Occupation: June 2016

Occupation Title	2016	2015	Year to Year Difference
Industrial Engineers	68	81	-13
First-Line Supervisors of Production and Operating Workers	64	84	-20
Helpers--Production Workers	31	28	3
Crossing Guards	28	5	23
Maintenance and Repair Workers, General	22	48	-26
First-Line Supervisors of Mechanics, Installers, and Repairers	21	13	8
Laborers and Freight, Stock, and Material Movers, Hand	20	10	10
Accountants	15	14	1
Production, Planning, and Expediting Clerks	15	14	1
Computer-Controlled Machine Tool Operators, Metal and Plastic	13	6	7
Security Guards	13	4	9
Stock Clerks- Stockroom, Warehouse, or Storage Yard	11	4	7
Industrial Engineering Technicians	10	9	1
First-Line Supervisors of Non-Retail Sales Workers	10	5	5
Helpers--Installation, Maintenance, and Repair Workers	10	0	10
Welders, Cutters, and Welder Fitters	9	5	4
Purchasing Agents, Except Wholesale, Retail, and Farm Products	9	13	-4
Heavy and Tractor-Trailer Truck Drivers	9	12	-3
Machinists	9	10	-1
Packaging and Filling Machine Operators and Tenders	9	9	0
Industrial Safety and Health Engineers	8	3	5
Electrical Engineers	8	11	-3
Human Resources Managers	7	7	0
Computer User Support Specialists	7	15	-8
Inspectors, Testers, Sorters, Samplers, and Weighers	7	7	0
Driver/Sales Workers	7	1	6
Industrial Truck and Tractor Operators	7	1	6
First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	6	6	0
Electricians	6	4	2
Information Technology Project Managers	6	3	3
Public Relations Specialists	6	0	6
Managers, All Other	6	3	3
Bookkeeping, Accounting, and Auditing Clerks	6	5	1
Industrial Machinery Mechanics	5	10	-5
Electrical and Electronic Equipment Assemblers	5	4	1

Occupation Title	2016	2015	Year to Year Difference
Bus and Truck Mechanics and Diesel Engine Specialists	5	6	-1
Training and Development Specialists	5	10	-5
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	5	7	-2
Retail Salespersons	5	2	3
First-Line Supervisors of Office and Administrative Support Workers	5	4	1
Production Workers, All Other	5	3	2
Stock Clerks, Sales Floor	5	2	3
Computer Systems Analysts	5	12	-7
Mechanical Engineers	5	25	-20
Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	5	3	2
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	5	2	3
Marketing Managers	5	8	-3
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	5	16	-11
Industrial Production Managers	5	6	-1
Human Resources Assistants, Except Payroll and Timekeeping	5	7	-2
Other Occupations	207	222	-15
Total	**775**	**791**	**-16**

Source: Help Wanted Online, The Conference Board

Figure 19 presents regional hiring data for all occupations with at least five current openings. The importance of the demand for engineering and supervisory talent is again emphasized and extended with the addition of a number of similar occupations. It is also important to note that the hiring needs of manufacturers in the region are quite diverse and include demands for skilled, unskilled, and support occupations in all facets of their operations.

We can also see the importance of skilled trades occupations in meeting the needs of the region's manufacturers in current hiring activity. The demand for Maintenance and Repair Workers, Computer-Numerical-Controlled Machinists, Welders, and Machinists are the most acute with 31 regional openings. A number of other occupations ranging from electricians to information technology workers also require some form of post-secondary education. These demands will need to continue to be met by the region's educational institutions.

The significance of the region's skilled trades demand is also confirmed by the findings of the *Future of Manufacturing*. Manufacturing is becoming more efficient and sophisticated as firms of all sizes capitalize on a number of technological innovations ranging from additive manufacturing and automation. As the adoption of these new processes and

products continues and manufacturers evolve further, we would expect that demand for many of these occupations will continue to increase.

This trend will reverse the decline in demand and interest in many of these occupations during the past twenty years. This shifting demand is frequently cited as one of the causes of the manufacturing skills gap that has garnered a great deal of national attention. Demand for a number of technical careers has increased while a pool of skilled workers with industry experience has dwindled. This has caused a number of manufacturers to consider a series of more novel solutions for meeting their hiring needs. This includes a growing appreciation of the value of transferrable skills.

4.4 IMPLICATIONS

The general implications of the current hiring demands of the region that we must consider include:

- Hiring demand has increased significantly since 2012. As industry retirements continue to accelerate, we would expect this demand to continue to grow modestly regardless of external economic conditions.
- Occupational demand is most acute in the transportation and health care industries, with the largest demands for heavy and tractor-trailer drivers and nursing professionals.
- Hiring demand in the manufacturing sector is more modest and reflects an industry sector that is maintaining current staffing levels. This is expected to change in the next several years due both to retirement demands and expected growth by General Dynamics Land Systems and other large employers.

