

Economic Opportunities in South Columbus

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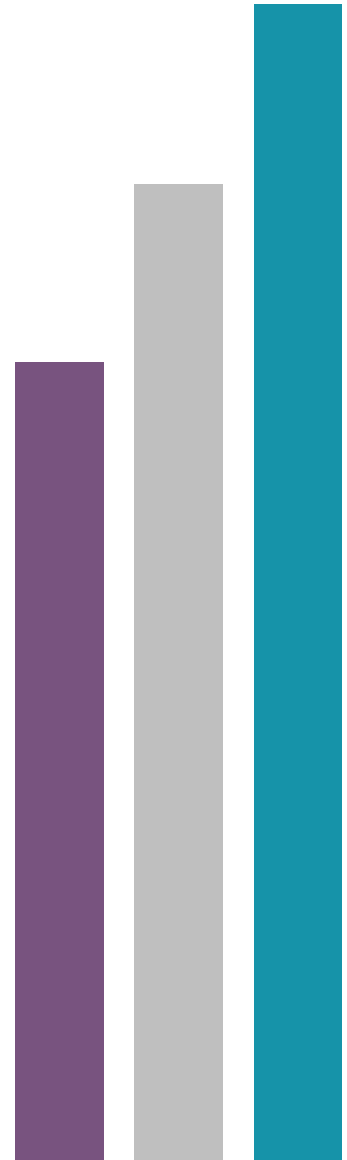


Table of Contents

Acknowledgements	1
Summary of Key Findings	2
Introduction	6
Social and Economic Characteristics of South Side Residents	6
Geography	6
About the Data	7
Total Population and Population Change	8
Age	8
Race/Ethnicity	9
Educational Attainment	10
Household Income and Poverty	11
Housing Cost Burdens	14
Labor Force and Employment	15
Employment: Industry Sector, Class, and Occupation	16
Employment by Industry Sector and Class	16
Employment by Occupation	19
Workplaces of Area Residents	21
Industry Employment in the South Side	21
Occupational Analysis of Focus Industry Sectors	23
Requirements for Worker and Business Success	28
Education and Training Needs	28
Knowledge, Skills, and Abilities	29
Insights from Industry Leaders	34
Healthcare	34
Manufacturing	35
Finance and Insurance	36
Workforce Development Contributions of Nationwide Children’s Hospital	37
Impacts of Technology and Artificial Intelligence	37
Quality Jobs	42
Concluding Thoughts and Recommendations	43
Appendix A: Tables	45
Appendix B: O*NET Definitions of Knowledge, Skill, and Ability Attributes	62
Knowledge	62
Skills	64
Abilities	65

Table of Figures

Figure 1: Household Study Area	7
Figure 2: Study Area and Columbus Male and Female Age Distributions, 2017-2021	9
Figure 3: Columbus and Study Area Household Income, 2017-2021	12
Figure 4: 43206 ZIP Code Area	22
Figure 5: 43207 ZIP Code Area	23
Figure 6: Historical and Projected Five-Year Population Growth Percentages, Ages 18-64, Columbus MSA and Franklin County, 2000-2050	28

Table of Tables

Table 1: Columbus and Study Area Population and Population Change	8
Table 2: Study Area and Columbus Median Age, 2017-2021	9
Table 3: Study Area and Columbus Population and Population Shares by Race and Ethnicity	10
Table 4: Study Area and Columbus Educational Attainment, Adults 25 Years and Older, 2017-2021 ..	11
Table 5: Median Earnings of Columbus Adults 25 Years and Older by Educational Attainment, 2017-2021	11
Table 6: Columbus and Study Area Households by Household Income, 2017-2021	13
Table 7: Columbus and Study Area Persons at Family Income Relative to Poverty Threshold, 2017-2021	14
Table 8: Columbus and Study Area Household Renter and Owner Costs, 2017-2021	15
Table 9: Employment in Columbus and the Study Area by Industry Sector, 2017-2021	18
Table 10: Employment in Columbus and the Study Area by Class of Worker, 2017-2021	18
Table 11: Employment in Columbus and the Study Area by Occupational Group, 2017-2021	19
Table 12: Healthcare Employment by Detailed Industry	25
Table 13: Manufacturing Employment by Detailed Industry	26
Table 14: Finance and Insurance Employment by Detailed Industry	27
Table 15: Knowledge Requirements for Occupations in Healthcare, Manufacturing, and Finance and Insurance: Weighted Averages	30
Table 16: Skill Requirements for Occupations in Healthcare, Manufacturing, and Finance and Insurance: Weighted Averages	31
Table 17: Ability Requirements for Occupations in Healthcare, Manufacturing, and Finance and Insurance: Weighted Averages	33
Table 18: Industry Sector Exposure to AI Automation	40
Table 19: Most Important Reskilling Needs, 2023-2027	41
Table A-1: Columbus and Study Area Labor Force Status, 2007-2011 and 2017-2021	45
Table A-2: Workplace of Residents Living in 43206 and 43207, 2002 and 2020	46
Table A-3: Estimated Employment in ZIP Codes 43206 and 43207	49
Table A-4: Occupational Growth and Replacement Needs, Healthcare, by Total Need	50
Table A-5: Occupational Growth and Replacement Needs, Manufacturing, by Total Need	51
Table A-6: Occupational Growth and Replacement Needs, Finance and Insurance, by Total Need	53
Table A-7: Education, Experience, and Training Requirements for High-Demand Occupations in Healthcare and Median Annual Pay	54
Table A-8: Education, Experience, and Training Requirements for High-Demand Occupations in Manufacturing and Median Annual Pay	57
Table A-8: Education, Experience, and Training Requirements for High-Demand Occupations in Finance and Insurance and Median Annual Pay	59

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Summary of Key Findings

The objective of this study is to identify industries and employers offering better-paying jobs accessible to residents of the South Side of Columbus and the knowledge, skills, and abilities needed to perform these jobs successfully. The study area for residents includes the 43206 ZIP code area excluding German Village, Schumacher Place, and the northern part of Merion Village, and the northern portion of the 43207 ZIP code area. The employer analysis includes all of 43206 and 43207.

Social and Economic Characteristics of Residents

Population in the study area totals approximately 33,700. The 43206 area lost an estimated 11%, a statistically significant decline, but the population change of the 43207 area and the study area as a whole was not statistically significant. The general pattern of age reveals a lower share of younger individuals in the study area – especially those in their early 20s – and a higher share of individuals in their 50s and 60s than the shares citywide. Significantly larger shares of residents are Black or African American and of multiple races. The shares of White and Asian residents are below average.

Educational attainment is significantly below the Columbus average. The share of adult residents lacking a high school diploma or GED is significantly greater than average and the share with a college degree is significantly less. However, about 60% of adults hold a high school diploma, in some cases with some amount of post-secondary training.

Household income is significantly less than that of households citywide. The share of households earning less than \$20,000 is nearly twice the share in all of Columbus. As a result, poverty and need are greater. Nearly 60% of people in families in the study area live in families with income less than 200% of the applicable poverty threshold, compared to 40% of families in Columbus. Around half of study area renter households pay more than 35% of their income in rent, and nearly one-third pay at least half of their income in rent.

Neither the percentage of adults aged 20 to 64 in the study area participating in the labor force nor the unemployment rate is significantly different from the Columbus average, and there are few significant differences in the employment of study area and Columbus residents by industry sector. However, study area workers tend more often to be employed in occupations whose pay is less than average and less often employed in better-paying occupations. While the percentage of self-employed workers is close to the Columbus average, both percentages are substantially less than the U.S. average. Self-employment conveys substantial economic benefits for both the business owner and the broader economy.

Residents of the study area are employed throughout the 10-county Columbus metropolitan statistical area (MSA) and beyond. The percentage of residents employed within 43206 or 43207 declined from 11.3% in 2002 to 7.6% in 2020.

Industry Employment in the South Side

This part of the study considers jobs in 43206 and 43207 rather than employment of local residents. Estimating total employment in this area requires private data sources that are neither complete nor error-free but are the best available. The results count 7,147 jobs in 43206 and 20,812 in 43207 for a total of 27,959. Among industry sectors, business and professional services, public and private educational services, and healthcare and social assistance have below-average concentrations. Manufacturing and finance and insurance are above average.

Three industry sectors were selected for in-depth analysis: finance and insurance, healthcare, and manufacturing. Despite healthcare's below-average concentration of jobs within the area boundaries, the proximity of Nationwide Children's Hospital just outside the study area and Grant Medical Center further north makes healthcare a worthwhile segment for focus.

For each target industry sector, the total 10-year need for new workers, both through change in the number of positions and employee turnover, was estimated. This required an allocation of sector employment into detailed industries. Turnover needs were the overwhelming majority of total need. These were much greater than in earlier analyses because of the aging workforce and upcoming retirements. The 10-year need in South Side healthcare employers is more than 2,500 new workers by the employers in 43206 and 43207, 20% higher than the total employment. Manufacturers will need more than 3,200 new workers, 12% greater than the total current employment. Finance and insurance will need around 2,700 workers over the coming decade, 92% of current employment.

South Side employers' ability to meet these worker needs will be difficult. Employment projections by age suggest that growth of the prime working-age population has slowed substantially since 2015 and this slow growth will persist over the remainder of the decade before increasing after 2030.

Requirements for Worker and Business Success

A detailed analysis of education and training needs for key occupations in the three sectors revealed that a large number of workers will be needed in occupations typically requiring only a high school diploma, in some cases supplemented by post-secondary training short of an associate degree. Very few openings are available for those lacking a high school diploma or GED, and those that are available pay poorly.

The analysis includes the knowledge, skill, and ability requirements for occupations in each sector. The most necessary knowledge elements across the sectors are administration and management (including management of one's own job tasks), computers and electronics, and the English language. Knowledge of mathematics is important for manufacturing and finance and insurance; customer and personal service is necessary for healthcare and finance and insurance. Key skill requirements include active listening, critical thinking, reading comprehension, and speaking clearly. Similarly, oral comprehension and oral expression are important abilities, as are problem sensitivity and speech recognition.

Insights from Industry Leaders

To confirm or refute these findings, focus groups of industry leaders were convened for each of the three industry sectors. The healthcare representatives discussed needed occupations, which mostly confirmed the findings of the occupational analysis. The primary group of skills needed that are lacking

are work-ready (soft) skills. Workers sometimes fail to call in when they will miss work, fail to treat others with dignity and respect, and fail to act appropriately in a professional setting. The shift from institutional to home care will require differences in occupational mix and a somewhat different mix of skills.

The manufacturing focus group cited numerous open positions for machine operators and fabricators that are difficult to fill. English and reading comprehension are particularly important: an inability to understand spoken language or written text can be dangerous. The availability of smartphones has degraded technical skills and distracts people from their job. Cultural competencies are increasingly important given the increasingly global workforce. Despite automation, physical strength and stamina remain important. The negative impression of manufacturing is a barrier to recruiting. Employee referrals and public relations can overcome this barrier. Transportation and the physical infrastructure surrounding some manufacturers' facilities can prevent people from getting to the plants. A suggested formal group of employers could collaborate on outreach and training initiatives.

The representatives from Grange Insurance cited customer service and claims adjusters/investigators as highest-need occupations because of high turnover. These are open to individuals with high school diplomas. The company provides on-the-job training and pays for outside classes. Many positions can be fully remote, making them available to people who would otherwise be unable to work at the office. As discussed in the other groups, work-ready skills are crucial. This includes being an agile learner, being able to provide effective customer service, and to possess a high level of integrity. Active listening skills, critical thinking, and interpersonal skills are vital. A specific need for customer service representatives is the ability to handle conversations over multiple media simultaneously.

While not in the study area, Nationwide Children's Hospital (NCH) is a major regional employment center. NCH puts a priority on hiring from neighborhoods in the study area and offers a variety of programs targeting both youth and adults that help individuals on the South Side and elsewhere begin and develop their career.

Impacts of Technology and Artificial Intelligence

Two facets of technological innovation are machine automation and artificial intelligence. Machine automation dates at least to the birth of the Industrial Revolution and is facilitated by the knowledge economy – production not of goods but of ideas and information. The impacts of machine automation first affected agriculture and manufacturing, shifting employment from these sectors to knowledge-driven sectors. With the advent of computers, the impact of machine automation has spread to many other parts of the economy. The most significant impact of machine automation on the South Side will be on manufacturing employment, which will likely decline further over time.

Artificial intelligence (AI) is emerging as a far more pervasive disruptor than machine automation. But AI is likely to transform many more jobs than it eliminates. Based on the results of a recent Goldman Sachs study, AI will have a much greater impact on healthcare and finance and insurance than on manufacturing. Substantial worker reskilling will be required to deploy AI effectively.

Quality Jobs

Jobs must provide South Side residents with jobs with household-sustaining wages, but it is also important that these jobs be of high quality. Characteristics such as benefits, fair schedules, and training

opportunities and career pathways allow workers to build savings, enjoy better health, improve work-life balance, and enhance their career. Employers benefit by attracting more and better-quality job candidates, improving diversity, equity, and inclusion, and reducing turnover. Results for America's Job Quality Playbook identifies eight principles that define a quality job, including household-sustaining earnings, benefits, predictable schedules, learning and career development opportunities, physical and emotional safety and security, voice and representation, environment and culture, and purpose and meaning of work. Results for America's Job Quality Playbook includes best practices and measurement of the impacts of implementing the principles.

The Mid-Ohio Regional Planning Commission (MORPC) has adopted the tracking of job quality and equity as an element of its 2023-2025 Regional Data Agenda, which could support the job quality efforts of South Side Thrive.

Concluding Thoughts and Recommendations

This study documents the significant social and economic challenges of the South Side, as well as the tools and resources that can help address those challenges. A large number of the jobs of South Side employers offer jobs that pay reasonably well without the need for a college degree. However, jobs not requiring a high school diploma are much fewer and do not pay well. Self-employment is not for everyone but should be presented as a viable career option.

The high rate of housing cost burden is of great concern. Better-paying jobs would obviously help to address this problem. For income-qualifying homeowners, MORPC's home weatherization program could bring significant savings to homeowners.

The study found large (and probably unattainable) occupational needs as well as low current and projected prime working-age population growth. This will make it easier for residents to find a job, but harder for employers to operate profitably and efficiently.

If the findings of the occupational needs analysis are to have value, they should be shared with Ohio Means Jobs Columbus-Franklin County and Columbus City Schools. The Job Quality Playbook could help ensure that jobs meet both financial and personal needs of employees. MORPC's Regional Data Advisory Committee is responsible for tracking and reporting on job quality regionwide.

The interest and commitment of members of the steering committee and focus groups should be leveraged by maintaining contact with these individuals. They could provide valuable information and assistance as the South Side jobs initiative is implemented.

Ongoing gentrification is occurring in South Side neighborhoods. It will be necessary not to confuse the resulting increase in household income with improvement of the income of target households.

Introduction

South Columbus has a rich economic and cultural history. The economic history centered around the large manufacturing plants that dotted the area. Workers moved their families from first Europe and later Appalachia and the South to work in the plants, bringing their music and culture with them. But the closure of first the breweries along South Front Street and then manufacturers such as Columbus Castings, Techneglass, and Federal Glass cost the area thousands of jobs. With the loss of these well-paying jobs, incomes declined. Parts of the area suffered physical and economic decay, crime, and hopelessness, while the gentrification of Merion Village forced out long-time residents. The evolution of the South Side mirrors the fate of many of Ohio's legacy cities.

But opportunities still exist for South Side residents. The objective of this study is to identify industries and employers offering better-paying jobs accessible to local residents and the knowledge, skills, and abilities needed to perform these jobs successfully. The route to achieving this objective is first to understand the characteristics of the people and households of the South Side, to categorize the employment in the area by industry sector, to identify the best prospects for meaningful employment among these sectors, the crucial occupations within those sectors, and the knowledge, skills, and abilities needed for those occupations. This intelligence can be used to direct residents to jobs that will improve their economic status. It will also increase the worker pipeline for South Side businesses, improving their efficiency and profitability. This could lead to a virtuous cycle of thriving businesses and households, improving the wellbeing of the South Side and hence of the entire region. It must be emphasized that this is only the beginning of what must be a years-long initiative.

This report begins with an overview of the social and economic characteristics of the people of the South Side, then local employment by sector and the workplaces of area residents. Following is the employment by industry sector and the sectors selected for focus. The next steps include an analysis of critical occupations for the selected industry sectors, and the knowledge, skills, and abilities necessary for success in those occupations. This analysis is informed by discussions with leaders of South Side businesses in those industries. Following are discussions of the impacts of machine automation and artificial intelligence, and of the research on the characteristics of quality jobs. A set of conclusions and recommendations ends the report.

Social and Economic Characteristics of South Side Residents

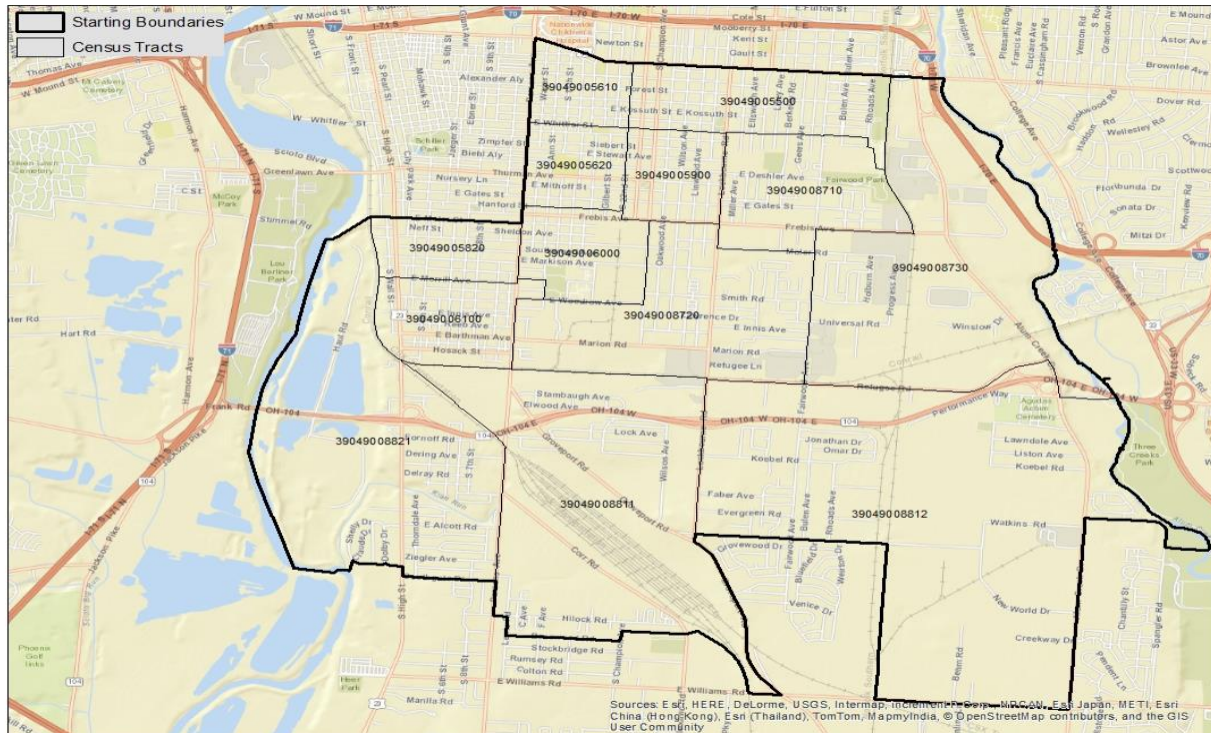
Identifying realistic employment opportunities for South Side residents requires an understanding of the social and economic characteristics of these residents. These characteristics include age, income, employment, educational attainment, and more. In addition to the importance of this analysis for identifying current opportunities, it can serve as a benchmark for measuring future progress of the initiative.