The analysis will next turn to consider the role of relationships between occupations as the basis for the development of a hiring demand forecast model.

5.0 FORECASTED OCCUPATIONAL SUPPLY AND DEMAND MODEL

The analysis to this point has focused on an analysis of historical trends and current workforce needs in the Greater Lima Region. The general consensus of employers and community stakeholders in the region suggests that the region's education and workforce development ecosystem is doing at least an adequate job of meeting these needs. The demographic analysis presented in Section 3.0 implies that these needs will be more difficult to meet in the near future due to a fundamental shift in labor availability. As such, it is of critical strategic importance for the region's economic and workforce development ecosystem to begin to assume a proactive posture in anticipating the changing needs of the future.

In order to gain a better understanding of the ways that various industry and economic trends could potentially impact hiring patterns in the region, the Future iQ team developed a scenario-driven hiring demand model that introduces two innovative concepts to our understanding of workforce needs – the linkage between employment and economic growth, and the importance of transferrable skills when considering hiring demands across industries. The model that has been developed for this analysis will be described in the next section.

5.1 OCCUPATIONAL DEMAND MODEL METHODOLOGY

The basic theory driving this model suggests that there is some relationship between economic growth and employment growth. While this theory is imperfect and works better in describing growth patterns in some industries than others, it is the simplest, most elegant means of forecasting future growth.

In order to forecast cluster demand, industry employment and output (GDP) were measured for the eight-county region from 2004-2014, as estimated by the United States Bureau of Economic Analysis. Bayesian estimation was then used to generate stabilized Labor Utilization Rates, or LUR. A LUR simply expresses a ratio of the extent to which employment increases with respect to a one percent change in GDP over a given period. For example, manufacturing carries a Labor Utilization Rate of 0.31%, meaning that three employees are employed for every $1,000 in revenue a typical manufacturer generates. In some instances, these rates were refined to incorporate other factors, such as technological change, or, in the case of health care, patient demand. These rates serve as the means by which our growth assumptions are translated to demand for employment.

The baseline employment used in this simulation is taken from the 2014 Annual Averages of the Quarterly Census of Employment and Wages, as reported by the United States Bureau of Labor Statistics. In a limited number of instances, employment and income data from the Bureau of Economic Analysis was used to supplement these estimates in the case of agricultural and self-employment. One limitation of the model specification is that revenue and employment effects are only reported at the industry super sector level, meaning that, while it is possible to project potential employment changes in manufacturing, we cannot forecast employment changes among food processors, for example.

Industry employment is translated to occupational employment through use of the national industry-occupation matrix provided by the United States Bureau of Labor Statistics. This allows the analyst to estimate how many accountants are employed by manufacturers as opposed to banks, for example. Each state develops its own unique industry-occupation matrix in the production of its long-term industry and occupation employment projections. The national matrix is used in this case as the model is designed to respond to both national and local economic conditions.

5.1.1 CLUSTERING OCCUPATIONS BY SKILLS

Each occupation has been further coded by a unique occupational skills cluster and sub-cluster, thereby allowing us to forecast these same growth assumptions into cluster demand. This method was selected for two principal reasons. First, reporting projected growth across a large cluster allows for relative ease in analysis. Second, and more importantly, the use of occupational skills clusters emphasizes the transferability of skills across occupations.

The characteristics of specific occupational skills clusters will be discussed in further detail in the model results. The logic underlying the development of the occupational skills clusters asserts that each occupation can be defined in terms of the knowledge, skills, and work activities that are commonly associated with it.

- Knowledge refers to organized sets of principles and facts in a general domain. The United States Department of Labor classifies each occupation in one of 33 areas of knowledge, ranging from Administration and Management to Transportation.
- Skills are those developed capacities that facilitate learning or the more rapid acquisition of knowledge. Occupations are classified along 35 different dimensions in areas including basic skills, social skills, and technical skills.
- Work Activities are general types of job behaviors that occur on multiple different jobs. Forty-one different work activities have been measured, ranging from information input to work output.

Each occupation is further assigned two scores for each of these 109 characteristics – an importance measure and a level measure which describe how important the characteristic is and how frequently it is used. Indexing each occupation by both of these scores across each measure leads to the creation of a compatibility matrix which compares how similar every occupation is to every other occupation and on which dimensions. For example, a Biochemist and a Geneticist have a high level of similarity while neither is similar to a Model.

Those occupations that display a high level of compatibility were then grouped into a series of fifteen clusters and sixty-five sub-clusters. The occupational skills clusters include:

- General physical labor
- Clerks, secretaries and agents
- Construction and machinery repair
- Equipment operation and maintenance
- Health care and biological sciences
- Service
- Humanities, social science, outreach, and education
- Engineering, except industrial
- Equipment repair
- Food preparation, service, and security attendants
- Managers, except production
- Law, quantitative analysis, computers, and physical sciences
- Outreach, public safety aides, technicians, and performing arts
- Communications and visual arts
- Public safety

A full description of each cluster and sub-cluster is included as an appendix to this analysis. This allows us to discuss occupations in terms of transferable groupings where it is reasonable to assume that an individual in every occupation in a given cluster could fill an opportunity in another occupation in the cluster with marginal additional training.

An example of one of the largest occupational clusters is General physical labor, which includes all occupations where workers generally engage in physical activity. This includes such occupations as farmworkers, landscapers, and machine operators. There are more than 32,000 workers employed in this occupational skills cluster in the Greater Lima Region.

5.2 OCCUPATION DEMAND MODEL RESULTS AND ANALYSIS

The results presented in the following section present the expected industry and employment growth associated with a ten-year average GDP growth rate of 3.2 percent. This is consistent with historical growth over the past decade. As the model forecasts the number of jobs in a given industry and occupation class, it makes no distinction for part-time or full-time, or new or replacement positions. It also carries no assumption as to whether a given position is filled, or whether it reflects excess demand needed to meet capacity requirements. As such, the model is in no way constrained by the size of the available labor force.

The model suggests that, given average GDP growth of 3.2 percent, regional employment demand will increase by 9.8 percent, or nearly 21,500 positions. The projected hiring demand by industry sector is presented in Figure 20.

Figure 20: Industry Hiring Forecast: 3.2 Percent Annual GDP Growth

NAICS	Industry	2014 Baseline	GDP Share	LUR	2024 Projected
11	Agriculture, Forestry, Fishing & Hunting	1,419	1.8%	0.06%	1,449
21	Mining, Quarrying & Oil & Gas Extraction	98	0.2%	0.49%	116
22	Utilities	645	2.0%	0.36%	732
23	Construction	8,348	3.2%	0.55%	10,039
31-33	Manufacturing	34,979	18.7%	0.31%	39,017
42	Wholesale Trade	6,685	5.6%	0.13%	7,011
44-45	Retail Trade	16,730	6.1%	0.04%	16,977
48-49	Transportation & Warehousing	5,761	2.8%	0.27%	6,329
51	Information	1,983	2.9%	0.04%	2,013
52	Finance & Insurance	3,253	9.2%	0.36%	3,685
53	Real Estate & Rental & Leasing	1,176	11.6%	0.72%	1,491
54	Professional & Technical Services	3,759	4.5%	0.34%	4,231
55	Management Of Companies & Enterprises	2,719	2.3%	0.35%	3,067
56	Administrative & Waste Services	8,923	2.3%	0.85%	11,730
61	Educational Services	11,537	1.0%	0.46%	13,514
62	Health Care & Social Assistance	21,781	9.2%	0.39%	24,913
71	Arts Entertainment & Recreation	2,940	0.7%	0.85%	3,868
72	Accommodation & Food Services	10,990	2.5%	0.31%	12,269
81	Other Services Excluding Public Administration	22,593	2.5%	0.08%	23,224
92	Public Administration	25,474	10.8%	0.16%	26,950
TE	Self-Employed and Unpaid Family Workers	28,300	N/A	0.06%	28,929
0	**Total, All Industries**	**220,093**	**100.0%**		**241,555**

We see that increased hiring demand is forecasted in every industry sector as the model presents an estimate of demand rather than specific employment. This demand is not consistent across all industry sectors due to the interaction of the GDP shares of each industry sector and its Labor Utilization Rate. For example, the model projects that regional manufacturing employment will increase by more than 4,000 positions over the ten-year period while retail trade employment will only increase by slightly more than 200 positions. The model also forecasts modest growth in the transportation and warehousing industry sector of 668 total positions. This reflects the current projected hiring difficulty that industry firms face and will continue to face in attracting local and regional drivers and owner-operators.

Figure 21: Projected Hiring Demand by Occupational Skills Cluster: 3.2 Annual GDP Growth

Cluster	2014 Baseline	2024 Projected	Employment Change
General physical labor	32,201	35,612	3,410
Clerks; secretaries; agents	38,228	41,961	3,734
Construction & machinery repair	4,772	5,380	608
Equipment operation & maintenance	23,178	25,406	2,227
Health care; biological sciences	8,288	9,315	1,027
Service	20,173	22,009	1,836
Humanities, social science, outreach & education	10,923	12,247	1,325
Engineering, except industrial	4,146	4,367	222
Equipment repair	3,474	3,828	355
Food preparation; service & security attendants	20,492	22,198	1,706
Managers, except production	19,023	20,692	1,670
Law; quantitative analysis; computers; physical sciences	11,536	12,658	1,122
Outreach & public safety aides & technicians & performing arts	16,413	18,193	1,781
Communications & visual arts	3,886	4,173	288
Public safety	2,088	2,243	155
Total	**218,819**	**240,283**	**21,464**

When we shift our attention to forecasted hiring demand by occupational skills cluster, we are presented with slightly different results. First, it is important to note that the total employment estimates here do not exactly match those presented in the industry employment forecast. This is because a small group of occupations could not be clustered with any other occupations. These occupations are largely found in the group of self-employed workers.