Geography

The area for the household study includes portions of the 43206 and 43207 ZIP code areas and is mapped in Figure 1. The 43206 area omits German Village, Schumacher Place, and the northern part of Merion Village, north of East Moler Street. The 43207 portion is generally north of Williams Road. As shown in Figure 1, the area is defined by 13 census tracts. Census tracts are small, relatively permanent county subdivisions defined by local committees of census data users. The population of a census tract is

ideally around 4,000 with about 1,600 housing units. The industry analysis identifies employment opportunities for the residents in the study area, so that area includes the entirety of the 43206 and 43207 ZIP codes.

Figure 1: Household Study Area



Source: South Side Thrive.

About the Data

The source for the household analysis is the Census Bureau's American Community Survey (ACS). This is an ongoing detailed survey sent randomly to approximately 3.5 million households annually. Available information includes a wide array of data on people and their households, work and labor force participation, income and poverty, and housing characteristics, value, and affordability. The ACS originated in 2005 as a timelier replacement for the long form of the decennial census. But because the survey reaches only about 2.8% of the nation's 124 million households, data for areas with fewer than 65,000 residents – including all census tracts – are available only as five-year averages. This is still a substantial improvement over the long-form data, which became virtually useless as the decade ended.

However, because the data are based on the results from a limited sample, **margins of error attach to almost all estimates from the ACS**. Practically, this means not only that the estimates are imprecise, but also that changes over time must be interpreted carefully. As an example, the population in the study area averaged 32,186 during 2017-2021, compared to 33,666 during 2007-2011. This suggests that the study area lost 1,480 residents during the decade, or 4.4%. But the margin of error of this difference is plus or minus 1,964. This means that if all residents could have been counted in both surveys, there is a strong likelihood (nine to one odds) that the true difference could have been anywhere from a decrease of 3,444 to an increase of 484 – negative 1,480 minus 1,964 and plus 1,964, respectively. Thus, while it is

more likely than not that population in the area declined, we cannot be sure. The formal conclusion is that the measured population change is not statistically significant.

The smaller the population of the area being analyzed, the more impactful are the margins of error and the less likely that definite conclusions can be reached. For that reason, rather than analyzing individual census tracts, this analysis will be limited to the 43206 and 43207 ZIP codes. Conveniently, almost all the individual tracts are in one ZIP code or the other. Although data were collected for earlier periods, the focus will for the most part be on the 2017-2021 averages because very few differences over time are significant.

Total Population and Population Change

Table 1 provides the total population and population change for Columbus, each ZIP code area, and the total study area. The table compares average population during 2017-2021 to average population during 2007-2012, so it is not strictly speaking a 10-year change. Statistically significant cells are shaded. As discussed above, the 4.4% measured decline in the study area is not statistically significant, so we cannot be sure that there was in fact a population decline in the study area. The decline in the 43206 ZIP was significant, though, as was the population increase citywide. While it is highly unlikely that the decline in 43206 was exactly 1,696, we can be reasonably sure that there was a decline.

Table 1: Columbus and Study Area Population and Population Change

	2007-2011	2017-2021	Change, 2007-11 to 2017-21	
Columbus	779,573	898,143	118,570	15.2%
ZIP 43206	14,760	13,064	-1,696	-11.5%
ZIP 43207	18,906	19,122	216	1.1%
Study area	33,666	32,186	-1,480	-4.4%

Note: Changes in shaded cells are statistically significant at a 90% confidence level.

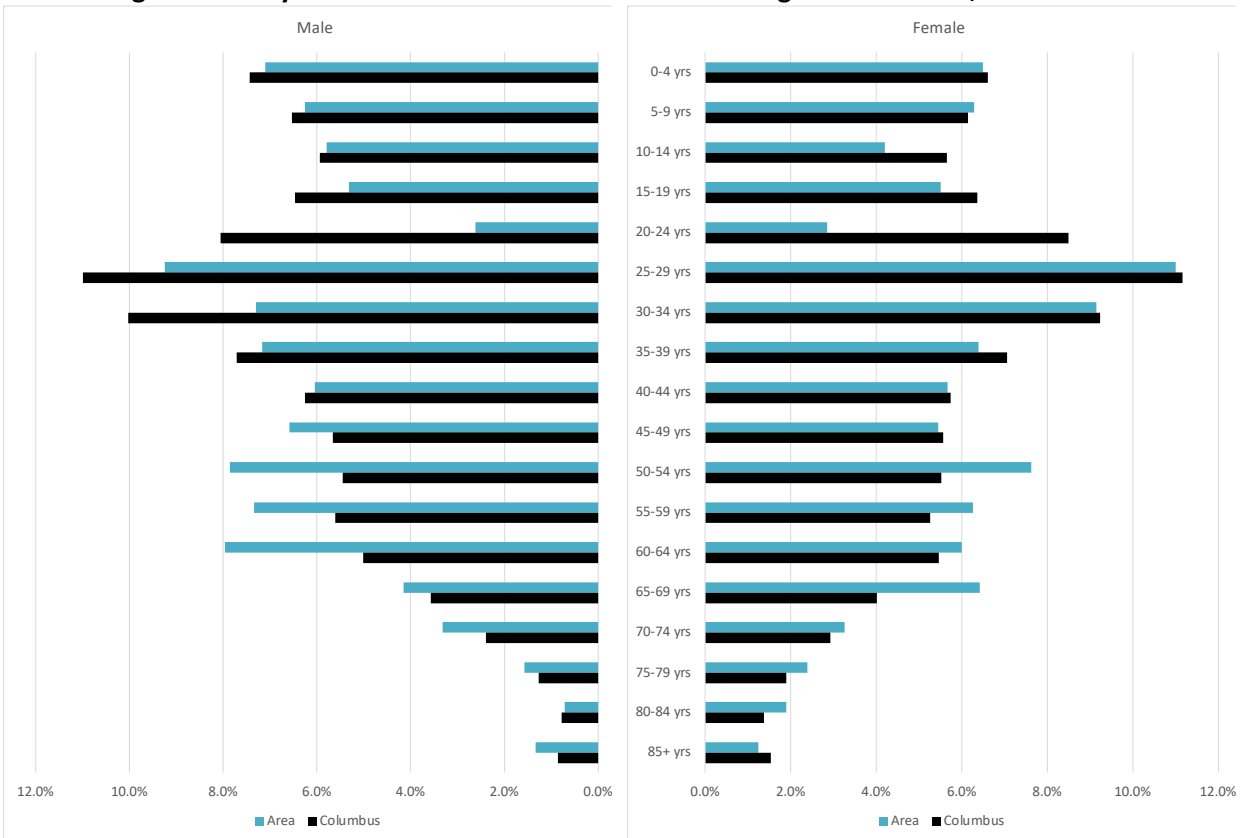
Source: American Community Survey Five-Year Estimates, 2011 and 2021.

Age

Figure 2 compares the age distribution of the area to that of the city of Columbus using a “population pyramid.” Although few of the individual differences are statistically significant, the general pattern reveals a lower share of younger individuals in the study area – especially those in their early 20s – and a higher share of individuals in their 50s and 60s. Neither the share of individuals currently 65 and older nor the share of individuals in their prime working years (ages 25 to 59) is significantly different from the Columbus total. However, the fact that working-age individuals tend to be older than average suggests that South Side residents in the workforce are closer to retirement, and that the share of residents 65 and older in the study area will soon be higher than average.

Additional insight comes from the median age. Half the residents are younger than the median and half are older. Medians for the city, the two ZIP code areas, and the total study area are shown in Table 2. This table reveals that the residents of the 43207 area tend to be older than those both citywide and of the 43206 area further north.

Figure 2: Study Area and Columbus Male and Female Age Distributions, 2017-2021



Source: American Community Survey Five-Year Estimates, 2021.

Table 2: Study Area and Columbus Median Age, 2017-2021

	Columbus	ZIP 43206	ZIP 43207	Study area
Total	32.5	34.7	39.4	37.4
Male	32.1	36.0	40.7	39.5
Female	32.9	33.8	42.5	38.5

Source: American Community Survey Five-Year Estimates, 2021. ZIP code and study area medians calculated by Regionomics.

Race/Ethnicity

The racial and ethnic composition of a population can be approached in a variety of ways. First, the census and the American Community Survey define six racial categories or some other race and allow individuals to choose as many of these as are appropriate. Thus, individuals can be of a specific race either alone or in combination with up to five other races. Second, Hispanic or Latino/Latina¹ heritage is a separate ethnic category: one chooses a race and then an ethnicity. Thus, including the total number of people identifying as Hispanic/Latino/a in a table with the total racial breakdown would introduce double counting. The simplifying approach used here (at the cost of some detail) is to classify non-

¹ The terms “Hispanic” and “Latino/Latina” are often used interchangeably but are not exactly the same. Hispanic individuals are Spanish speaking or of Spanish-speaking descent, while Latino/a individuals are those from American countries south of the U.S. Thus, someone from Spain would be Hispanic but not Latino/a, while someone from Brazil (where Portuguese is spoken) would be Latino/a but not Hispanic.

Hispanic/Latino/a people as either of one specific race or of two or more races, and then to include Hispanic/Latino/a individuals of any race separately. Further, Asian and Native Hawaiian or Pacific Islander are two separate race categories in the data, but the percentage of the latter group alone is so small in Columbus (0.2%) that it is combined with Asian – as is often the case in other race analyses as well.

Table 3 presents population estimates by race and ethnicity. Significant differences in the racial and ethnic makeup in the study area are mostly driven by those in the 43206 ZIP code. The 43206 area is more than half Black, and the share of multiracial residents is also significantly higher than the Columbus average. The share of non-Hispanic/Latino/a and White residents in 43206 is significantly less than average, which carries over to the total study area.

Table 3: Study Area and Columbus Population and Population Shares by Race and Ethnicity

	Columbus		ZIP 43206		ZIP 43207		Study area	
Total	898,143	100.0%	13,064	100.0%	19,122	100.0%	32,186	100.0%
Not Hispanic or Latino	839,602	93.5%	12,775	97.8%	17,942	93.8%	30,717	95.4%
White alone	482,768	53.8%	4,037	30.9%	10,065	52.6%	14,102	43.8%
Black or African American alone	260,128	29.0%	7,501	57.4%	6,266	32.8%	13,767	42.8%
American Indian & Alaska Native alone	1,044	0.1%	86	0.7%	0	0.0%	86	0.3%
Asian or Pacific Islander alone	52,801	5.9%	50	0.4%	413	2.2%	463	1.4%
Some other race alone	3,789	0.4%	80	0.6%	5	0.0%	85	0.3%
Two or more races	39,072	4.4%	1,021	7.8%	1,193	6.2%	2,214	6.9%
Hispanic/Latino (any race)	58,541	6.5%	289	2.2%	1,180	6.2%	1,469	4.6%

Note: Population shares in shaded cells are significantly different from Columbus shares at a 90% confidence level.

Source: American Community Survey Five-Year Estimates, 2021.

Educational Attainment

The level of schooling completed by adults is one measure of workforce quality – albeit an imperfect one. Table 4 compares the percentage of adults 25 and older at each level of education to the citywide average. As before, shaded cells identify percentages significantly higher or lower than the Columbus average. Unshaded cells are not significantly different from the average; in other words, an estimate lower than that for Columbus may in fact be higher. It is clear that educational attainment in both ZIP codes is significantly below the Columbus average, with the percentage of adults with college degrees only about half the city average.

Table 4: Study Area and Columbus Educational Attainment, Adults 25 Years and Older, 2017-2021

Educational attainment	Columbus		ZIP 43206		ZIP 43207		Study area	
Total, 25 years and older	594,345	100.0%	8,915	100.0%	14,154	100.0%	23,069	100.0%
Less than 9th grade	21,221	3.6%	288	3.2%	575	4.1%	863	3.7%
9 th -12th grade, no diploma	36,648	6.2%	979	11.0%	1,833	13.0%	2,812	12.2%
High school graduate/GED	147,105	24.8%	3,184	35.7%	5,259	37.2%	8,443	36.6%
Some college, no degree	120,379	20.3%	2,270	25.5%	3,183	22.5%	5,453	23.6%
Associate degree	43,944	7.4%	613	6.9%	1,130	8.0%	1,743	7.6%
Bachelor's degree	144,292	24.3%	1,121	12.6%	1,556	11.0%	2,677	11.6%
Graduate/prof. degree	80,756	13.6%	460	5.2%	618	4.4%	1,078	4.7%
At least high school diploma	536,476	90.3%	7,648	85.8%	11,746	83.0%	19,394	84.1%
College degree	268,992	45.3%	2,194	24.6%	3,304	23.3%	5,498	23.8%

Note: Population shares in shaded cells are significantly different from Columbus shares at a 90% confidence level.

Source: American Community Survey Five-Year Estimates, 2021.

Educational attainment is an imperfect measure of workforce quality for at least two reasons. First, it fails to reflect experience, which is an important factor in the ability to succeed at a job. Because age in the study area is greater than average, so may be experience. Second, and perhaps more important, educational attainment as defined by the Census Bureau does not include licenses, certifications, and other occupational credentials. These have never routinely been included in the Bureau's surveys, but Census Bureau studies have repeatedly shown that these credentials can have a substantial impact on a worker's employability and earning power.

Nevertheless, there is a clear correlation between educational attainment and income, as demonstrated in Table 5 for Columbus. The higher the education level, the higher the median wage. The table also documents the frequently noted fact that women tend to earn less than men.

Table 5: Median Earnings of Columbus Adults 25 Years and Older by Educational Attainment, 2017-2021

In 2021 inflation-adjusted dollars

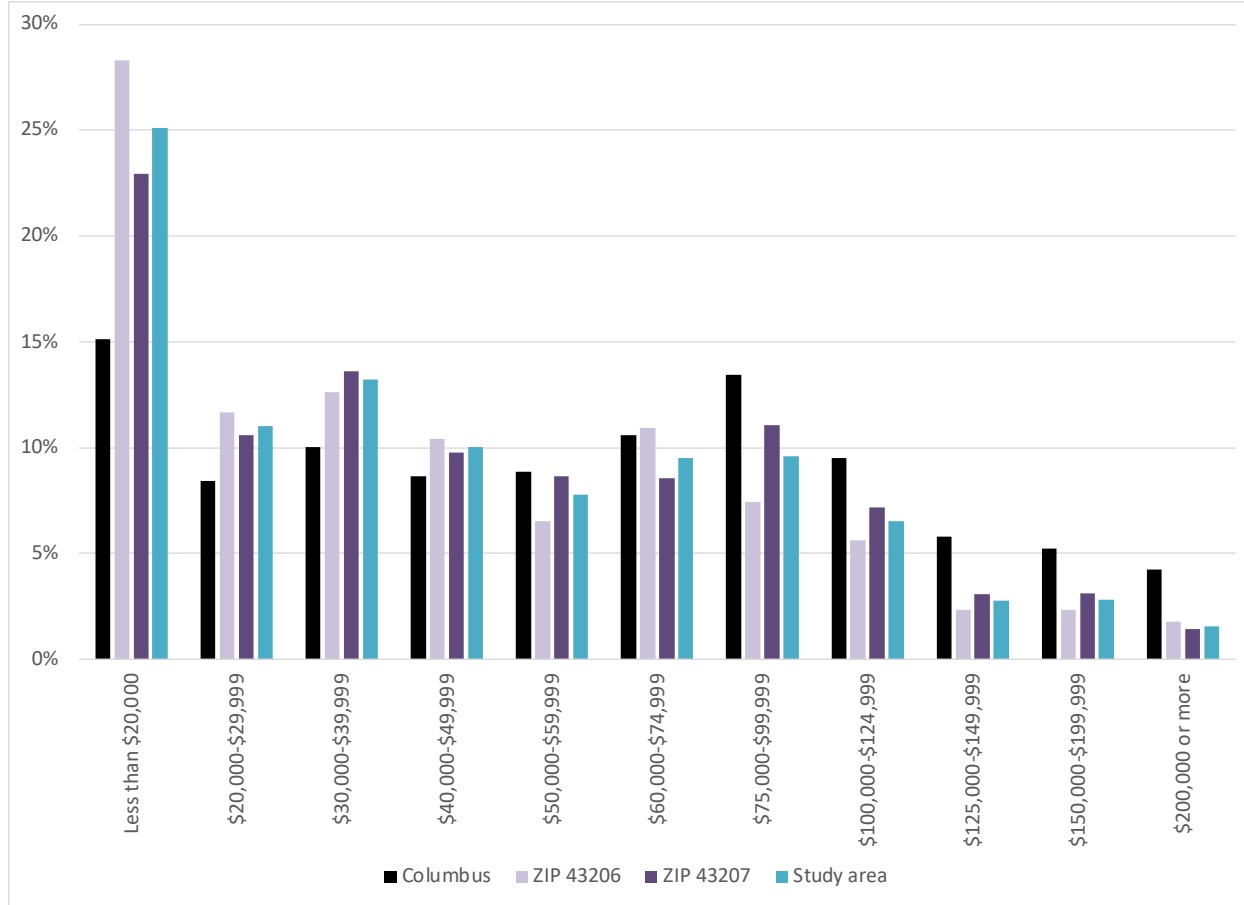
Educational attainment	Total	Male	Female
Total	\$42,338	\$45,861	\$38,664
Less than high school graduate	\$25,484	\$29,610	\$19,044
High school graduate or associate degree	\$32,746	\$37,129	\$28,197
Some college, no degree	\$37,831	\$41,336	\$34,680
Bachelor's degree	\$55,115	\$61,315	\$51,393
Graduate/professional degree	\$64,849	\$73,612	\$61,108

Source: American Community Survey Five-Year Estimates, 2021.