The manufacturing industry growth forecast is shared by similar growth expectations in the general physical labor skills cluster. The forecasted increase of 3,410 jobs is only eclipsed by the 3,734 position increase forecasted in the clerks, secretaries and agents, occupational skills cluster. This finding makes intuitive sense since workers in this cluster are employed in nearly every industry sector.

It is also important to note that the forecast model projects relatively weak growth in engineering and maintenance occupations, with only 222 general engineering positions forecasted. This projection also accounts for the current difficulty regional firms face in attracting qualified candidates. Similarly, modest demand is forecast in construction and machinery repair occupations for similar reasons.

5.2.1 A NOTE ABOUT SUPPLY AND DEMAND

At this point we can begin considering the alignment of workforce supply and demand in a general sense. Earlier estimates of workforce availability suggested that the region has 192,834 workers at present, but will only have 189,775 in the next decade. Neither of these estimates is sufficient to meet either existing or projected employment in the region.

This illustrates another important point regarding the region's workforce and its potential alignment. We know that the regional labor market is largely defined within the borders of the eight-county region. However, there is some inflow and outflow around the edges. As such, we know that the actual size of the regional labor force is somewhat larger than these estimates.

The best way to assess the impact of these size disparities can be seen in a simple analysis of the gap that needs to be filled by workers outside of the region. Under our baseline scenario, roughly 12 percent of positions are filled by a worker outside of the eight-county region. By 2025, this is expected to increase to more than 21 percent. Given that we know that the population of West Central Ohio is generally declining, we must also presume that

the region's employers will have to recruit from further and further distances in order to meet the labor needs created by even average economic growth rates.

It is also important to note here that we cannot make more specific observations regarding the alignment of workforce availability around specific industry or occupation needs. Official employment projection estimates such as those developed by the United States Bureau of Labor Statistics assume that each forecasted unit of employment represents a filled job. The forecasts here are freed from this constraint. As such, we cannot predict which of the openings predicted by the forecast may remain unfilled, but the supply estimates provided here suggest that significant numbers may be.

We will next consider a number of alternative growth scenarios that demonstrate the flexibility of the model and the utility of the occupational skills cluster approach.

5.3 CONSIDERING ALTERNATIVE GROWTH SCENARIOS

There are a number of advantages of analyzing hiring demand using the model that has been developed here. The removal of a labor force constraint allows us to consider areas where growth might be constrained due to a lack of qualified workers and other areas where growth might be accelerated due to some industry change. The hiring demand model also allows us to consider a variety of scenarios where changes to some aspect of the model may change hiring demand.

The analysis in this section will consider a number of such scenarios. The first considers the continued implications of a the slow-growth pattern recently observed nationally. The second considers a counter to this argument but envisioning a short-lived growth spurt. The third examines the impact of a change in labor utilization prompted by an increase in manufacturing automation. The final scenario considers the regional adjustment that may occur due to the introduction of a new industry sector to the region, such as the opening of an internet-commerce distribution facility, such as those operated by Amazon.com.

5.3.1 SCENARIO DESCRIPTIONS

Scenario 1: Continued Sluggish Growth

The first scenario considers a potential worst-case scenario for the Greater Lima Region. Regional GDP growth has generally stayed above national trends over the past five years. This scenario projects the impacts on the region's hiring demand if the region's growth rate would decline to reflect recent national trends. This could occur due to a number of potential factors such as a weakening of automotive demand, a decrease in consumer spending driven by an aging population, or the cancellation of a military contract, for example. For the sake of this scenario, we will assume that regional GDP will increase by 1.5 percent per year for the next decade.

Scenario 2: Large, but Short-Lived Growth

The second scenario assumes that there is some short-term increase in the manufacturing sector due to a change in activity. For example, we could envision a scenario in which activity at the JSMC increases due to the award of a demonstration contract or a large foreign sale. We could also envision a scenario where growth increases as regional firms begin to collaborate more closely and purchase a higher volume of goods from each other. For the same of this scenario, we will assume that the region's GDP increases by 3.8 percent, which would be driven by a five percent increase in manufacturing GDP. For reference, this would equate to roughly $122 million per year in new regional activity. We can also assume that this change would be short-lived as supply chains and production scheduling would eventually adjust to the new production demand.