Household Income and Poverty

The income of study area households is significantly less than that of households citywide. Figure 3 graphs these differences. The difference is most apparent in the lowest income category: the share of households earning less than \$20,000 is nearly twice the share in all of Columbus.

Figure 3: Columbus and Study Area Household Income, 2017-2021
In 2021 inflation adjusted dollars



Source: American Community Survey Five-Year Estimates, 2021.

But as usual, it is important to test these differences for statistical significance. This is accomplished in Table 6. As this table makes clear, the income in the study area is significantly less than the Columbus average, with significantly fewer households at high incomes, and a significantly greater number earning less than \$30,000. Table 6 also reports the median income for each area. The median income of households in the study area is \$18,000 less than that for all Columbus households.

Table 6: Columbus and Study Area Households by Household Income, 2017-2021

Household income*	Columbus		ZIP 43206		ZIP 43207		Study area	
Total	377,648	100.0%	5,767	100.0%	8,448	100.0%	14,215	100.0%
Less than \$20,000	57,146	15.1%	1,633	28.3%	1,938	22.9%	3,571	25.1%
\$20,000-\$29,999	31,887	8.4%	673	11.7%	893	10.6%	1,566	11.0%
\$30,000-\$39,999	37,935	10.0%	727	12.6%	1,150	13.6%	1,877	13.2%
\$40,000-\$49,999	32,672	8.7%	602	10.4%	825	9.8%	1,427	10.0%
\$50,000-\$59,999	33,443	8.9%	376	6.5%	731	8.7%	1,107	7.8%
\$60,000-\$74,999	40,012	10.6%	631	10.9%	723	8.6%	1,354	9.5%
\$75,000-\$99,999	50,826	13.5%	429	7.4%	935	11.1%	1,364	9.6%
\$100,000-\$124,999	35,916	9.5%	324	5.6%	606	7.2%	930	6.5%
\$125,000-\$149,999	21,964	5.8%	134	2.3%	261	3.1%	395	2.8%
\$150,000-\$199,999	19,787	5.2%	136	2.4%	265	3.1%	401	2.8%
\$200,000 or more	16,060	4.3%	102	1.8%	121	1.4%	223	1.6%
Median income	\$58,575		\$37,782		\$42,470		\$40,597	

Note: Household shares in shaded cells are significantly different from Columbus shares at a 90% confidence level.

Source: American Community Survey Five-Year Estimates, 2021. ZIP code and study area median incomes calculated by Regionomics.

Lower household incomes lead to higher levels of poverty. Poverty studies recognize that the official poverty threshold is much less than what households currently need to make ends meet. A family's poverty threshold is based on the size of the family and the number of related children under 18 years. For a household of four with two children, the 2022 poverty threshold is \$29,678,² while the Ohio Association of Community Action Agencies' self-sufficiency wage for this family in Franklin County is \$71,770.^{3,4} As a rough benchmark, economists generally consider a family with income less than twice the poverty threshold to be in need.

Table 7 shows the number of persons at various family income levels as a ratio of the poverty threshold for that family. The percentages of people with families below the poverty threshold are all significantly higher than average. Around one in five people in the study area live in a family with income less than half the poverty threshold (defined as "deep poverty") This percentage is two-thirds greater than the Columbus average. The percentage of people whose families enjoy incomes higher than twice the poverty threshold is nearly one-third less than the percentage for Columbus.⁵

² U.S. Census Bureau. (2023). Poverty. Retrieved from <https://www.census.gov/topics/income-poverty/poverty.html>

³ Ohio Association of Community Action Agencies. (2023). Self-sufficiency calculator. Retrieved from <https://oacaa.org/self-sufficiency-calculator/>

⁴ The reason for the disparity between the poverty threshold and the self-sufficiency wage is that the calculation method for the poverty thresholds dates from the 1960s and President Lyndon Johnson's War on Poverty. The measure was developed based on the Department of Agriculture's 1963 estimate of the minimum amount of food needed for a "fair" to "good" diet. The measure has not been comprehensively revised since.

⁵ Most analyses in this section refer to households, but the poverty analysis is for families. The two are not synonymous. A household is one or more individuals occupying a dwelling unit, while a family is two or more *related* individuals occupying a dwelling unit. Thus, all families are households, but not all households are families.

Table 7: Columbus and Study Area Persons at Family Income Relative to Poverty Threshold, 2017-2021

Ratio of income to poverty threshold	Columbus		ZIP 43206		ZIP 43207		Study area	
Total persons in families	843,325	100.0%	13,833	100.0%	19,078	100.0%	32,911	100.0%
Under 0.50	80,260	9.5%	2,493	18.0%	2,738	14.4%	5,231	15.9%
0.50 to 0.99	91,574	10.9%	2,576	18.6%	3,290	17.2%	5,866	17.8%
1.00 to 1.24	40,381	4.8%	954	6.9%	1,146	6.0%	2,100	6.4%
1.25 to 1.49	39,583	4.7%	714	5.2%	1,245	6.5%	1,959	6.0%
1.50 to 1.84	59,689	7.1%	1,350	9.8%	1,367	7.2%	2,717	8.3%
1.85 to 1.99	24,331	2.9%	539	3.9%	562	2.9%	1,101	3.3%
2.00 or above	507,507	60.2%	5,207	37.6%	8,730	45.8%	13,937	42.3%

Note: Household shares in shaded cells are significantly different from Columbus shares at a 90% confidence level.

Source: American Community Survey Five-Year Estimates, 2021.

Housing Cost Burdens

A detailed analysis of housing is beyond the scope of this study, but one element is relevant: the affordability of housing. The U.S. Department of Housing and Urban Development defines households spending 35% or more of their income on shelter as “housing cost burdened.” For renters, housing costs are defined as gross rent. For owners, the comparison is to selected monthly owner costs including mortgages (when applicable), real estate taxes, property insurance, utilities, heating fuels, mobile home costs, and condominium and homeowner association fees. Cost burdened households have greater difficulty affording other essentials such as food and medicine and are at greater risk for eviction or foreclosure. These events affect not only the stability of households but also the stability of the surrounding neighborhood.

Table 8 reveals the distribution of the percentage of income spent on rent and whether owner households with and without a mortgage are burdened or not. Cost burdens are generally less of a concern for owner households than for renters. Renters in the study area face significantly greater rates of burden than do all Columbus renter households. One-third of households at the city level are burdened, but within the study area it is around one-half. Nearly one-third of study area households pay at least half their income in rent. Fewer owner households with a mortgage – about one in four – are burdened, but that is also a significantly greater share than that citywide.

Table 8: Columbus and Study Area Household Renter and Owner Costs, 2017-2021

	Columbus		ZIP 43206		ZIP 43207		Study area	
Total renters	208,644		3,144		3,815		6,959	
Total computed	200,067	100.0%	2,886	100.0%	3,657	100.0%	6,543	100.0%
Less than 10.0 percent	7,084	3.5%	18	0.6%	108	3.0%	126	1.9%
10.0 to 14.9 percent	19,481	9.7%	310	10.7%	244	6.7%	554	8.5%
15.0 to 19.9 percent	31,226	15.6%	441	15.3%	527	14.4%	968	14.8%
20.0 to 24.9 percent	31,080	15.5%	223	7.7%	459	12.6%	682	10.4%
25.0 to 29.9 percent	25,230	12.6%	215	7.4%	415	11.3%	630	9.6%
30.0 to 34.9 percent	16,406	8.2%	295	10.2%	177	4.8%	472	7.2%
35.0 to 39.9 percent	11,607	5.8%	250	8.7%	230	6.3%	480	7.3%
40.0 to 49.9 percent	15,835	7.9%	439	15.2%	312	8.5%	751	11.5%
50.0 percent or more	42,118	21.1%	695	24.1%	1,185	32.4%	1,880	28.7%
Total burdened*	69,560	34.8%	1,384	48.0%	1,727	47.2%	3,111	47.5%
Owners with mortgage	120,747		1,430		2,703		4,133	
Total computed	120,176	100.0%	1,421	100.0%	2,692	100.0%	4,113	100.0%
Not burdened	100,232	83.4%	1,114	78.4%	2,031	75.4%	3,145	76.5%
Burdened*	19,944	16.6%	316	22.2%	672	25.0%	988	24.0%
Owners without mortgage	46,898		1,156		1,903		3,059	
Total computed	46,110	100.0%	1,128	100.0%	1,887	100.0%	3,015	100.0%
Not burdened	41,608	90.2%	1,037	91.9%	1,660	88.0%	2,697	89.5%
Burdened*	4,502	9.8%	91	8.1%	227	12.0%	318	10.5%

*Burdened households are those with housing costs equal to or greater than 35% of total household income.

Note: Household shares in shaded cells are significantly different from Columbus shares at a 90% confidence level.

Source: American Community Survey Five-Year Estimates, 2021.

Labor Force and Employment

This subsection considers the labor force status and type of employment of adults in the study area. Some definitions and explanations are necessary. The working-age population includes most individuals 16 years and older, with no upper age limit. The only individuals excluded from this population are those who live in institutions, including facilities such as nursing homes, jails and prisons, and psychiatric in-patient hospitals, but not college dormitories. The key issue is whether the residents of a group facility are able or likely to participate in the labor force, as dorm residents are.

The labor force is defined as the sum of people working and people actively looking for work. If an individual works any number of hours during a defined week, she/he is in the labor force and employed. Additionally, people are considered to be employed if they are temporarily absent from a job for reasons such as vacation, illness, bad weather, or strike. If individuals were not employed but were actively looking for work during the previous four weeks and were available to take a job, they are in the labor force and unemployed. People are also considered to be unemployed if they are not actively looking for work but are willing to be called back to a job from which they had been laid off.

Individuals who are not considered employed or unemployed are not included in the labor force, regardless of their availability and willingness to work. This is converting a more-or-less question into a yes-or-no question: you are either in the labor force or you are not. The Bureau of Labor Statistics publishes monthly estimates of other categories of individuals who are “marginally attached” to the labor force, including the reasons for their nonparticipation, but those are not available below the national level.

Two important ratios are calculated from the labor force estimates. The most familiar of these is the unemployment rate, the ratio of the number unemployed to the labor force. The other is the participation rate, the ratio of the labor force to the working-age population. Please note that because of the way that the labor force is defined, the unemployment rate and the participation rate can be affected by factors unrelated to the employment trend. The aging population and retirements put downward pressure on both rates. Also, as economic conditions deteriorate and jobs become harder to get, people stop looking for work and drop out of the labor force. This causes labor force to decline and also puts downward pressure on the unemployment rate. It is not uncommon in the beginning months of a recession to see the number of people employed and the unemployment rate both decline.

The employment situation in both the South Side study area and Columbus has substantially improved over the past decade. The labor force status of area adults in the most recent ACS estimates and those a decade earlier is in Table A-1 in Appendix A. The labor force status, participation and unemployment rate estimates focus on adults aged 20 to 64. This is to minimize the impact of retirements and those aged 16 to 19 whose participation rates are low because many of these individuals are in school.

It is important to note that the earlier estimates include the severe 2007-2009 recession, so it is to be expected that conditions will have improved more recently. The improvement in the study area's employment picture seems especially large, but so are the margins of error. Thus, it is unclear whether the area's employment status improved any more than that of the city. Also, the differences in the area and city unemployment rates are not significantly different from each other in either time period.

Employment: Industry Sector, Class, and Occupation

Employment of residents can be measured in two ways: by industry and by occupation. Industry employment refers to where people work regardless of the job they do, and occupational employment refers to the job people do regardless of where they work. An accountant at a hospital and an accountant at a manufacturing plant would both be classified in the accountants and auditors occupation, but the hospital accountant would be counted in a healthcare industry, while the manufacturing accountant would be classified in a manufacturing industry. Each of these two workers does similar things, but in a different setting.

This subsection will discuss the industry distribution of employment first and then the occupational distribution. It is important to keep in mind that these are the same workers. The total of each of the two distributions is identical. It is also important to keep in mind that because the ACS is a survey of households rather than businesses, the estimates refer to employment of residents of the area, not jobs in the area.

Employment by Industry Sector and Class. The federal government classifies industries according to the North American Industry Classification System (NAICS). NAICS is a hierarchical structure developed and used jointly by the U.S, Canada, and Mexico. The broadest classifications are the 20 sectors, which are composed successively of subsectors, industry groups, NAICS industries, and U.S.-specific industries. However, ACS only reports sector-level employment. Moreover, the government sometimes groups certain sectors into "supersectors" to improve reliability of smaller sector and smaller geographic estimates. That practice is followed here in some cases.

Table 9 presents employment in Columbus and the study area by sector and/or supersector. Some sector definitions are self-explanatory, but some require explanation:

- The transportation and utilities supersector is composed of the transportation and warehousing and the utilities sectors. Utilities includes only establishments (i.e., places of business) that directly maintain utility systems. It does not include those in administrative establishments such as the AEP or Columbia Gas headquarters.
- Information includes motion picture and sound recording industries, publishing, software publishing, broadcasting and content providers, wired and wireless telecommunications, data processing and web hosting, web search portals, and libraries and archives.
- The financial activities supersector includes finance, banking, insurance, real estate, and all forms of rental and leasing services.
- The professional and business services supersector includes three sectors: (1) professional and technical services, including offices of accountants, engineers, architects, and designers; research and development; marketing and marketing research services; photographic services; and veterinarians; (2) corporate headquarters and administrative offices; and (3) administrative and waste services, offices and facilities support services and employment services – including all temporary employment, regardless of the industry in which the temporary employee works.
- The social assistance component of the healthcare and social assistance sector includes supportive services for individuals, community food and housing services, vocational rehabilitation services, and daycare centers.
- The leisure and hospitality supersector includes two sectors: (1) arts, entertainment, and recreation; and (2) accommodation and food services, including hotels, motels, campgrounds, restaurants, bars, and caterers.
- Other services, as the name implies, is a miscellaneous sector. It includes repair and maintenance services, personal care services, death care services, dry cleaning and laundry services, religious organizations, grantmaking and giving services, social advocacy organizations, civic and social organizations, business and professional organizations, and labor organizations.
- Public administration includes only establishments supervising government functions, such as Columbus City Hall. Other government functions are classified in the relevant sector. For example, public schools are in the educational services sector, COTA is in transportation and warehousing, and public health agencies are in healthcare and social assistance.

As the table reveals, relatively few sector employment percentages in the study area are significantly different from city averages. The share of employment in construction and mining and manufacturing is significantly greater than average, while the share in financial activities and educational services is significantly less.

Table 9: Employment in Columbus and the Study Area by Industry Sector, 2017-2021

Sector/supersector	Totals				Percentages	
	Columbus	ZIP 43206	ZIP 43207	Study area	Columbus	Study area
Total	478,130	5,985	9,072	15,057	100.0%	100.0%
Construction and mining*	21,592	201	734	935	4.5%	6.2%
Manufacturing	36,030	349	1,183	1,532	7.5%	10.2%
Trade, transportation, and utilities*	102,858	1,681	1,923	3,604	21.5%	23.9%
Wholesale trade	11,181	224	292	516	2.3%	3.4%
Retail trade	57,061	784	879	1,663	11.9%	11.0%
Transportation & utilities*	34,616	673	752	1,425	7.2%	9.5%
Information	10,745	60	158	218	2.2%	1.4%
Financial activities*	43,653	310	403	713	9.1%	4.7%
Professional/business svcs.*	59,486	626	1,168	1,794	12.4%	11.9%
Educational services	42,655	350	352	702	8.9%	4.7%
Healthcare/social assistance	75,485	1,056	1,359	2,415	15.8%	16.0%
Leisure and hospitality*	46,822	779	1,095	1,874	9.8%	12.4%
Other services	18,589	357	334	691	3.9%	4.6%
Public administration	20,215	216	363	579	4.2%	3.8%

*Supersector.

Note: Indented categories are subsets of the category above. Employment percentages in shaded cells are significantly different from Columbus percentages at a 90% confidence level.

Source: American Community Survey Five-Year Estimates, 2021.

A broader measure of employment according to workplace is by the class of employer – employment in for-profit companies, nonprofit organizations, government, or self-employment. This is in Table 10, which reveals only small differences between the study area and the city, with even fewer differences that are significant.

Table 10: Employment in Columbus and the Study Area by Class of Worker, 2017-2021

Sector/supersector	Totals				Percentages	
	Columbus	ZIP 43206	ZIP 43207	Study area	Columbus	Study area
Total	478,130	5,985	9,072	15,057	100.0%	100.0%
Employees of private for-profit companies	335,199	4,032	6,931	10,963	70.1%	72.8%
Employees of not-for-profit organizations	46,272	881	702	1,583	9.7%	10.5%
Employees of government enterprises	66,007	668	778	1,446	13.8%	9.6%
Local government workers	24,761	404	393	797	5.2%	5.3%
State government workers	33,229	203	264	467	6.9%	3.1%
Federal government workers	8,017	61	121	182	1.7%	1.2%
Self-employed workers	29,975	404	635	1,039	6.3%	6.9%
Unpaid family workers	677	0	26	26	0.1%	0.2%

Note: Indented categories are subsets of the category above. Employment percentages in shaded cells are significantly different from Columbus percentages at a 90% confidence level.

Source: American Community Survey Five-Year Estimates, 2021.

One element in this table bears special mention: self-employment. The share of workers who own their own business is close to the Columbus average, but both are significantly less than the national average, 9.7%. This is a troubling finding because self-employment, while a risky proposition, offers the potential of far greater income than is available from wage and salary employment. It is also a path to gainful employment for restored citizens and others facing various barriers to employment by others. There are also implications for the broader economy: locally owned, locally serving retailers and restaurants in particular trap spending that would leak out to distant headquarters if the dollars had been spent at a chain. This difference is significant. According to Civic Economics, chain retailers retain an average of \$14 of every \$100 of sales for at least one additional round of local spending. Locally owned retailers trap \$48. Chain restaurants retain \$30 of every \$100 in sales; locally owned restaurants retain \$65.⁶ Work by this author suggests that the difference between locally owned businesses and chains in Central Ohio – a large, widely diversified economy allowing more business needs to be satisfied locally – may be even greater.

Employment by Occupation. As discussed earlier, employment can also be classified by occupation: one's job duties regardless of the industry within which one is employed. The government classification of occupational employment follows the Standard Occupational Classification (SOC) system. Like NAICS, the SOC system has a hierarchical structure. Here the broadest category is the occupational group. The SOC includes 23 of these – including military-specific occupations, which are not generally available in government statistics. The results for the study area are in Table 11. As with the industry classifications, some of the smaller SOC occupational groups are combined with related groups.

⁶ See Civic Economics. (n.d.). Indie impact study series. <http://www.civiceconomics.com/indie-impact.html>

Table 11: Employment in Columbus and the Study Area by Occupational Group, 2017-2021

Sector/supersector	Totals				Percentages	
	Columbus	ZIP 43206	ZIP 43207	Study area	Columbus	Study area
Total employment	478,130	5,985	9,072	15,057	100.0%	100.0%
Management, business, and financial occupations*	80,773	777	1,144	1,921	16.9%	12.8%
Computer, engineering, and science occupations*	38,451	230	377	607	8.0%	4.0%
Legal and community service occupations*	15,212	174	228	402	3.2%	2.7%
Education and library occupations	27,631	383	291	674	5.8%	4.5%
Arts, design, sports, and media occupations	9,809	86	181	267	2.1%	1.8%
Healthcare practitioners and technical occupations	31,743	208	403	611	6.6%	4.1%
Healthcare support occupations	16,990	293	399	692	3.6%	4.6%
Protective service occupations	8,769	212	258	470	1.8%	3.1%
Food preparation and serving related occupations	28,553	531	739	1,270	6.0%	8.4%
Building and grounds cleaning and maintenance occupations	15,007	332	364	696	3.1%	4.6%
Personal care and service occupations	11,327	184	148	332	2.4%	2.2%
Sales and related occupations	43,202	536	447	983	9.0%	6.5%
Office and administrative support occupations	59,244	820	1,140	1,960	12.4%	13.0%
Natural resources, construction & maintenance and repair occupations*	23,589	237	1,089	1,326	4.9%	8.8%
Production occupations	22,629	287	843	1,130	4.7%	7.5%
Transportation and material moving occupations	45,201	695	1,021	1,716	9.5%	11.4%

*Combined occupational group.

Note: Employment percentages in shaded cells are significantly different from Columbus percentages at a 90% confidence level.

Source: American Community Survey Five-Year Estimates, 2021.

The results reveal many more significant employment differences from Columbus than the industry analysis. Some patterns can be identified. The study area's share of employment in several higher-paying sectors is below average. These include management, business, and financial occupations; computer, engineering, and science occupations; and healthcare practitioners. Meanwhile, generally lower-paying occupations are more common, including protective services, food preparation and serving, building and grounds cleaning and maintenance, and sales occupations. These results are consistent with those showing relatively low household income in the study area.

Workplaces of Area Residents

Residents of 43206 and 43207 are employed throughout the 10-county Columbus metropolitan statistical area (MSA) and beyond. MSAs nationwide are designated by the U.S. Office of Management and Budget based on worker commuting patterns, so we expect the vast majority of workers to commute within this area. This is the case, but the percentages of workers employed within the immediate area, the city of Columbus, Franklin County, and the MSA were all lower in 2020 than they were in 2002. One objective of this project is to work on reversing this trend by matching area residents with the needs of local employers, facilitating training where necessary. In addition to improving quality of life, this would reduce commuting costs for South Side residents, increasing discretionary income.

Details of commuting trends are in Appendix A Table A-2. This analysis uses the Census Bureau's Longitudinal Employer-Household Dynamics dataset, which provides the number of workers residing in a given ZIP code who commute to other ZIP codes and the residence ZIP code of workers within a specific ZIP code. The first of these two components is used here.

Table A-2 includes a detailed listing of ZIP codes within Columbus and Franklin County, totals for MSA counties outside Franklin, elsewhere in Ohio, and out of state. These county-level counts are not exact: while ZIP codes never cross state lines, they can cross county lines – as do some municipalities. Generally, two-county ZIP codes are assigned to the county where most of their residents live. One adjustment is explicit: the Polaris 43240 ZIP code is in Columbus but in Delaware County. This ZIP code is included in Columbus but in Delaware County rather than Franklin County.

The table reveals that fewer South Side residents were working in the immediate area in 2020 than in 2002. The share of workers who lived in 43206 and were employed in 43206 or 43207 was 5.3%, down from 8.9%. Those living in 43207 and working nearby was down from 13.4% to 8.8%. Declines were also registered for those living in both ZIP codes and working in Columbus or its first-ring suburbs. The percentage of residents working elsewhere in Franklin County and elsewhere in the MSA (primarily in Delaware County) increased, but not enough to offset the decline in the Columbus percentages. Still, 83% of workers living in 43206 and 80% of workers living in 43207 worked in Franklin County in 2020. The net decrease in residents' jobs in the MSA translated to increases in employment elsewhere in Ohio and out of state.

Industry Employment in the South Side

The analysis now turns from the employment of South Side residents to jobs in the South Side. The area of analysis expands to the entirety of 43206 and 43207. These areas are mapped in Figures 4 and 5. The 43206 area includes much, but not all, of German Village and the Brewery District, but does not include Nationwide Children's Hospital, an important employment center. The 43207 area includes Great Southern and the surrounding retail and office developments, Scioto Downs, and Obetz, but not the Rickenbacker area.

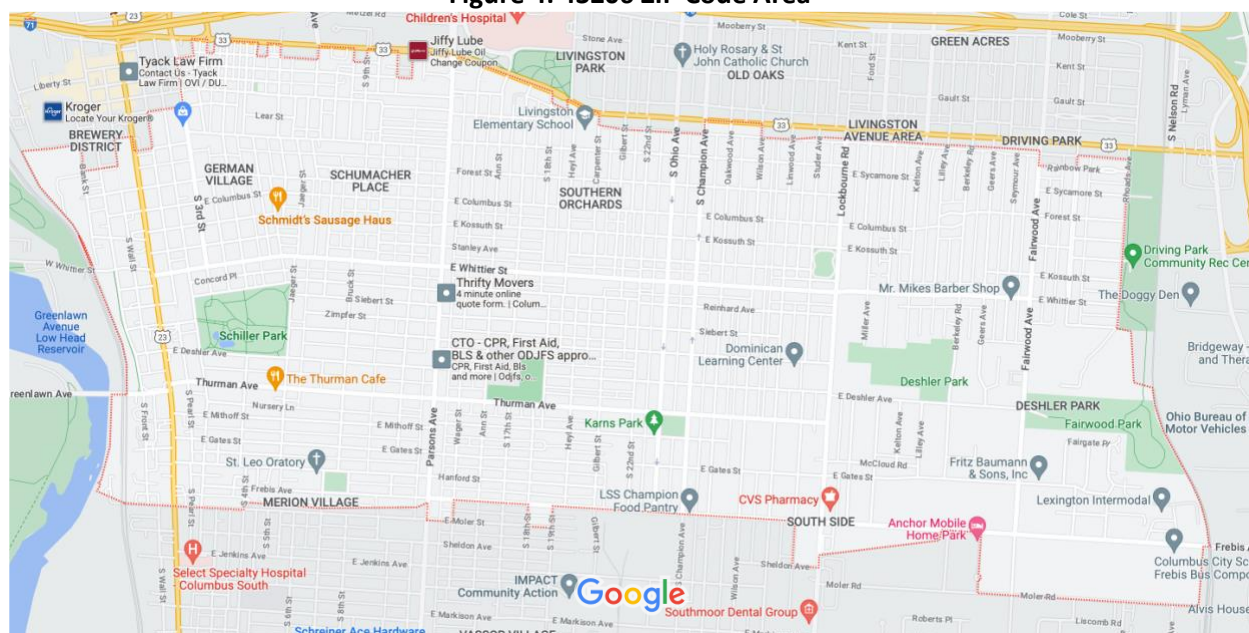
The need is for employment in these two ZIP codes by NAICS industry sector, but there are no government data giving complete, current employment at this level of detail. The process to generate industry sector employment estimates began with downloading address and use for all 1,707 commercial and industrial parcels in the two ZIP codes from the Franklin County Auditor's website. The identity, industry, and employment of the occupants of most of these parcels were obtained from the

Data Axle Reference Solutions database. Data Axle lists 562,000 Ohio businesses and 70,500 in Franklin County. Unlike sources such as Dun & Bradstreet that are based on credit applications, Data Axle originates with telephone listings. Staff members contact businesses on an ongoing basis to ensure that information is current. The results are neither complete nor error-free but provide information on the vast majority of the businesses occupying these parcels. Google Street View and Bing were used to check listings that were in question. Google Street View is rarely more than seven or eight months old for primary commercial corridors in Columbus. The resulting line-item employer records are classified by NAICS sector.

Results of this analysis are in Table A-3 in Appendix A. To bring greater specificity to the other services sector, it is divided into three segments. Repair and maintenance services includes establishments that repair or maintain vehicles, electronic and precision equipment, other commercial and industrial equipment, and personal and household goods. Personal and laundry services include hair, nail, and skin care services; funeral homes and cemeteries; laundries, laundromats, and drycleaners, and non-veterinary pet care services. The religious, civic, professional, and social organizations segment is composed of religious organizations; grantmaking and giving services; social and civic organizations; and business, professional, labor, and political organizations.

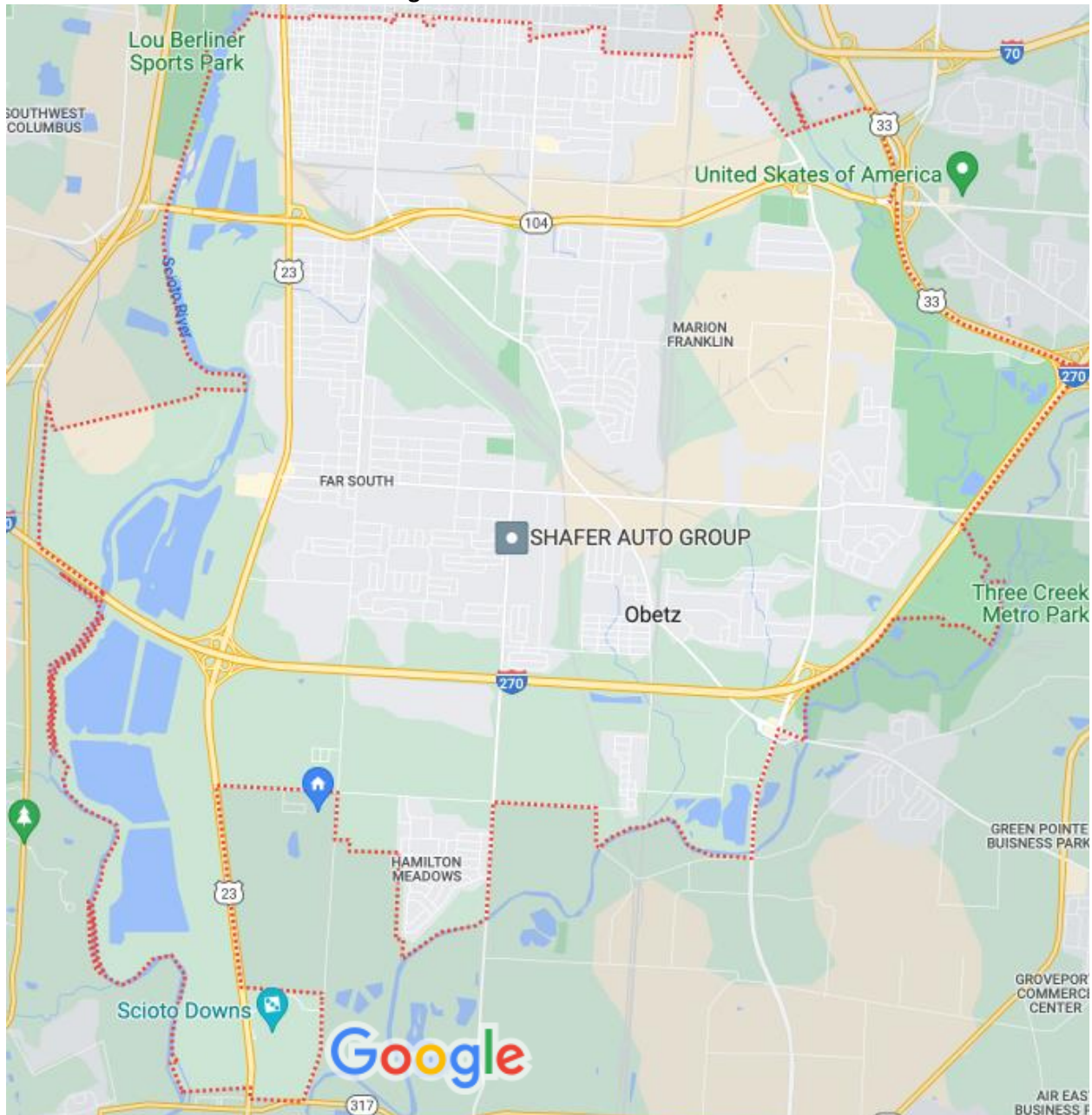
As Table A-3 makes clear, the employment distribution in South Columbus differs substantially from the Franklin County average. The sectors within business and professional services each have employment less than average, as do educational services (despite including public school employment), and healthcare and social assistance. Manufacturing employment is far above average at 13.1% – and well above the 8.3% U.S. share as well. Finance and insurance is another above-average sector, thanks largely to the operations of Grange Insurance. Other sectors with smaller, but above average employment concentrations include wholesale trade; transportation and warehousing; arts, entertainment, and recreation; and the religious, civic, professional, and social organizations subset of other services.

Figure 4: 43206 ZIP Code Area



Source: Google Maps.

Figure 5: 43207 ZIP Code Area



Source: Google Maps.

Occupational Analysis of Focus Industry Sectors

A steering committee assembled by South Side Thrive in collaboration with Regionomics selected three industry sectors for in-depth analysis: finance and insurance, healthcare, and manufacturing. These sectors each have meaningful employment opportunities open to the dominant share of South Side adults with a high school diploma. Although healthcare has a below-average concentration of jobs within the area boundaries, the proximity of Nationwide Children's Hospital – and Grant Medical Center further to the north – makes this a worthwhile segment for focus. Another feature of these three

sectors is that they can accommodate workers with a variety of skills and preferences. Those unwilling or unable to undertake the physical demands of a manufacturing job or many jobs in healthcare can opt for a career in finance and insurance. Finance and insurance jobs are also more able to accommodate those who need or wish to work remotely.

Translating these focus sectors into specific in-demand jobs involves relating employment by sector to employment by occupation. The Bureau of Labor Statistics' (BLS) Employment Projections include national-level 2021 estimates and 2031 projections of the number of workers employed in specific occupations within a wide array of industries. A given sector might contain dozens of detailed industries. Thus, it is necessary to return to the detailed business listings and derive employment by industry within the three sectors.

The healthcare industry allocation is in Table 12. Note that the employment total is less than that shown in Table A-3. This sector includes both healthcare and social assistance organizations. The latter include individual and family services; community food, housing, and emergency and other relief services; vocational rehabilitation services, and childcare services. The decision was made to limit the focus solely to healthcare. Note, however, that employment also includes three retail industries. This is to reflect employment in pharmacies, optometry centers, and clinics housed in these businesses. The Employment Projections data reveal that nationwide, 55.4% of pharmacists, 82.5% of pharmacy aides, and 71.1% of pharmacy technicians work in retail establishments.

The healthcare employment totals in retail industries were predicted by calculating total 43206 and 43207 employment in the three industries and multiplying each total by the national average percentage of healthcare occupations within those industries. The same calculation was performed for the larger healthcare industries – those with asterisks in Table 12. It is unlikely that analyzing the smaller industries would change the occupational results materially.

The critical occupations are those with the greatest projected 10-year need for new workers, which are not necessarily those with the largest current employment. Part of worker need is driven by employment growth of the industry. The U.S. industry employment projections were used to estimate the total growth need for the industry; the employment projections include the projected occupational distribution within each industry for both 2021 and 2031.⁷ These net employment changes represent only a small fraction of the total need for new employees, though. A much greater need is created through turnover in existing positions. The employment projections provide U.S. annual average openings for all occupations across all industries. Multiplying each occupation's annual openings by 10, subtracting the 10-year net change, and dividing the result by the 2021 employment total yields the 10-year turnover percentage projected for each occupation. This percentage multiplied by the derived 2021 occupational employment gives the 10-year replacement need. The growth need plus the turnover need equals the total need.

⁷ Local projections data would be preferable to the national average projections. The Ohio Labor Market Information Bureau issues 10-year industry growth projections for the state and for the Columbus MSA. Although 2020-2030 projections were just released, the most recent ones when this work was completed covered 2018-2028. Because they were three years older than the U.S. projections and did not include effects of the pandemic, they were not useful. Also, the local industry projections are far less detailed than the U.S. projections.

Table 12: Healthcare Employment by Detailed Industry

Industry	Employment
Offices of physicians*	312
Offices of dentists*	100
Offices of chiropractors	49
Offices of optometrists	19
Offices of mental health practitioners (except physicians)*	239
Offices of physical, occupational and speech therapists, and audiologists	52
Offices of all other health practitioners*	91
Outpatient care centers*	144
Outpatient mental health and substance abuse centers	3
Medical and diagnostic laboratories	12
Home healthcare services*	272
Ambulance services	30
All other ambulatory healthcare services	39
General medical and surgical hospitals; local*	264
Psychiatric and substance abuse hospitals; private	26
Nursing care facilities (skilled nursing facilities)*	183
Residential mental health and substance abuse facilities*	320
Continuing care retirement communities and assisted living facilities for the elderly	12
Other residential care facilities*	98
Total	2,265
Predicted relevant retail employment	
Grocery stores and specialty food stores*	313
Pharmacies and drug stores*	127
General merchandise stores*	342
Total	782
Grand total	3,047

*Included in the occupational analysis.