Scenario 3: Increases in Regional Manufacturing Automation

The second advantage of the hiring demand forecast model is the ability to consider the impact of changes on a single occupation or an occupational skills cluster prompted by industry changes. One such scenario may consider the role that an increase in the use of automation technologies such as robotics or remote manufacturing may have on the

demand for manufacturing labor. The easiest way to model this change is to analyze an adjustment to the manufacturing Labor Utilization Rate.

In this scenario, we can easily assume that the introduction of new automation technology at a number of regional manufacturers may reduce demand for less-skilled labor, such as machine operators, machine tenders, and assemblers. For the sake of this scenario, we assume that the baseline Labor Utilization Rate of 0.31% is depressed by 0.05% to 0.26%. We could also consider related changes in other industry sectors, but will restrict our analysis to a single change for ease of interpretation.

Scenario 4: Development of a New Internet Commerce Distribution Center

The final scenario expands on the premise of the third scenario while considering changes in the labor utilization rate of multiple industries. In this scenario, we assume that an internet commerce retailer announces plans to open a new distribution facility in the region. This would lead to a hypothetical 0.03% increase in the labor utilization rate of the transportation and warehousing industry sector and similar increases in the information and professional and business services industry sectors. This further assumes no changes in any other industry sector as the demand experienced by these industries will be unaffected in the short-run by the introduction of this new competitor.

All alternative growth scenarios assume a ten-year forecast. The results of each of these scenarios on industry and occupational skills cluster hiring demand are presented in Figure 22.

Figure 22: Alternative Industry Hiring Demand Scenario Results

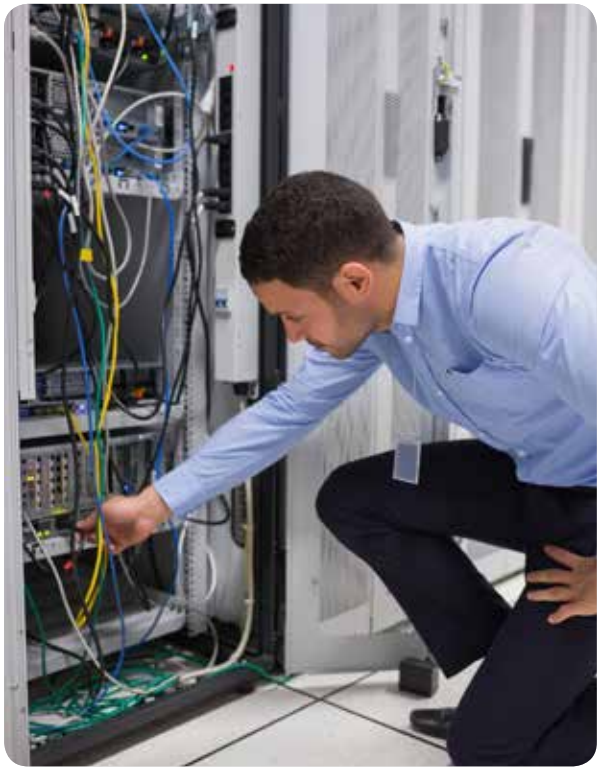
NAICS	Industry	2014 Baseline	2024 Projected Baseline	Scenario 1: 1.5% Annual Growth	Scenario 2: 4.3% Annual Growth for 5 Years	Scenario 3: Increase of Manufacturing Automation	Scenario 4: Introduction of Internet Commerce Distribution Center
11	Agriculture, Forestry, Fishing & Hunting	1,419	1,449	1,432	1,455	1,449	1,449
21	Mining, Quarrying & Oil & Gas Extraction	98	116	106	120	116	116
22	Utilities	645	732	683	751	732	732
23	Construction	8,348	10,039	9,081	10,413	10,039	10,039
31-33	Manufacturing	34,979	38,994	36,720	39,090	38,346	38,994
42	Wholesale Trade	6,685	7,011	6,827	7,084	7,011	7,011
44-45	Retail Trade	16,730	16,977	16,837	17,032	16,977	16,977
48-49	Transportation & Warehousing	5,761	6,329	6,007	6,455	6,329	6,444
51	Information	1,983	2,013	1,996	2,020	2,013	2,034
52	Finance & Insurance	3,253	3,626	3,415	3,709	3,626	3,685
53	Real Estate & Rental & Leasing	1,176	1,491	1,313	1,561	1,491	1,491
54	Professional & Technical Services	3,759	4,231	3,964	4,335	4,231	4,260
55	Management Of Companies & Enterprises	2,719	3,067	2,870	3,144	3,067	3,067
56	Administrative & Waste Services	8,923	11,730	10,140	12,351	11,730	11,730
61	Educational Services	11,537	13,514	12,394	13,950	13,514	13,514
62	Health Care & Social Assistance	21,781	24,913	23,139	25,605	24,913	24,913
71	Arts Entertainment & Recreation	2,940	3,868	3,342	4,073	3,868	3,868
72	Accommodation & Food Services	10,990	12,269	11,545	12,551	12,269	12,269
81	Other Services Excluding Public Administration	22,593	23,224	22,867	23,364	23,224	23,224
92	Public Administration	25,474	26,950	26,114	27,276	26,950	26,950
TE	Self-Employed and Unpaid Family Workers	28,300	28,929	28,573	29,068	28,929	28,929
0	**Total, All Industries**	**220,093**	**241,473**	**229,364**	**245,405**	**240,825**	**241,696**