Source: Analysis of Data Axle employment counts.

Current and projected employment estimates were derived for a total of 172 healthcare occupations across these industries; the 44 occupations with the greatest total growth and replacement need are in Table A-4. A cause for concern in this analysis is the total growth and replacement need for more than 2,500 new workers by the employers in 43206 and 43207, 20% higher than the total employment in these occupations. This need is far greater than it was even five years ago. Clearly, the need is driven by the aging workforce and the upcoming wave of retirements. This trend affects all industries as demographic effects cause the growth of the senior population to increase and the prime working age population to slow. Many workers are still in their 50s, so the 10-year need for this and the other two sectors is likely to be somewhat backloaded.

Critical occupations for manufacturing and finance and insurance were generated by the same process as those in healthcare. The manufacturing industry distribution is in Table 13. Plastics manufacturing employment dominates, but high employment totals are also in wood product manufacturing; paint, coating, and adhesive manufacturing; cement and concrete product manufacturing; and motor vehicle parts manufacturing. The 36 occupations (out of 213) with the largest growth and replacement need are

listed in Table A-5. Here the need is for more than 3,200 new workers, 12% greater than the total current employment in these occupations.

Table 13: Manufacturing Employment by Detailed Industry

Industry	Employment
Animal slaughtering and processing	10
Bakeries and tortilla manufacturing	22
Other food manufacturing*	90
Beverage manufacturing	57
Other wood product manufacturing, including wood tv, radio and sewing machine cabinet manufacturing*	325
Converted paper product manufacturing	83
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	70
Paint, coating, and adhesive manufacturing*	340
Plastics product manufacturing*	1,184
Cement and concrete product manufacturing*	246
Printing and related support activities	21
Steel product manufacturing from purchased steel	69
Alumina and aluminum production and processing	45
Nonferrous metal (except aluminum) production and processing	41
Foundries	15
Forging and stamping	66
Architectural and structural metals manufacturing*	101
Boiler, tank, and shipping container manufacturing*	114
Hardware manufacturing	10
Spring and wire product manufacturing	30
Machine shops; turned product; and screw, nut, and bolt manufacturing	31
Coating, engraving, heat treating, and allied activities*	107
Other fabricated metal product manufacturing	84
Industrial machinery manufacturing	62
Commercial and service industry machinery manufacturing, including digital camera manufacturing*	100
Metalworking machinery manufacturing	30
Navigational, measuring, electromedical, and control instruments manufacturing	75
Motor vehicle parts manufacturing*	225
Household and institutional furniture and kitchen cabinet manufacturing, excluding wood tv, radio and sewing maching cabinet manufacturing	10
Other miscellaneous manufacturing*	111
Total	3,774

*Included in the occupational analysis.

Source: Analysis of Data Axle employment counts.

The finance and insurance industry breakdown is in Table 14. Insurance employment is 95% of the total, thanks to the Grange Insurance headquarters on South High Street. The resulting need analysis identified 90 occupations. The projections for the top 34 occupations are in Table A-6. The total projected need is for around 2,700 workers in South Columbus over the coming decade, 92% of current employment.

Table 14: Finance and Insurance Employment by Detailed Industry

Industry	Employment
Credit intermediation and related activities*	115
Nondepository credit intermediation	34
Insurance carriers*	1,000
Direct life insurance carriers*	132
Direct insurance (except life, health, and medical) carriers*	1,655
Insurance agencies and brokerages*	34
Other insurance related activities*	30
Securities, commodity contracts, and other financial investments and related activities	25
Total	3,025

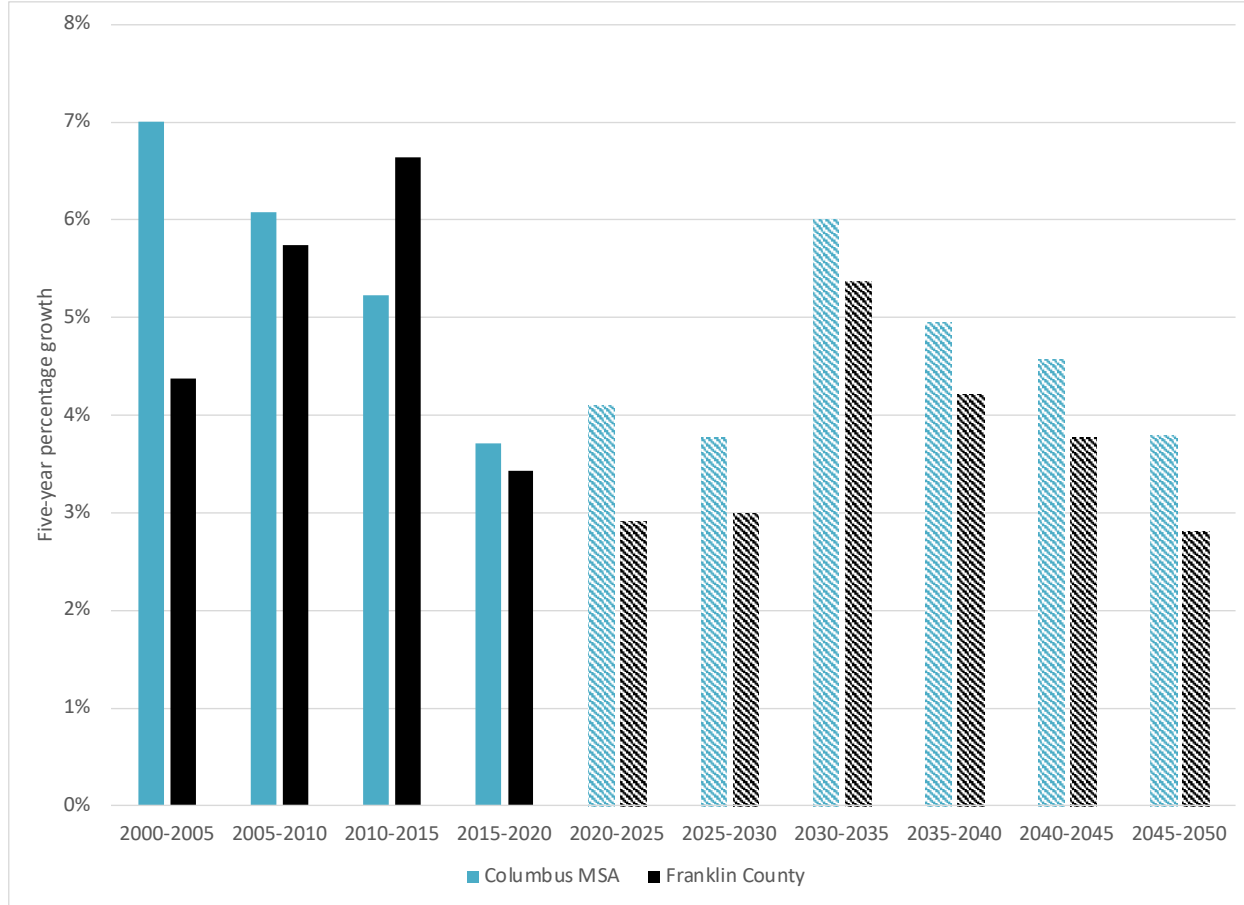
*Included in the occupational analysis.

Source: Analysis of Data Axle employment counts.

South Side employers' ability to meet the needs for new workers identified in this analysis will be difficult. The sharply increasing retirement-driven turnover need will confront all employers in all industries. This will continue to create downward pressure on participation rates and ongoing workforce shortages.

This challenge is illustrated in Figure 6, which compares historical five-year growth of the prime working-age population (ages 18-64) to projected growth for the 10-county Columbus metropolitan statistical area and Franklin County. The projections by the Mid-Ohio Regional Planning Commission (MORPC) are newly issued and include the impacts of the Intel development. This chart suggests that the slower growth of this population will persist through the current decade before a return to higher growth in the 2030s. This trend is a benefit to South Side jobseekers, whose services will be needed more than ever, and creates an imperative for employers to focus on the development of their current and prospective workforce.

Figure 6: Historical and Projected Five-Year Population Growth Percentages, Ages 18-64, Columbus MSA and Franklin County, 2000-2050



Source: Population Estimates, U.S. Census Bureau, and 2020-2050 County Forecasts, Mid-Ohio Regional Planning Commission (hatched bars).

Requirements for Worker and Business Success

Again, the goal of this initiative is to align job opportunities on the South Side with the skills of the population. It is thus important to determine the typical education and training requirements for the jobs in the three industry sectors and the knowledge, skill, and ability needs for these jobs. An equally important, but somewhat less tangible, requirement for worker and business success is that jobs be of high quality.

Education and Training Needs

The U.S. Bureau of Labor Statistics tabulates the level of formal education, experience, and training typically required of applicants for hundreds of occupations. The education requirement ranges from no formal educational credential through a doctoral or professional degree. Previous work experience typically required in a related occupation can be none, less than five years, or five years or more. Typical on-the-job training requirements can be none, short-term (less than one month), moderate-term (one month up to one year), or long-term (one year or more).

The education, experience, and training requirements for the 35 highest-need occupations in healthcare are in Table A-7, those for manufacturing are in Table A-8, and those for finance and insurance are in Table A-9. Also included in these tables is the median annual pay for the occupation in the Columbus metropolitan area as of May 2022.

The jobs in manufacturing and healthcare available to those with a high school diploma is probably not surprising. What may be surprising is the number of jobs in finance and insurance available to high school graduates, including the four highest-need occupations. These jobs could potentially attract the large number of South Side residents with a diploma. The other insight from these tables is the relatively small number of occupations not requiring at least a high school diploma and the low pay for these jobs. As the demographic discussion made clear, a higher-than-average share of South Side adult residents lack a diploma and are consequently shut out of many higher-paying jobs. An important priority of this initiative should be to engage these individuals and work with them to enable them to earn their GED.

Knowledge, Skills, and Abilities

Education and training needs are only part of a worker's ability to succeed. Success also depends on knowledge, skills, and abilities (KSA). The following definitions for these three attributes are adapted from those on the career website, Indeed.com.⁸ **Knowledge** is the body of a worker's information needed to help him or her perform a specific job successfully. **Skills** build on knowledge. These consider the ability to manipulate things, data, people, and ideas to accomplish a task. Skills can be developed with practice or training. While technical skills are necessary, an important component of skills is "soft skills" – or what some prefer to call "work-ready skills." These are personality traits and personal attributes that help an individual relate to others and function effectively in the workplace. These include traits such as integrity, punctuality, empathy, oral and written communication, creativity, problem solving and critical thinking, and leadership. In conversations with business leaders over the years, the author has found that most leaders consider these skills at least as important as technical skills. Finally, **abilities** build on both knowledge and skills, and allow the individual to apply his or her knowledge and skills to accomplish the tasks required in the job.

Detailed KSA sets for more than 900 occupations are compiled in the publicly available Occupational Information Network (O*NET) application⁹, maintained for the U.S. Department of Labor's Employment and Training Administration. O*NET surveys employers to determine the requirements for each occupation and ranks the importance of each KSA attribute from 0 to 100. The ranks of the 10 most important KSA elements for each of the occupations in Tables A-7, A-8, and A-9 were collected and a weighted average rank was calculated for each attribute, where the weights are the total 10-year growth and turnover needs for each of the occupations. For the healthcare and finance and insurance occupations, weights were calculated both for all occupations and for those occupations open to those with a high school diploma. A separate high school calculation was not performed for manufacturing because the vast majority of manufacturing jobs require only a high school diploma.

Table 15 displays the results of the analysis of knowledge requirements. The O*NET definitions of the KSA attributes are in Appendix B. The blank cells in the table indicate knowledge elements that were not

⁸ J. Herrity (2023). Knowledge, skills and abilities (KSA): Definitions and examples. *Indeed.com*. <https://www.indeed.com/career-advice/career-development/knowledge-skills-and-abilities>

⁹ O*NET OnLine. (2023). <https://www.onetonline.org>. The database also includes information on work activities, geographical area-specific sources of training, interests, work values and styles, and more.

present in any of the 35 occupations in the sector, while a cell displaying 0.00 indicates that the element was identified in at least one occupation but the weighted average of the rankings for all occupations was less than 0.005. Shaded cells indicate rankings that are in the top five (or more in cases of a tie in the fifth ranked element).

Table 15: Knowledge Requirements for Occupations in Healthcare, Manufacturing, and Finance and Insurance: Weighted Averages

Knowledge attribute	Healthcare		Mfg.	Finance and insurance	
	All occs.	HS occs.	All occs.	All occs.	HS occs.
Administration and Management	0.48	0.47	0.37	0.55	0.54
Administrative	0.40	0.37	0.20	0.50	0.55
Biology	0.02	0.01	0.00		
Building and Construction			0.03	0.01	0.00
Chemistry	0.03	0.02	0.05		
Communications and Media	0.04	0.05	0.02	0.16	0.14
Computers and Electronics	0.29	0.30	0.37	0.56	0.56
Customer and Personal Service	0.78	0.77	0.35	0.78	0.86
Design			0.16	0.03	0.00
Economics and Accounting	0.07	0.07	0.03	0.34	0.34
Education and Training	0.44	0.37	0.35	0.33	0.35
Engineering and Technology	0.01	0.02	0.26	0.06	0.02
English Language	0.70	0.68	0.56	0.74	0.74
Food Production	0.01	0.00	0.00		
Geography				0.01	0.02
Law and Government	0.12	0.12	0.03	0.33	0.34
Mathematics	0.23	0.22	0.52	0.56	0.57
Mechanical	0.02	0.02	0.49	0.02	0.03
Medicine and Dentistry	0.38	0.39	0.00	0.01	0.00
Personnel and Human Resources	0.15	0.18	0.09	0.13	0.05
Philosophy and Theology	0.08	0.02			
Physics			0.04		
Production and Processing	0.04	0.04	0.58	0.06	0.07
Psychology	0.48	0.39	0.01	0.11	0.10
Public Safety and Security	0.31	0.35	0.33	0.11	0.14
Sales and Marketing	0.04	0.05	0.07	0.30	0.33
Sociology and Anthropology	0.17	0.11		0.02	0.00
Telecommunications	0.06	0.08	0.03	0.05	0.00
Therapy and Counseling	0.36	0.25		0.01	0.00
Transportation	0.09	0.12	0.14	0.06	0.09

Note: Shaded cells: the highest-ranked attributes. Blank cells: attribute appears in no occupations. 0.00: attribute is present but weighted average is less than 0.005.

Source: Analysis of O*NET data.

Administration and management is an important knowledge attribute across all sectors. Even if one is not managing others, one must still manage one's own job duties and performance. This goes hand in hand with customer and personal service. Even if one does not deal with the public, one still needs to meet the needs of coworkers. This and working with others to help them improve their job performance (education and training) are important elements of teamwork. Knowledge of English is also important for all sectors. Although familiarity with computers and their use is not a top-ranked attribute across all

sectors and the specifics of the need differ across occupations, it is still important knowledge. It will become more important as technology becomes even more important in work.

Beyond this, the important knowledge attributes differ. Knowledge of mathematics is essential in manufacturing and finance, but somewhat less so in healthcare. (Computing correct dosages is essential in some settings.) Mechanical aptitude and knowledge of production processes are necessary in manufacturing, while the psychology of human behavior is an important understanding in a healthcare setting.

The weighted averages of the 31 identified skill attributes are displayed in Table 16.

Table 16: Skill Requirements for Occupations in Healthcare, Manufacturing, and Finance and Insurance: Weighted Averages

Knowledge attribute	Healthcare		Mfg.	Finance and insurance	
	All occs.	HS occs.	All occs.	All occs.	HS occs.
Active Learning	0.21	0.22	0.18	0.32	0.22
Active Listening	0.70	0.67	0.47	0.69	0.68
Complex Problem Solving	0.18	0.12	0.16	0.47	0.42
Coordination	0.38	0.40	0.29	0.24	0.18
Critical Thinking	0.62	0.58	0.53	0.67	0.64
Equipment Maintenance	0.01	0.02	0.14	0.01	0.02
Equipment Selection			0.01		
Instructing	0.15	0.21	0.07	0.04	0.04
Judgment and Decision Making	0.34	0.25	0.23	0.38	0.23
Learning Strategies	0.01	0.00	0.01	0.01	0.00
Management of Financial Resources			0.00	0.01	0.00
Management of Personnel Resources	0.02	0.00	0.05	0.02	0.00
Mathematics	0.01	0.01	0.01	0.06	0.00
Monitoring	0.56	0.53	0.48	0.40	0.35
Negotiation	0.03	0.03	0.04	0.15	0.22
Operation and Control			0.30		
Operations Analysis			0.02	0.03	0.00
Operations Monitoring	0.01	0.00	0.38		
Persuasion	0.12	0.14	0.03	0.15	0.23
Programming	0.00	0.00	0.00	0.03	0.00
Quality Control Analysis	0.02	0.02	0.33	0.01	0.02
Reading Comprehension	0.54	0.48	0.44	0.70	0.69
Repairing	0.02	0.02	0.06	0.01	0.02
Service Orientation	0.61	0.62	0.02	0.26	0.40
Social Perceptiveness	0.61	0.56	0.19	0.29	0.35
Speaking	0.65	0.61	0.43	0.68	0.67
Systems Analysis			0.01	0.06	0.00
Systems Evaluation				0.01	0.00
Time Management	0.26	0.32	0.28	0.28	0.43
Troubleshooting	0.02	0.02	0.13	0.01	0.03
Writing	0.27	0.18	0.07	0.44	0.39

Note: Shaded cells: the highest-ranked attributes. Blank cells: attribute appears in no occupations. 0.00: attribute is present but weighted average is less than 0.005.

Source: Analysis of O*NET data.

The two skill attributes ranking in the top five across all three sectors are critical thinking and active listening. These are two of the most important work-ready skills but based on the conversations with business leaders for this project and conversations for similar projects over many years, they are far less common than they should be. A lack of these skills can diminish one's own performance and the performance of others, and in some settings could be dangerous. Developing these skills should thus be a priority in upgrading the skills of South Side residents. Reading comprehension is also important across the board even though it did not rank among the top five in healthcare.

Two other skill attributes were understandably important in healthcare: service orientation, actively looking for ways to help others, and social perceptiveness, understanding the motivation behind people's actions. These are important in finance and insurance as well, even though they were not among the top five.

The 39 ability attributes that appeared in the occupations in the three sectors are listed in Table 17 on the next page. There are seven marked attributes for all finance and insurance jobs because of a three-way tie for fifth place. As was true of skills, two ability attributes were important in all three sectors. These are oral comprehension and problem recognition. Understanding the speech of others is a vital ingredient for effective teamwork. Identifying problems, especially those that are potentially serious, could lead to inefficiencies, financial losses, and perhaps injury or loss of life. This specific trait only considers the ability to recognize that a problem exists. Other traits would be brought to bear in fixing the problem or reporting it to a responsible teammate. Near vision is important in all three sectors. Deductive reasoning, the ability to apply general patterns and rules to addressing a specific case, is especially important in higher-skill jobs in healthcare and finance and insurance. Manual dexterity is one of a number of identified traits that reflect the physical nature of these jobs.

Table 17: Ability Requirements for Occupations in Healthcare, Manufacturing, and Finance and Insurance: Weighted Averages

Knowledge attribute	Healthcare		Mfg.	Finance and insurance	
	All occs.	HS occs.	All occs.	All occs.	HS occs.
Arm-Hand Steadiness	0.04	0.03	0.40		
Auditory Attention			0.01		
Category Flexibility	0.06	0.07	0.17	0.15	0.11
Control Precision			0.32		
Deductive Reasoning	0.57	0.53	0.31	0.62	0.58
Depth Perception			0.04		
Dynamic Strength	0.01	0.01	0.04		
Extent Flexibility	0.06	0.07	0.01		
Far Vision	0.01	0.01	0.08		
Finger Dexterity	0.03	0.02	0.23		
Flexibility of Closure			0.07		
Fluency of Ideas	0.08	0.03	0.02	0.07	0.00
Hearing Sensitivity			0.02		
Inductive Reasoning	0.45	0.37	0.09	0.48	0.38
Information Ordering	0.38	0.38	0.33	0.36	0.33
Manual Dexterity	0.01	0.01	0.43		
Mathematical Reasoning	0.00	0.00	0.01	0.06	0.00
Multi-Limb Coordination	0.01	0.01	0.27		
Near Vision	0.51	0.57	0.53	0.57	0.62
Number Facility	0.00	0.00	0.01	0.03	0.00
Oral Comprehension	0.73	0.72	0.41	0.72	0.75
Oral Expression	0.73	0.72	0.29	0.70	0.74
Originality	0.00	0.00		0.01	0.00
Perceptual Speed			0.12		
Problem Sensitivity	0.66	0.62	0.48	0.63	0.63
Rate Control			0.07		
Reaction Time			0.12		
Response Orientation			0.04		
Selective Attention	0.03	0.03	0.04		
Spatial Orientation			0.02		
Speech Clarity	0.56	0.51	0.19	0.62	0.68
Speech Recognition	0.58	0.61	0.21	0.43	0.55
Stamina	0.01	0.00	0.04		
Static Strength	0.05	0.06	0.10		
Trunk Strength	0.06	0.07	0.14		
Visual Color Discrimination			0.01		
Visualization			0.03		
Written Comprehension	0.52	0.47	0.21	0.72	0.71
Written Expression	0.41	0.38	0.13	0.62	0.65

Note: Shaded cells: the highest-ranked attributes. Blank cells: attribute appears in no occupations. 0.00: attribute is present but weighted average is less than 0.005.

Source: Analysis of O*NET data.

Insights from Industry Leaders

The analysis above is intended to provide a baseline understanding of the nature of jobs in the target sectors and the education, knowledge, skills, and ability needs for success in these jobs. But this analysis cannot address the unique needs of the employers in South Columbus and the unique characteristics of their applicants and incumbent workers. This requires direct conversations with local leaders in the three sectors. Accordingly, South Side Thrive convened focus groups of human resources leaders of South Side businesses. The focus groups were led by the author. This section summarizes the insights from those focus groups.

Healthcare

The healthcare focus group convened on September 6, 2023, and included Melissa Miller, Chief Human Resources Officer at Southeast Healthcare; Alyssa Friend, Human Resources Analyst at the Central Ohio Area Office on Aging; and Angela Montemarano, Human Resources – Recruitment and Staff Development at Maryhaven.

Consistent with the occupational analysis, there are numerous positions in the three organizations that are open to people with a high school education. Social and human service positions such as chemical dependency counselors and state-tested nurses' aides (STNAs) require only a high school diploma/GED and successfully completing an online test for certification. Patient care assistants are badly needed. Resident programs also have openings for certified peer supporters, which in Ohio requires a high school diploma, training, and the lived experience of mental health and/or substance use issues. These are called residential specialists or service specialists and are classified as residential advisors in the occupational classification. The panel members cited an ongoing need to fill these positions. The position is cited as relatively high need in Table A-4, and experiences above-average turnover. Licensed practical nurses (LPNs), unlike many registered nurse positions, do not require a bachelor's degree, but rather a shorter post-secondary training program. These programs prepare graduates to take the NCLEX exam, which is a requirement to be licensed. While hospitals generally do not hire licensed practical nurses because of accreditation requirements, these organizations do.

Some of these entry-level occupations can lead to higher-skill, better-compensated positions with additional training. The panelists noted difficulties in hiring licensed counselors and licensed social workers, which would be a career progression for the initially hired counselors and aides mentioned above. Medical assistant training is brief and accessible and can lead to an LPN career. For LPNs wishing to advance their career, a relatively short LPN to RN program is offered by Columbus State. Numerous online LPN to RN programs also exist. The organizations offer partial or full reimbursement for tuition and licensure costs.

The main concern of participants regarding the knowledge, skills, and abilities of their current workforce and applicants is a lack of work-ready skills. It is hard to find people with a true work ethic. One participant summarized this as a lack of professionalism, including such basic traits as workers calling in absences, having a good reason for being absent, and behaving appropriately in a professional setting. Empathy – a bedside manner and treating individuals with dignity and respect – is also critically important. Workers must be present in the situation, understand it, and respond to it appropriately. This includes listening to both the patient and his/her family members and evaluating the sometimes-conflicting information.

Active listening and speaking are especially important because of direct contact with a wide variety of patients and family members. Employers do formal trainings on bias and cultural sensitivity. An increasingly important need, not explicitly included in the ability requirements above, is de-escalation. This is the ability to defuse uncomfortable or threatening situations rather than allowing them to fester or making them worse.

An ongoing national trend is the shift from institutional to home-based healthcare, and the participants confirmed that this is happening here in Columbus. The need for sensitivity and professionalism skills will be even greater because the worker will be entering the patient's home. The need for direct caregivers will be greater, and so will be the need for case managers. This position requires a minimum of an associate degree, but it is an easy entry point to the medical field with the appropriate qualifications.

Manufacturing

The manufacturing focus group was convened on September 7, 2023, and included Randy Winkle, Vice President Human Resources at Engineered Profiles; Scot Donaldson, Human Resources Director at Franklin International; Karen Kustich, General Manager at Lapham Hickey Steel; Adina Neagomir, Human Resources Director at N. Wasserstrom; and Sue Ehrlich, Senior Human Resources Business Partner at Royal Building Products.

Participants cited machine operators and fabricators as positions that are open to applicants with a high school diploma and are particularly hard to fill. There are numerous open positions in these occupations and will be more as older workers retire. Packers and packagers is an entry-level position that allows a new worker the opportunity to enter the field, but these positions are so hard to fill that employers are resorting to automation to get the work done. Automation is becoming increasingly important in other positions as well. This is likely to increase the entry education requirement beyond its current GED level.

First-line supervisors are also needed. Employers try to promote from within, but talented operators lacking leadership skills make poor supervisors. There is also a hesitancy among employees to take the career advancement opportunities that are open to them – perhaps in some cases because of benefit cliffs.

Among the KSA attributes that are most needed are basic mathematical skills, mechanical aptitude, computers and automation, and English and reading comprehension. This is particularly important because an inability to understand spoken language or written text can be dangerous. The availability of smartphones has degraded technical skills and distracts people from their job, which is also potentially dangerous. Cultural competencies are increasingly important given the increasingly global workforce. Despite automation, physical strength and stamina remain important.

One barrier to recruitment is the common belief that manufacturing is a dirty, dangerous, and dying industry. This is a significant stigma. The most effective way that the employers have found to overcome this barrier is employee referrals and public relations. In some cases, incentives are paid both to the new employee and the employee doing the referring. Plant tours could be effective, but these are problematic from a safety and liability standpoint. Virtual tours are an option.

Career days at local schools including and beyond Eastland-Fairfield Career Center could be an effective way to engage young people. Engaging parents and guidance counselors could also be effective.

Apprenticeship programs are a good point of entry, but these require a curriculum. One participant discussed the possibility of clearly articulating the content of a training program and working with nonprofits to implement it. A formal advocacy group of employers could be convened to facilitate this effort. (Such a group, convened by Columbus State, did exist prior to the 2007-2009 recession.)

One other problem is transportation and the physical infrastructure surrounding some manufacturers' facilities. The lack of sidewalks on Frebis Avenue and the lack of bus stops close to plants are both concerns. The City and COTA should both be engaged to help solve this problem. Rickenbacker faces similar infrastructure barriers. This has been a focus for at least 25 years; engaging with the Rickenbacker Employer Assistance Network could reveal strategies.

Finance and Insurance

The finance and insurance focus group, convened on September 8, 2023, was a conversation with a panel of human resources leaders at Grange Insurance because of Grange's dominance in this sector on the South Side. Participants included Jenny Jacobs, Director – Human Resources; Carrie Maun-Smith, Assistant Vice President – Diversity, Equity, and Inclusion and Community Relations; Damon Porter, Senior Vice President, Chief Human Resources Officer; and Nicole Smith, Senior Recruiter.

The highest-need occupations open to individuals with high school diplomas are customer service and claims adjusters/investigators. These occupations also face high turnover. A somewhat lesser need is for clerical occupations and commercial underwriting. People are also retiring out of risk control, loss control, and investigator positions. These are not entry-level positions, and Grange is focused on developing staff to fill these positions. The company provides on-the-job training and pays for outside classes. Customer service is in Grange's call center. While turnover is creating numerous openings, industry growth has been slow. This is confirmed by recent BLS employment estimates for the Columbus MSA.

Other high-need occupations identified in the earlier analysis are not targeted by Grange in particular. Claims processing is done by a partner firm, so Grange does not hire for these positions. Policy sales and administration are done by independent agencies, while Grange's sales agents engage the agencies rather than policyholders. Many of these positions can be fully remote, making them available to people who would otherwise be unable to work at the office.

The knowledge elements and technical skills listed are important. Employees must be able to handle the administrative functions of their job. The focus needs to be on work ready skills, though – the ability to collaborate, to be an agile learner, to provide effective customer service, and to possess a high level of integrity. Active listening skills are vital, as are critical thinking and interpersonal skills.

A key ability needed by claims and customer service representatives is to manage multiple communication channels with agents and policyholders simultaneously. These include phone, chat, email, and texting. While they respond to messages, they must conduct research and possibly engage other team members to answer the question. Technology facilitates this communication shift and is supplanting traditional skillsets with more complex skill needs including data and actuary skills. Technology will speed claims activity but will make it more complex. This will require upskilling claims adjusters to work with this more complex process.

Workforce Development Contributions of Nationwide Children’s Hospital

While not in the study area, Nationwide Children’s Hospital (NCH) is a major regional employment center, with total employment of nearly 13,500, including nearly 1,500 Research Institute employees. As part of their Healthy Neighborhoods Healthy Families initiative in South Columbus and Linden, NCH puts a priority on hiring from neighborhoods in the South Side study area and offers a variety of programs helping individuals on the South Side and elsewhere develop their career.

Two paid programs target those entering the workforce. NCH hires youth and young adults aged 16 to 24 for paid summer internships, thereby creating interest in healthcare careers. In 2022, 73 individuals and 66 NCH departments participated, with 12 youth receiving employment offers.¹⁰ The NCH High School Career Academy is open to students in the Columbus and Reynoldsburg City School Districts. Participants are required to attend two classes per month from November through April and are paid \$12 per hour. The program includes job shadowing, medical terminology, HIPAA and CPR training, occupational certifications, and employer tuition assistance opportunities. Students successfully completing the program earn the Ohio Means Job Readiness Seal.¹¹

Boost is a free career development program for individuals 18 years and older hoping to work at NCH but needing help developing job seeking skills. Monthly classes cover understanding one’s skills and talents, planning career goals, developing a resume, and interviewing successfully.¹²

The Residences at Career Gateway addresses both healthcare workforce development and the need for affordable housing. The development consists of a 58-unit affordable apartment development at 755 East Whittier Street in the study area. Included is a 2,400 square-foot workforce development training space through which NCH offers job coaching and job skills classes.¹³

Impacts of Technology and Artificial Intelligence

Technological innovation is having a major impact on necessary job skills and the way work is done. Two facets are machine automation and artificial intelligence. Machine automation dates at least to the birth of the Industrial Revolution. This trend has impacted all sectors, but agriculture and manufacturing to the greatest extent – at least to date. As a result of machine automation, farm employment in the U.S. fell from 72% of total employment in 1820 to 30% in 1916 (the year of the numerical farm employment

¹⁰ Nationwide Children’s Hospital. (2023). Youth & young adult employment program – Paid summer work experiences for students. <https://www.nationwidechildrens.org/about-us/population-health-and-wellness/healthy-neighborhoods-healthy-families/workforce-development/youth-employment-program>

¹¹ Nationwide Children’s Hospital. (2023). High school career academy. <https://www.nationwidechildrens.org/about-us/population-health-and-wellness/healthy-neighborhoods-healthy-families/workforce-development/high-school-career-academy>

¹² Nationwide Children’s Hospital. (2023). Boost - Free work readiness training & coaching. <https://www.nationwidechildrens.org/about-us/population-health-and-wellness/healthy-neighborhoods-healthy-families/workforce-development/boost>

¹³ Nationwide Children’s Hospital. (2023). Economic development. <https://www.nationwidechildrens.org/about-us/population-health-and-wellness/healthy-neighborhoods-healthy-families/workforce-development>; The Residences at Career Gateway. (2023). <https://www.residencesatcareergateway.com>

peak) to less than 2% today. But the output of U.S. farms increased sixfold between 1929 and 2018.¹⁴ Similarly, U.S. manufacturing employment totaled 14 million in 1950, nearly one-third of total employment, but currently amounts to 13 million, 8.3% of total employment, and less than its level more than 70 years ago.¹⁵ Manufacturing output increased markedly over that period.

These changes were enabled by the knowledge economy, one reliant not on the production of goods but on the production of data and information. The technological advances enabled by the knowledge economy have increased output per goods worker exponentially. Thus, the jobs lost on farms and in manufacturing firms were not lost in the overall economy. The economy transformed one form of employment into another – including employment that enabled the output increases in the agricultural and manufacturing economies. One measure of knowledge jobs – those in the business and professional services – increased from 2.9 million and 6.5% of the U.S. total in 1950 to 23 million and 14.7% of the total currently.¹⁶ This is only one component of the knowledge economy, but its growth alone much more than offset the decline of goods-producing economy.

Machine automation – including that facilitated by computers – impacts other sectors of the economy as well. Examples (among many) include word processing programs replacing large secretarial pools equipped with IBM Selectric typewriters, self-service checkout lanes in supermarkets and department stores, ordering kiosks in fast food restaurants, electronic patient data in healthcare, the Uber and Lyft interfaces that allow individuals driving their own vehicles to replace taxicabs, and, as discussed earlier, the necessity of customer service representatives to converse with customers over phone, email, and text – sometimes simultaneously.

The term “knowledge economy” suggests one reliant on advanced skills and advanced degrees, But this is not true; knowledge work permeates nearly all industries and all occupations. It encompasses “the ability of a factory worker to program a computer numerical control machine, a hairdresser to give a client a permanent, a plumber to find and correct a leak, and a salesperson to provide excellent customer service.”¹⁷ A similar point is made by the urban studies theorist Richard Florida in his study of the creative class.

What are the implications of machine automation on employment in the South Side? One is that manufacturing employment will not increase and is likely to decline. Members of the manufacturing focus group made this point in their discussion of their automation plans. These plans were not a way of eliminating workers, but rather a means of maintaining production in the face of a declining pool of job applicants. Based on the population projections discussed earlier, this is a problem likely to continue, at least for this decade.

The long-term manufacturing employment decline has had profound effects on other cities in Ohio; these cities were and are heavily dependent on manufacturing and lack the economic diversification that would offset the long-term declines. To a certain extent, the South Side has suffered the same economic decline from the loss of manufacturing jobs, but the economic diversification of the South Side and the region has buffered this impact somewhat.

¹⁴ Bill LaFayette, Wayne Curtis, Denise Bedford & Seema Iyer. (2019). *Knowledge economies and knowledge work*. Bingley, UK: Emerald Publishing, pp. 19-20.

¹⁵ LaFayette, Curtis, Bedford & Iyer. (2019), p. 5 (updated).

¹⁶ LaFayette, Curtis, Bedford & Iyer. (2019), p. 5 (updated).

¹⁷ LaFayette, Curtis, Bedford & Iyer.. (2019), p. 5.

This absolutely does not mean that choosing manufacturing as a focus sector was incorrect. Manufacturing employment may decline in coming years, but it will not decline to zero. Manufacturing offers, and will continue to offer, relatively well-paying jobs for mechanically inclined individuals. One strategy for addressing the below-average growth of manufacturing employment is to focus on firms that provide knowledge services to manufacturing, such as machinery maintenance and repair and engineering firms. Another possibility that capitalizes on the deep manufacturing experience in the South Side is to encourage the development of entrepreneurial manufacturing. Small and entrepreneurial manufacturing firms are more common than may be imagined. The availability of technology makes these firms more feasible than they were in the past. Half of all manufacturing establishments in the Columbus MSA employ fewer than 10.

Artificial intelligence (AI) is a more recent innovation but older than most imagine. AI was introduced as a theoretical academic discipline in the mid-1950s, but only became feasible around 10 years ago. Its potential as a disruptor is at least as great as machine automation and will be far more pervasive. The popular fear is that AI will substitute entirely for millions of jobs, causing massive layoffs. The recent studies on the labor market impacts of AI do not expect a widescale loss of jobs, although some job losses will definitely occur. An IBM report puts it succinctly: “AI won’t replace people – but people who use AI will replace people who don’t.”¹⁸ Relatively few jobs will be *replaced* by AI, but many jobs will be *assisted* by AI. This will significantly change important knowledge, skill, and ability characteristics of jobs, and will in many cases require substantial reskilling.