We see a number of disparate outcomes in each of these scenarios. Each scenario demonstrates a general level of growth over the ten-year forecast period. This growth varies significantly, ranging from 9,271 positions in the low-growth scenario to 25,312 positions in the high growth scenario. This suggests that hiring demand is expected to increase in all instances regardless of the level of economic growth. This is again significant as we need to keep in mind that the region's available labor force is also expected to decline during this period. As the region's employers find it more difficult to attract available talent, this may also impact the region's economic growth.

The second significant finding is that growth in the high-growth forecast that growth is somewhat, but not significantly higher than some of the other forecasts. This makes intuitive sense as the changes in one industry sector may not necessarily impact other industry sectors. This demonstrates the importance of economic conditions on hiring demand. This also points to the reactiveness of the region to national economic conditions.

More nuanced results can be observed in the second two scenarios where the forecasted impact is more strongly felt in a series of industry sectors. In the fourth scenario, we see that forecasted manufacturing hiring demand is slower than all but the lowest growth forecast. This points to positions that could be made irrelevant by an increase in automation. No other industry sectors are specifically affected as we can also assume that many of these positions may simply be eliminated through retirement or attrition with the incumbent workers not moving into another industry sector.

The final scenario presents changes in a number of seemingly-unrelated industry sectors. The introduction of a new internet commerce distribution facility only generates a modest increase in hiring demand through a change in the labor utilization rate. Hiring demand in the manufacturing, information, and professional and technical services sectors also increase. This finding may seem somewhat counterintuitive, but it speaks to the potential indicated by the development. The presence of an information technology-dependent industry sector in a region indicates that the region has the capacity to develop workers with the skillsets needed to succeed in the industry. As this training infrastructure develops, other industries that have specific related needs may signal an increase in hiring demand.



In each instance, we know that the region's forecasted labor force is not large enough to even meet the hiring demand of the slowest growth scenario.

We next turn our attention to the impact of the alternative growth scenarios on occupational skills cluster hiring demand. The results presented in Figure 23 display the occupational skills cluster hiring demand that results, holding the time period (10 years) constant.

Figure 23: Alternative Occupational Skills Cluster Occupational Demand Scenarios

Cluster	2014 Baseline	2024 Projected Baseline	Scenario 1: 1.5% Annual Growth	Scenario 2: 4.3% Annual Growth for 5 Years	Scenario 3: Increase of Manufacturing Automation	Scenario 4: Introduction of Internet Commerce Distribution Center
General physical labor	32,201	35,602	33,676	36,019	35,329	35,628
Clerks; secretaries; agents	38,228	41,920	39,829	42,659	41,897	41,989
Construction & machinery repair	4,772	5,379	5,035	5,505	5,372	5,379
Equipment operation & maintenance	23,178	25,401	24,142	25,738	25,275	25,448
Health care; biological sciences	8,288	9,315	8,733	9,539	9,313	9,316
Service	20,173	22,008	20,969	22,385	21,985	22,020
Humanities, social science, outreach & education	10,923	12,247	11,497	12,540	12,247	12,247
Engineering, except industrial	4,146	4,367	4,242	4,403	4,356	4,369
Equipment repair	3,474	3,828	3,627	3,889	3,814	3,830
Food preparation; service & security attendants	20,492	22,197	21,231	22,552	22,180	22,202
Managers, except production	19,023	20,683	19,742	20,993	20,644	20,707
Law; quantitative analysis; computers; physical sciences	11,536	12,647	12,017	12,820	12,596	12,671
Outreach & public safety aides & technicians & performing arts	16,413	18,193	17,185	18,586	18,193	18,198
Communcations & visual arts	3,886	4,172	4,010	4,228	4,166	4,178
Public safety	2,088	2,243	2,155	2,277	2,243	2,243
Total	**218,819**	**240,201**	**228,091**	**244,134**	**239,612**	**240,424**

We again see that hiring demand in each of the alternative scenarios is less than that forecast by the baseline. Growth in the first two alternative scenarios is consistently distributed throughout each occupational skills cluster. Again, it is important to note that the sum of projected hiring demand in each of these scenarios will not equal the sum of industry hiring demand as some occupations are not included in any particular occupational skills cluster.