A Goldman Sachs analysis of U.S. occupational estimates and their tasks from O*NET concludes that around two-thirds of jobs have some degree of exposure to AI. Although the share of the tasks of these jobs that will be replaced by AI is significant, it is only partial for most jobs – 25% to 50%, depending on the job.¹⁹ Table 18 quantifies the exposure of jobs in the three target industry sectors to the Goldman Sachs results for the occupational groups important in those sectors. For each sector, the percentage of total employment by industry group is calculated. (Recall that this occupational employment distribution is specific to employers in the South Side.) Table 18 lists the most prevalent occupational groups, comprising at least 80% of sector employment, and Goldman Sachs’ estimate of each occupational group’s exposure to AI automation.

The implication of Table 18 is that the impact of AI will be felt much more heavily in healthcare and finance and insurance than in manufacturing. Each of the key occupational groups in healthcare and in finance and insurance has above-average exposure to AI disruption, while in manufacturing this is true only of the relatively minor office and administrative support occupational group. Again, the implication is not that there will be wholesale job loss in those two sectors due to widespread adoption of AI. Rather, there will be a much more significant shift in the importance of individual knowledge, skill, and ability attributes, with an accompanying need to retrain the workforce to work effectively with AI.

¹⁸ IBM. (2023). Augmented work for an automated, AI-driven world, p. 2.
<https://www.ibm.com/downloads/cas/NGAWMXAK>

¹⁹ Joseph Briggs and Devesh Kodnani. (2023). The potentially large effects of artificial intelligence on economic growth. Goldman Sachs & Co. LLC, pp. 4-5. https://www.key4biz.it/wp-content/uploads/2023/03/Global-Economics-Analyst_-The-Potentially-Large-Effects-of-Artificial-Intelligence-on-Economic-Growth-Briggs_Kodnani.pdf

Table 18: Industry Sector Exposure to AI Automation

Industry sector/occupational group	Share of employment	Share of work tasks subject to automation
All occupational groups, total economy	100%	25%
Healthcare		
Healthcare practitioners and technicians	31%	28%
Healthcare support	25%	26%
Community and social service	16%	33%
Office and administrative support	14%	46%
Manufacturing		
Production	54%	9%
Transportation and material moving	12%	11%
Office and administrative support	9%	46%
Installation, maintenance, and repair	5%	4%
Finance and insurance		
Business and financial operations	34%	35%
Office and administrative support	29%	46%
Computer and mathematical	11%	29%
Management	10%	32%

Source: South Side occupational analysis; Briggs and Kodani (2023), p. 7.

The World Economic Forum's latest biennial report on the future of the workforce²⁰ agreed with the conclusion of IBM and Goldman Sachs: The loss of jobs resulting from AI will be much less significant than the shift in necessary skills in existing jobs and the creation of new occupations through 2027. The report undertook a detailed analysis of these five-year skill shifts based on a survey of 803 companies employing 11.3 million workers in 45 economies worldwide. Table 19 summarizes the most important attributes for reskilling in the three sectors. These reskilling needs arise from the characteristics of the current workforce and all expected innovations in the industry sector over the coming five years, not only the increase in the use of AI. The most noteworthy needs confirm the points raised by the South Side business leaders: analytical and creative thinking; leadership and social influence; and resilience, flexibility, and agility.

²⁰ World Economic Forum. (2023). Future of jobs report 2023.
https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf

Table 19: Most Important Reskilling Needs, 2023-2027

Sector/attribute	Share of organizations reporting reskilling need
Healthcare (Medical and healthcare services)	
Creative thinking	64%
Curiosity and lifelong learning	49%
Leadership and social influence	46%
Analytical thinking	36%
Empathy and active listening	36%
Manufacturing (Production of consumer goods)	
Analytical thinking	52%
Creative thinking	42%
Resilience, flexibility, and agility	41%
AI and big data	38%
Curiosity and lifelong learning	35%
Leadership and social influence	35%
Finance and insurance (Insurance and pensions management)	
AI and big data	64%
Analytical thinking	61%
Resilience, flexibility, and agility	50%
Design and user experience	43%
Service orientation and customer service	43%
Finance and insurance (Financial services and capital markets)	
Analytical thinking	65%
AI and big data	50%
Creative thinking	46%
Leadership and social influence	40%
Curiosity and lifelong learning	36%
Resilience, flexibility, and agility	36%

Source: World Economic Forum (2023).

In a recent blog post, the journalist Noah Smith argued that unlike earlier technological advancements that have widened economic inequality, the broad use of AI can reduce inequality by reducing the difference in physical and intellectual output between low performers and high performers.²¹ Research has shown that AI provides a bigger productivity advantage to low performers than high performers. In one study, the lowest-skill workers increased their output by 35%, but there was no productivity increase for the highest-skill workers. Other studies found similar results for programmers, students taking exams, and creative writers. In Smith's words, "Generative AI is a power tool for the mind...that looks like it could level the playing field." This suggests that South Side employers might not have to look as hard for the most skilled employees, and South Side residents who previously might not have succeeded in jobs such as insurance underwriting or customer service could be highly successful once AI is introduced – with consequent improvement in their income.

²¹ Noah Smith. (2023, September 4). Is it time for the Revenge of the Normies? *Noahpinion Blog*. <https://www.noahpinion.blog/p/is-it-time-for-the-revenge-of-the>

Quality Jobs

As we focus on improving the income of South Side residents, these jobs must provide workers with household-sustaining wages. But that is just the start. The think tank Results for America has argued that these jobs should be of high quality. In addition to fair pay, a quality job should provide benefits, fair schedules, and training opportunities and career pathways. These characteristics benefit workers by allowing them to build savings, enjoy better health, improve work-life balance, and enhance their career. Employers benefit by attracting more and better-quality job candidates, improving diversity, equity, and inclusion, and reducing turnover. Turnover reduction is an important goal: replacing departing workers is costly in terms of advertising, interviewing, and onboarding costs, as well as the cost of lost productivity.

Results for America's Job Quality Playbook identifies eight principles that define a quality job.²² In the words of the Playbook, these include:

- **Earnings:** A living wage that provides full-time workers with the financial means to meet basic needs based on their local cost of living. This includes...hourly wage or annual salary, commission, tips, bonus, or profit share.
- **Benefits:** Employer-sponsored health insurance, paid leave, employee education benefits, retirement plans, childcare subsidies or support and other benefits, including those that address barriers to work.
- **Schedules:** Employers provide a good faith estimate of an employee's schedule at the time of hire, employee input on work schedule, predictable hours, advanced notice of schedule changes, compensation when using on-call scheduling, and avoid or provide additional compensation for employees working between closing and opening shifts separated by fewer than 10 hours.
- **Learning and development:** Pre-employment training partnerships, onboarding, technical skill training, cross-training, mentoring and coaching, sponsorship, upskilling opportunities such as apprenticeship or targeted degree programs and structured promotion pathways.
- **Safety and security:** Policies and practices to promote physical safety (precautions against disease or injury) as well as mental and emotional safety (e.g., training and clear policies for reporting, investigating and addressing harassment or discrimination). This also includes psychosocial safety and the level of role stressors employees experience (e.g., the extent to which employees feel safe to take risks, feel cared for by colleagues and are clear on what is expected, as well as the extent to which work tasks create ongoing conflict with other colleagues, teams or departments).
- **Voice and representation:** Valuing and acting upon employee input and engagement through surveys, stay interviews, employee resource groups and meaningful task forces or improvement teams.
- **Environment and culture:** Use of skills, proper tools and technology to be productive, connection with co-workers, level of input, and autonomy and control in the performance of duties. This also includes the culture established, modeled and reinforced by an organization's leadership and management teams, as well as...the quality of relationships employees have with direct supervisors.
- **Purpose and meaning:** The extent jobseekers and workers feel work tasks are significant, interesting, and challenging. This also includes how well a job, career path, specific employer or industry aligns with an individual's strengths, interests and values.

²² Results for America. (2022).

For each of these principles, the Job Quality Playbook website cites examples of how organizations are putting the principle into practice, tips to get started, and how results from implementing the principle can be measured. MORPC has adopted the tracking of job quality and equity as an element of its 2023-2025 Regional Data Agenda,²³ possibly using the Job Quality Playbook as a measurement tool.

Concluding Thoughts and Recommendations

This study has documented the significant social and economic challenges of the South Side. But also documented are tools and resources that can help address those challenges. The most important of these are jobs open to individuals with a high school diploma or GED that offer higher pay than the restaurant and retail jobs that many residents currently hold. Some of these jobs require training, but the focus groups made clear that local employers are committed to providing or financing that training.

This is certainly positive – as is the fact that the labor force participation rate is comparable to that in Columbus – but some residents will certainly need financial support and possibly other wraparound services to access the necessary training. These services should be publicized as part of the outreach to South Side residents. Those without a high school diploma or GED should be strongly encouraged to earn a GED.

Self-employment should be presented as a potentially viable career choice. Although owning a business requires hard work, focus, and risk-taking, it can potentially provide those with a viable product and service and the willingness to take the risk with an income far greater than they could earn from a payroll job. It is also a reasonable alternative for ex-offenders or those with other employment barriers. A collateral advantage is the significant economic benefit that locally owned, locally serving businesses convey to the community. For those who are interested, the free consultation services and classes offered by the Small Business Development Center at Columbus State can be a way to learn whether a concept is viable, how to start and operate a business, and how to craft a business plan. The Columbus Metropolitan Library has databases and other resources. The Economic and Community Development Institute (ECDI) offers incubation services including a commercial kitchen, classes, and business funding.

As discussed, many South Side households are housing cost burdened. Given the housing shortage in Central Ohio and increasing rents, this problem is likely to worsen rather than improve. One way to lower housing costs for burdened homeowners is to connect them with the home weatherization services offered by the Mid-Ohio Regional Planning Commission. These are available at no cost to income-eligible households. The older homes on the South Side are probably uninsulated unless they have previously been retrofitted. Weatherization can reduce utility bills markedly. Placing residents in better-paying jobs would clearly be helpful as well.

The large (and probably unattainable) occupational needs found in the employment projections analyses coupled with the low current and projected growth of the prime working-age population are great news for South Side jobseekers. The news is less good for South Side employers, who will suffer persistent difficulties in hiring qualified workers. Vacant positions cost employers in revenue, productivity, efficiency, and profitability. Prior to the pandemic, the author modeled the impact of a moderate recession on the workforce shortage. The recession moderated the shortage but did not

²³ Mid-Ohio Regional Planning Commission. (2023). Regional data agenda, 2023-2025.
<https://www.morpc.org/2023/wp-content/uploads/2023/08/2023-2025-Regional-Data-Agenda.pdf>

eliminate it, and the shortage returned as soon as economic growth resumed. This finding is consistent with economists' current recession forecasts, which generally do not expect the unemployment rate to increase far beyond 5%. In general, prospective and current workers should not use the workforce shortage as an excuse to neglect the development of their workplace skills.

The occupational analysis and the focus groups provided valuable information regarding important knowledge, skills, and abilities for occupations in the target sectors. To have value, these should be shared with Ohio Means Jobs Columbus-Franklin County and with the leadership of Columbus City Schools so that the insights can be infused into job counseling and coursework. This would help with student job market preparedness, which will soon be an element of Ohio's school and district report cards.

The interest and commitment of members of the steering committee and focus groups were inspiring. One outcome of this study should be to continue engagement with these leaders to assist with the implementation of the employment strategies in particular. The idea raised in the manufacturing focus group of a collaborative group of South Side firms in the industry could be of tremendous value. The implementation of this group is largely up to the manufacturers themselves, but anything that South Side Thrive can do to assist in this effort would be worthwhile. At least, South Side Thrive should maintain open communication channels and offer support of the group's initiatives where possible (e.g., facilitating discussions with South and Marion Franklin High Schools).

Meanwhile, South Side Thrive can introduce the Job Quality Playbook to its employer network and stay in touch with the Regional Data Advisory Committee, the MORPC committee responsible for implementing the Regional Data Agenda, including its job quality and equity initiative. (The author is a member of that committee.)

One factor that may cause shifts in the needs and income of South Side residents is unrelated to the impacts of implementing the initiatives discussed in this study: gentrification. This trend has already occurred in parts of Merion Village and is beginning to occur in neighborhoods east of Parsons Avenue. As homes are rehabilitated with higher-end finishes and bought by professionals, area income will increase. As residents of the South Side are hired into jobs in the target industry sectors, it will be important to separate the impacts of increased area income driven by the impact of the initiative from impacts driven by gentrification.

Appendix A: Tables

Table A-1: Columbus and Study Area Labor Force Status, 2007-2011 and 2017-2021

	2007-2011 average				2017-2021 average			
	Columbus	ZIP 43206	ZIP 43207	Study area	Columbus	ZIP 43206	ZIP 43207	Study area
Total								
Population 20 to 64 years:	504,482	8,784	11,670	20,454	575,816	7,955	12,437	20,392
In labor force:	401,206	6,141	8,145	14,286	466,182	5,917	8,917	14,834
In Armed Forces	640	0	7	7	507	0	15	15
Civilian:	400,566	6,141	8,138	14,279	465,675	5,917	8,902	14,819
Employed	366,335	5,087	6,783	11,870	442,803	5,571	8,396	13,967
Unemployed	34,231	1,054	1,355	2,409	22,872	346	506	852
Not in labor force	103,276	2,643	3,525	6,168	109,634	2,038	3,520	5,558
Participation rate	79.5%	69.9%	69.8%	69.8%	81.0%	74.4%	71.7%	72.7%
Unemployment rate	8.5%	17.2%	16.7%	16.9%	4.9%	5.8%	5.7%	5.7%
Male								
Population 20 to 64 years:	247,300	4,163	5,976	10,139	284,976	3,635	6,518	10,153
In labor force:	205,502	2,997	4,290	7,287	240,365	2,643	4,910	7,553
In Armed Forces	568	0	7	7	438	0	0	0
Civilian:	204,934	2,997	4,283	7,280	239,927	2,643	4,910	7,553
Employed	186,332	2,274	3,574	5,848	228,541	2,469	4,656	7,125
Unemployed	18,602	723	709	1,432	11,386	174	254	428
Not in labor force	41,798	1,166	1,686	2,852	44,611	992	1,608	2,600
Participation rate	83.1%	72.0%	71.8%	71.9%	84.3%	72.7%	75.3%	74.4%
Unemployment rate	9.1%	24.1%	16.6%	19.7%	4.7%	6.6%	5.2%	5.7%
Female								
Population 20 to 64 years:	257,182	4,621	5,694	10,315	290,840	4,320	5,919	10,239
In labor force:	195,704	3,144	3,855	6,999	225,817	3,274	4,007	7,281
In Armed Forces	72	0	0	0	69	0	15	15
Civilian:	195,632	3,144	3,855	6,999	225,748	3,274	3,992	7,266
Employed	180,003	2,813	3,209	6,022	214,262	3,102	3,740	6,842
Unemployed	15,629	331	646	977	11,486	172	252	424
Not in labor force	61,478	1,477	1,839	3,316	65,023	1,046	1,912	2,958
Participation rate	76.1%	68.0%	67.7%	67.9%	77.6%	75.8%	67.7%	71.1%
Unemployment rate	8.0%	10.5%	16.8%	14.0%	5.1%	5.3%	6.3%	5.8%

Source: American Community Survey Five-Year Estimates, 2011 and 2021.

Table A-2: Workplace of Residents Living in 43206 and 43207, 2002 and 2020

Workplace geography	Residence in 43206				Residence in 43207			
	2002		2020		2002		2020	
Total jobs	14,003	100.0%	11,122	100.0%	15,135	100.0%	20,728	100.0%
43206	440	3.1%	267	2.4%	310	2.0%	272	1.3%
43207	806	5.8%	319	2.9%	1,732	11.4%	1,561	7.5%
Total 43206 and 43207	1,246	8.9%	586	5.3%	2,042	13.5%	1,833	8.8%
Other Columbus and near suburbs								
43201-Near north	231	1.6%	169	1.5%	219	1.4%	222	1.1%
43202-South Clintonville	77	0.5%	60	0.5%	88	0.6%	90	0.4%
43203-Near east	50	0.4%	31	0.3%	33	0.2%	55	0.3%
43204-Hilltop	288	2.1%	135	1.2%	370	2.4%	364	1.8%
43205-Near east	498	3.6%	401	3.6%	329	2.2%	406	2.0%
43209-Bexley	253	1.8%	159	1.4%	173	1.1%	280	1.4%
43210-OSU	442	3.2%	586	5.3%	209	1.4%	397	1.9%
43211-South Linden	123	0.9%	63	0.6%	132	0.9%	100	0.5%
43212-Grandview	281	2.0%	257	2.3%	326	2.2%	354	1.7%
43213-Whitehall	345	2.5%	237	2.1%	418	2.8%	513	2.5%
43214-North Clintonville	338	2.4%	210	1.9%	308	2.0%	385	1.9%
43215-Downtown	3,154	22.5%	1,937	17.4%	2,079	13.7%	2,026	9.8%
43217-Rickenbacker	9	0.1%	18	0.2%	61	0.4%	89	0.4%
43218-Citygate	4	0.0%	2	0.0%	0	0.0%	3	0.0%
43219-Airport/Easton	575	4.1%	573	5.2%	583	3.9%	965	4.7%
43220-North Arlington	170	1.2%	114	1.0%	125	0.8%	171	0.8%
43221-South Arlington	163	1.2%	83	0.7%	85	0.6%	115	0.6%
43222-North Franklinton	163	1.2%	44	0.4%	152	1.0%	96	0.5%
43223-South Franklinton	246	1.8%	128	1.2%	318	2.1%	333	1.6%
43224-North Linden	225	1.6%	80	0.7%	210	1.4%	116	0.6%
43227-East	69	0.5%	43	0.4%	156	1.0%	94	0.5%
43228-Far West	590	4.2%	303	2.7%	880	5.8%	845	4.1%
43229-Northland	386	2.8%	245	2.2%	371	2.5%	479	2.3%
43230-Gahanna	338	2.4%	351	3.2%	324	2.1%	506	2.4%
43231-Minerva Park/Northeast	110	0.8%	97	0.9%	124	0.8%	185	0.9%
43232-Eastland	272	1.9%	135	1.2%	407	2.7%	415	2.0%

See notes at the end of the table.