When we shift our focus to the third alternative growth scenario, we see that the total hiring demand expectations in this model have been depressed as a result of this change in labor utilization. Total demand decreases compared to all but the slowest growth forecast. This loss is not limited to the general physical labor occupational skills cluster, however. Hiring demand in this cluster decreases by 273 positions from the baseline in this scenario. This suggests that, while manufacturers may utilize lower levels of workers in these occupations, but other industries ranging from agriculture to accommodation may see an increase in demand due to an increase in available labor.

We also see that hiring demand in other occupational skills clusters is also affected. Demand in the equipment operation and maintenance cluster decreases by 126 positions. This finding is again intuitive as an increase in automation reduces the need for manual operation of most equipment. Occupational skills clusters in administrative and managerial roles are also affected as fewer human resources professionals and supervisors are needed to support a smaller production workforce. This outcome suggests both that a change in one aspect of labor demand can affect numerous others, and that the hiring demand model developed here can assist regional stakeholders in both anticipating and understanding the implications of these changes.

The analysis of the results of the fourth scenario are equally nuanced. The introduction of a new internet commerce distribution center increases hiring demand by 164 positions in this scenario. Hiring demand growth in this scenario is distributed among a number of occupational skills clusters, with the most significant growth occurring in the equipment operation and maintenance cluster (46 openings), clerks, secretaries, and agents (30 openings) and general physical labor (26 openings). This is due largely to the unique staffing patterns utilized in each of these industry sectors. We also observe more modest increases in the service, management, and law, quantitative analysis, computers, and physical science occupational skills clusters. This again points to the disparate hiring demand growth that may occur due to an increase in labor utilization in a single or multiple industries.

None of the alternative hiring demand growth scenarios presented here manipulate any of the underlying data in the analysis, such as baseline employment levels or industry staffing patterns. Each of these data layers are available for adjustment in the full model, providing the analyst with the ability to more fully model impacts of a number of economic and demographic factors on the hiring demand of the region.

5.4 IMPLICATIONS

The findings of the analysis in this section indicate:

- Hiring demands are highly responsive to changes in economic growth. We can effectively model this relationship to consider the implication of potential shocks.
- A historical average GDP growth rate of 3.2 percent yields an increase of 21,500 positions in a variety of occupational skills clusters. This suggests that the region's education and workforce development ecosystem must be flexible enough to deal with multiple needs simultaneously rather than concentrating on the needs of a single industry sector.
- The region's hiring market is relatively sensitive to changes in economic growth and technology adoption. This offers one potential solution for employers to temporarily reduce expected demand, though these shifts will be superseded by the demographic patterns previously discussed.

The model presents an informed, but hypothetical forecast of expected hiring demand in the Greater Lima Region. It provides us with a road map of sorts by which to plot out the workforce implications of economic growth. Many of these same trends have been confirmed through feedback from a number of the region's largest manufacturers. We will next examine the results of a companion survey before considering possible solutions to address these current and future needs.

6.0 NEXT STEPS

The most direct way of assessing the needs of the region's manufacturers is to engage them in a dialogue regarding the current and future workforce needs. There are a number of active conversations already occurring in the region, as represented by organizations such as Link Lima/Allen County, the West Central Ohio Manufacturing Consortium, and others. Much of the discussion coming out of these organizations to date has focused on meeting the immediate needs of employers and improving awareness of career opportunities. This has raised the importance of workforce availability as one of the region's most critical needs. The analysis presented in this study expands on these broader regional initiatives by engaging companies in a different manner. The intent here is not to discuss general trends, but rather to solicit and assess a deeper level of strategic and actionable information.

Future iQ Partners is working intensely with the Allen Economic Development Group and other regional economic development partners to develop and administer a targeted workforce and supply chain needs survey. The focus of this survey is to ascertain the specific challenges faced by the region's large manufacturing firms. The relatively narrow focus of the survey analysis is intentional as far as it first reinforces the stated objective of the Defense Industry Adjustment project to support and enhance the ecosystem surrounding the Joint Systems Manufacturing Center. The focus on regional manufacturers was also selected as a means of serving as a pilot project for the deployment of a more comprehensive economic development Business Retention and Expansion outreach process.

Invited firms are being asked to identify a number of current and prospective needs. Employers are being requested to specifically identify their current and future employment and skills needs. They are asked to identify both the employment and skills needs that the firms have in the next year, but also their needs five years in the future. The survey is being administered in two phases. An initial sample of thirty-five Allen County manufacturers is being invited to participate. A second cohort of firms from across the neighboring seven-county region will also be invited to participate by local economic development representatives. All firms will be personally visited over the course of the survey period, which is expected to extend throughout the next year. It is also suggested that the region consider administering this survey every two years to gain an ongoing understanding of changing industry needs.

In addition, a number of industry leaders in the food processing, chemical and plastics, machinery manufacturing, and transportation equipment manufacturing sectors will be invited to participate in a series of focus group meetings in September 2016. Data from this and other analyses will be shared for reaction and participants will be asked to develop unique solutions. Information from these sessions will serve to validate the findings of these analyses and to inform the creation of a Regional Collaborative Growth Plan.

7.0 REGIONAL WORKFORCE NEEDS – CONCLUSIONS

The regional workforce needs analysis identified a number of specific and critical needs that may affect the economic vitality of the broader Allen County region and its associated labor shed. This eight-county region is not unlike other regions in the Midwestern United States where an aging workforce and declining population threaten to impose long-term constraints on workforce availability and economic growth.

The importance of collaborative solutions has been demonstrated in the work of organizations such as Link Lima/ Allen County and the West Central Ohio Manufacturing Consortium. The analysis presented here suggests that a much more extensive and diverse array of collaborative partnerships will be required to meet the significant needs of the region's employer base. These partnerships will form the basis of the specific tactical recommendations that will be discussed in the regional Collaborative Growth Plan.

8.0 THE ROLE OF LINK LIMA IN THE GREATER LIMA REGION

Allen Economic Development Group is heading up a workforce development initiative that started in November 2014, with the targeted objectives to:

- Improve the quality and quantity of the local workforce so it is employer-ready, and able to serve the growth of local employers in Allen County and the surrounding region.
- Create a talent rich business and living environment in Lima/Allen County that will attract new employers to the region and support attracting new talent from other parts of the state and the country, as well as retaining the talent already in the region.

This has resulted in the establishment of "Link Lima" -- a workforce development framework that provides the foundation for collaboration by local stakeholders and support new and existing programs to achieve the targeted objectives and serve as a "talent incubator" for the region. The Link Lima framework is firmly established in the local culture and its activities have matured over the last two years from a "pilot" to a best practice. Some key features of this best practice model includes:

- Ohio Means Jobs-Allen County is expanding the use of the job candidate screening/ training processes beyond manufacturing to the healthcare, retail and service sectors.

Link LIMA/ALLEN COUNTY
Connect. Grow. Thrive.

- Launched the successful MakerFest in 2015, which has now become an annual event. Results in 2015 included:
  - 1,152 high school students attended from 17 high schools and career tech schools
  - 350 adult job seekers attended the MakerFest Job Fair
  - 15 job seekers were offered employment on the spot or immediately after the Job Fair
  - 52 employers and all 5 local colleges/universities exhibited
- Additional programs to help achieve the target objectives of an employer-ready workforce and recognition as a highly livable region have been initiated with Link Lima support, and are already having an impact. This includes the "Home Field Advantage", a program to connect high school seniors not going to college with paths to immediate employment, and the "Link Lima Site Visit Program", bringing students behind the scenes at local manufacturers for an insider's look at career opportunities.

The Link LIMA initiative has the potential to scale up and expand to support other workforce development initiatives.

9.0 ABOUT FUTURE IQ

Future iQ Partners is a market leader in the development and application of scenario planning; network analysis, industry and regional analysis, and community engagement and capacity building. We specialize in applying innovative tools and approaches to assist organizations, regions and industries shape their economic and community futures. We take a practical, hands-on approach to working with groups and communities. With over a decade of business experience, the company has grown to have a global clientele spanning three continents. To learn more about Future iQ Partners, and our recent projects visit www.future-iq.com or by email at info@future-iq.com

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David Beurle

As CEO of Future iQ Partners, David specializes in creating future planning approaches for the use in regional, community and organizational settings. David has worked in the field of organizational and regional economic and community planning for over 20 years. His work in community and economic development has earned his work international, national and state awards.

10.0 ABOUT AEDG (ALLEN ECONOMIC DEVELOPMENT GROUP)

The Allen Economic Development Group (AEDG) is a public/private partnership that was formed in 1993 as a facilitator for countywide economic development. This cooperative effort of the public and private sectors has been a significant catalyst for the economic growth in Lima/Allen County. AEDG staff have been instrumental in supporting the studies as part of the Comprehensive Growth Plan project.

For more information regarding AEDG, please contact:

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11.0 ABOUT THE ALLEN COUNTY COLLABORATIVE GROWTH PLAN

This study is one of many to be produced under an award issued by the U.S. Department of Defense Office of Economic Adjustment to assist Allen County in developing strategies to develop a regional collaborative growth plan. This includes ensuring the economic health and vitality of the Joint Systems Manufacturing Center and the broader region.

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www.future-iq.com/project/task-force-lima or www.aedg.org/strategic-plan/reports/

Asset Inventory
March 2015

Scenarios of the Future
April 2015

Strategic Action Plan
May 2015

Comprehensive Gap Analysis - Part 1
August 2016

Comprehensive Gap Analysis - Part 2
August 2016

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