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Table A-2: Workplace of Residents Living in 43206 and 43207, 2002 and 2020 (continued)

Workplace geography	Residence in 43206				Residence in 43207			
	2002		2020		2002		2020	
43235-Linworth/Far northwest	249	1.8%	170	1.5%	223	1.5%	264	1.3%
43240-Polaris	122	0.9%	165	1.5%	108	0.7%	209	1.0%
Total Other Columbus	9,771	69.8%	6,796	61.1%	8,811	58.2%	10,077	48.6%
Total Columbus and near suburbs	11,017	78.7%	7,382	66.4%	10,853	71.7%	11,910	57.5%
Other Franklin County								
43002-Amlin	9	0.1%	0	0.0%	8	0.1%	0	0.0%
43004-Blacklick	20	0.1%	13	0.1%	25	0.2%	30	0.1%
43016-Dublin	175	1.2%	187	1.7%	106	0.7%	259	1.2%
43017-Dublin	377	2.7%	265	2.4%	274	1.8%	300	1.4%
43026-Hilliard	222	1.6%	225	2.0%	292	1.9%	458	2.2%
43054-New Albany	167	1.2%	225	2.0%	68	0.4%	184	0.9%
43068-Reynoldsburg	129	0.9%	152	1.4%	162	1.1%	343	1.7%
43081-Westerville	257	1.8%	211	1.9%	281	1.9%	343	1.7%
43085-Worthington	214	1.5%	109	1.0%	207	1.4%	218	1.1%
43109-Brice	1	0.0%	0	0.0%	4	0.0%	5	0.0%
43110-Canal Winchester	32	0.2%	53	0.5%	98	0.6%	229	1.1%
43119-Galloway	11	0.1%	8	0.1%	9	0.1%	35	0.2%
43123-Grove City	240	1.7%	268	2.4%	535	3.5%	962	4.6%
43125-Groveport	103	0.7%	239	2.1%	257	1.7%	1,078	5.2%
43126-Harrisburg	2	0.0%	0	0.0%	0	0.0%	1	0.0%
43137-Lockbourne	16	0.1%	80	0.7%	58	0.4%	344	1.7%
Total Other Franklin County	1,975	14.1%	2,035	18.3%	2,384	15.8%	4,789	23.1%
Total Franklin County*	12,870	91.9%	9,252	83.2%	13,129	86.7%	16,490	79.6%
Other Columbus MSA								
Delaware County**	253	1.8%	413	3.7%	266	1.8%	682	3.3%
Fairfield County	50	0.4%	59	0.5%	100	0.7%	236	1.1%
Hocking County	2	0.0%	2	0.0%	2	0.0%	12	0.1%
Licking County	64	0.5%	112	1.0%	94	0.6%	290	1.4%
Madison County	48	0.3%	79	0.7%	67	0.4%	199	1.0%
Morrow County	1	0.0%	4	0.0%	2	0.0%	13	0.1%

See notes at the end of the table.

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Table A-2: Workplace of Residents Living in 43206 and 43207, 2002 and 2020 (continued)

Workplace geography	Residence in 43206				Residence in 43207			
	2002		2020		2002		2020	
Perry County	0	0.0%	2	0.0%	2	0.0%	6	0.0%
Pickaway County	31	0.2%	38	0.3%	83	0.5%	149	0.7%
Union County	31	0.2%	79	0.7%	57	0.4%	108	0.5%
Total Other Columbus MSA	480	3.4%	788	7.1%	673	4.4%	1,695	8.2%
Total Columbus MSA	13,350	95.3%	10,040	90.3%	13,802	91.2%	18,185	87.7%
Other Ohio	611	4.4%	959	8.6%	1,266	8.4%	2,215	10.7%
Out of state	41	0.3%	117	1.1%	66	0.4%	320	1.5%

*Excluding 43240. **Including 43240.

Note: Individual counts in the source data do not exactly add to the total.

Source: Longitudinal Employer–Household Dynamics, U.S. Census Bureau.

Table A-3: Estimated Employment in ZIP Codes 43206 and 43207

Sector	43206		43207		Total		Franklin County
Agriculture, Forestry, Fishing and Hunting	0	0.0%	24	0.1%	24	0.1%	0.1%
Mining, Quarrying, and Oil and Gas Extraction	0	0.0%	64	0.3%	64	0.2%	0.0%
Utilities	0	0.0%	25	0.1%	25	0.1%	0.5%
Construction	96	1.3%	1,567	7.5%	1,663	5.9%	4.7%
Manufacturing	132	1.8%	3,642	17.5%	3,774	13.5%	5.5%
Wholesale Trade	29	0.4%	1,615	7.8%	1,644	5.9%	4.0%
Retail Trade	217	3.0%	2,073	10.0%	2,290	8.2%	9.7%
Transportation and Warehousing	36	0.5%	2,562	12.3%	2,598	9.3%	7.8%
Information	67	0.9%	89	0.4%	156	0.6%	2.1%
Finance and Insurance	2,910	40.7%	115	0.6%	3,025	10.8%	6.4%
Real Estate and Rental and Leasing	208	2.9%	303	1.5%	511	1.8%	2.0%
Professional, Scientific, and Technical Services	879	12.3%	247	1.2%	1,126	4.0%	7.5%
Management of Companies and Enterprises	10	0.1%	0	0.0%	10	0.0%	3.7%
Administrative and Support and Waste Management and Remediation Services	337	4.7%	1,626	7.8%	1,963	7.0%	8.1%
Educational Services	212	3.0%	1,301	6.3%	1,513	5.4%	6.1%
Healthcare and Social Assistance	485	6.8%	2,272	10.9%	2,757	9.9%	16.5%
Arts, Entertainment, and Recreation	85	1.2%	1,156	5.6%	1,241	4.4%	1.4%
Accommodation and Food Services	1,022	14.3%	1,013	4.9%	2,035	7.3%	8.9%
Other Services: Repair and Maintenance	27	0.4%	398	1.9%	425	1.5%	1.1%
Other Services: Personal and Laundry Services	107	1.5%	118	0.6%	225	0.8%	1.1%
Other Services: Religious, Civic, Professional, and Social Organizations	288	4.0%	355	1.7%	643	2.3%	1.0%
Public Administration	0	0.0%	247	1.2%	247	0.9%	1.9%
Total	7,147	100.0%	20,812	100.0%	27,959	100.0%	100.0%

Note: Local percentages in boldface are substantially greater than the Franklin County average.

Source: Analysis of Data Axle employment counts and Quarterly Census of Employment and Wages, U.S. Bureau of Labor Statistics.

Table A-4: Occupational Growth and Replacement Needs, Healthcare, by Total Need

Occupation	2021	2031	Growth	Turnover	Total need	Pct. of 2021
Total, all occupations	2,108	2,330	221	2,313	2,534	120.2%
Total analyzed*	2,064	2,282	218	2,265	2,483	120.3%
Home health and personal care aides	242	283	40	412	453	187.0%
Nursing assistants	104	107	3	161	163	156.0%
Substance abuse, behavioral disorder, and mental health counselors	115	143	28	118	146	126.1%
Medical assistants	78	91	13	117	130	166.4%
Registered nurses	187	201	14	109	124	66.2%
Medical secretaries and administrative assistants	64	69	6	76	82	128.5%
Receptionists and information clerks	56	61	5	76	82	146.1%
Licensed practical and licensed vocational nurses	71	77	6	59	65	90.9%
Social and human service assistants	49	54	6	59	64	132.0%
Dental assistants	35	38	3	52	55	157.7%
Pharmacy technicians	55	57	2	51	53	95.5%
Office clerks, general	39	38	0	47	47	122.8%
Medical and health services managers	37	49	12	33	45	120.6%
Residential advisors	23	26	2	42	44	190.8%
Mental health and substance abuse social workers	33	38	4	32	36	107.9%
Nurse practitioners	29	43	14	18	32	111.9%
Clinical and counseling psychologists	39	44	5	27	32	81.6%
First-line supervisors of office and administrative support workers	28	29	1	30	31	109.3%
Secretaries and administrative assistants, except legal, medical, and executive	27	25	-1	30	28	106.7%
Psychiatric technicians	27	31	4	24	28	103.2%
Billing and posting clerks	23	25	2	26	28	123.0%
Maids and housekeeping cleaners	18	19	0	27	27	148.9%
Marriage and family therapists	24	28	3	20	24	98.1%
Cooks, institution and cafeteria	15	15	1	23	24	162.4%
Childcare workers	12	13	1	21	22	177.9%
Customer service representatives	15	15	0	20	20	138.5%
Healthcare social workers	17	19	2	17	18	109.4%
General and operations managers	18	20	2	16	18	101.2%
Massage therapists	9	13	4	14	17	188.0%
Food servers, nonrestaurant	10	10	0	16	16	163.5%

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Table A-4: Occupational Growth and Replacement Needs, Healthcare, by Total Need (cont.)

Occupation	2021	2031	Growth	Turnover	Total need	Pct. of 2021
Child, family, and school social workers	15	16	2	14	16	107.2%
Recreation workers	7	8	0	16	16	212.8%
Bookkeeping, accounting, and auditing clerks	13	13	0	15	15	119.6%
Counselors, all other	13	14	2	13	15	119.5%
Janitors and cleaners, except maids and housekeeping cleaners	10	10	0	14	14	145.8%
Social and community service managers	13	15	1	12	14	103.2%
Physician assistants	13	17	4	9	13	104.1%
Maintenance and repair workers, general	12	13	1	12	13	105.2%
Interviewers, except eligibility and loan	11	10	-1	13	13	119.0%
Pharmacists	34	33	-2	14	13	36.8%
Psychiatric aides	7	8	1	11	12	170.0%
Pharmacy aides	6	6	0	11	10	164.7%
Health technologists and technicians, all other	12	13	1	9	10	81.6%

*172 occupations.

Source: Analysis of National Employment Matrix data, Employment Projections, U.S. Bureau of Labor Statistics.

Table A-5: Occupational Growth and Replacement Needs, Manufacturing, by Total Need

Occupation	2021	2031	Growth	Turnover	Total need	Pct. of 2021
Total, all occupations	2,945	3,034	89	3,225	3,313	112.5%
Total analyzed*	2,899	2,984	85	3,175	3,260	112.4%
Miscellaneous assemblers and fabricators	302	276	-26	337	311	102.7%
Molding, coremaking, and casting machine SOT**, metal and plastic	175	179	4	178	182	103.7%
Laborers and freight, stock, and material movers, hand	112	119	7	161	168	150.7%
First-line supervisors of production and operating workers	132	140	9	138	146	110.8%
Inspectors, testers, sorters, samplers, and weighers	111	117	5	136	141	126.3%
Packers and packagers, hand	65	70	5	100	105	160.9%
Packaging and filling machine operators and tenders	79	86	6	92	99	124.8%
Heavy and tractor-trailer truck drivers	63	65	2	76	78	122.5%
Sales representatives, wholesale and manufacturing, except technical and scientific products	62	66	4	64	68	108.8%
Industrial machinery mechanics	56	71	15	53	68	121.4%
Industrial truck and tractor operators	54	58	4	64	67	123.7%
Shipping, receiving, and inventory clerks	63	61	-2	67	65	102.3%

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Table A-5: Occupational Growth and Replacement Needs, Manufacturing, by Total Need (cont.)

Occupation	2021	2031	Growth	Turnover	Total need	Pct. of 2021
Extruding and drawing machine SOT**, metal and plastic	57	59	1	62	63	110.4%
Maintenance and repair workers, general	59	62	4	58	62	105.6%
Mixing and blending machine SOT**	48	51	3	54	57	119.7%
General and operations managers	57	61	4	51	55	96.3%
Welders, cutters, solderers, and brazers	47	50	3	51	54	116.2%
Cutting, punching, and press machine SOT**, metal and plastic	53	51	-2	54	52	96.8%
Multiple machine tool SOT**, metal and plastic	44	47	3	47	50	114.1%
Customer service representatives	34	32	-1	46	45	134.0%
Office clerks, general	37	35	-1	45	44	119.2%
Woodworking machine SOT**, except sawing	42	43	1	42	43	102.3%
Production workers, all other	34	36	2	41	43	124.5%
Helpers—production workers	29	28	-1	43	42	141.9%
Chemical equipment operators and tenders	34	34	-1	35	34	99.6%
Production, planning, and expediting clerks	28	30	2	32	33	119.8%
Coating, painting, and spraying machine SOT**	30	31	1	30	32	104.7%
Stockers and order fillers	17	18	1	31	31	181.0%
Industrial engineers	42	47	4	27	31	74.1%
Machinists	27	29	2	29	31	113.5%
Industrial production managers	38	40	2	27	30	78.3%
Bookkeeping, accounting, and auditing clerks	25	24	-1	30	29	115.9%
Molders, shapers, and casters, except metal and plastic	17	21	4	20	24	142.7%
Extruding, forming, pressing, and compacting machine SOT**	22	23	1	23	24	108.2%
Sawing machine SOT**, wood	17	18	1	20	21	123.5%
Computer numerically controlled tool operators	22	21	-1	22	21	95.7%

*213 occupations. **SOT: Setters, operators, and tenders.

Source: Analysis of National Employment Matrix data, Employment Projections, U.S. Bureau of Labor Statistics.

Table A-6: Occupational Growth and Replacement Needs, Finance and Insurance, by Total Need

Occupation	2021	2031	Growth	Turnover	Total need	Pct. of 2021
Total, all occupations	2,902	2,920	18	2,670	2,688	92.6%
Total measured*	2,757	2,774	17	2,537	2,553	92.6%
Customer service representatives	251	236	-15	346	331	131.9%
Claims adjusters, examiners, and investigators	353	330	-23	271	248	70.4%
Insurance claims and policy processing clerks	225	210	-14	228	214	95.2%
Insurance sales agents	184	191	7	174	181	98.2%
Insurance underwriters	188	177	-12	137	125	66.4%
Software developers	97	116	19	73	92	94.1%
First-line supervisors of office and administrative support workers	74	70	-5	79	75	100.3%
Financial managers	78	89	11	63	74	95.4%
Management analysts	71	73	3	68	70	99.8%
General and operations managers	72	75	3	65	68	93.9%
Title examiners, abstractors, and searchers	67	70	3	65	67	100.0%
Computer systems analysts	68	73	5	50	55	81.1%
Accountants and auditors	50	52	2	44	46	92.5%
Business operations specialists, all other	45	47	2	43	45	99.9%
Office clerks, general	37	34	-2	45	43	116.9%
Market research analysts and marketing specialists	34	39	5	36	41	121.3%
Computer and information systems managers	42	47	5	33	38	90.2%
Bookkeeping, accounting, and auditing clerks	32	30	-2	38	36	114.4%
Secretaries and administrative assistants, except legal, medical, and executive	35	31	-4	39	35	100.3%
Loan interviewers and clerks	31	32	1	30	31	97.9%
Lawyers	38	44	7	18	25	66.2%
Managers, all other	28	30	1	23	24	84.9%
Financial and investment analysts	29	30	1	22	23	80.3%
Human resources specialists	23	23	0	22	22	99.2%
Securities, commodities, and financial services sales agents	22	24	1	20	21	95.8%
Computer user support specialists	26	26	0	21	21	79.2%
Registered nurses	32	34	2	19	20	64.1%
Training and development specialists	21	21	1	20	20	98.3%
Insurance appraisers, auto damage	30	28	-2	22	20	66.9%
Actuaries	23	28	5	15	19	83.4%

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Table A-6: Occupational Growth and Replacement Needs, Finance and Insurance, by Total Need (cont.)

Occupation	2021	2031	Growth	Turnover	Total need	Pct. of 2021
Tellers	20	18	-2	21	19	92.2%
Project management specialists	21	22	1	17	18	87.2%
Sales managers	20	21	1	17	18	88.0%
Compliance officers	20	21	1	16	17	85.4%

*90 occupations.

Table A-7: Education, Experience, and Training Requirements for High-Demand Occupations in Healthcare and Median Annual Pay

Occupation	Typical education needed for entry	Work experience in related occupation	Typical on-the-job training needed to attain competency	Columbus MSA median annual pay
Home health and personal care aides	High school diploma or equivalent	None	Short-term OJT*	\$ 27,620
Nursing assistants	Postsecondary nondegree award	None	None	\$ 35,400
Substance abuse, behavioral disorder, and mental health counselors	Bachelor's degree	None	None	\$ 50,020
Medical assistants	Postsecondary nondegree award	None	None	\$ 37,430
Registered nurses	Bachelor's degree	None	None	\$ 78,920
Medical secretaries and administrative assistants	High school diploma or equivalent	None	Moderate-term OJT*	\$ 38,410
Receptionists and information clerks	High school diploma or equivalent	None	Short-term OJT*	\$ 32,020
Licensed practical and licensed vocational nurses	Postsecondary nondegree award	None	None	\$ 51,990
Social and human service assistants	High school diploma or equivalent	None	Short-term OJT*	\$ 37,150
Dental assistants	Postsecondary nondegree award	None	None	\$ 46,240
Pharmacy technicians	High school diploma or equivalent	None	Moderate-term OJT*	\$ 36,960
Office clerks, general	High school diploma or equivalent	None	Short-term OJT*	\$ 39,050
Medical and health services managers	Bachelor's degree	Less than 5 years	None	\$ 101,970

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Table A-7: Education, Experience, and Training Requirements for High-Demand Occupations in Healthcare and Median Annual Pay (cont.)

Occupation	Typical education needed for entry	Work experience in related occupation	Typical on-the-job training needed to attain competency	Columbus MSA median annual pay
Residential advisors	High school diploma or equivalent	None	Short-term OJT*	\$ 33,010
Mental health and substance abuse social workers	Master's degree	None	Internship/residency	\$ 46,000
Nurse practitioners	Master's degree	None	None	\$ 113,570
Clinical and counseling psychologists	Doctoral or professional degree	None	Internship/residency	\$ 83,380
First-line supervisors of office and administrative support workers	High school diploma or equivalent	Less than 5 years	None	\$ 61,780
Secretaries and administrative assistants, except legal, medical, and executive	High school diploma or equivalent	None	Short-term OJT*	\$ 41,830
Psychiatric technicians	Postsecondary nondegree award	Less than 5 years	Short-term OJT*	\$ 34,800
Billing and posting clerks	High school diploma or equivalent	None	Moderate-term OJT*	\$ 42,120
Maids and housekeeping cleaners	No formal educational credential	None	Short-term OJT*	\$ 27,980
Marriage and family therapists	Master's degree	None	Internship/residency	\$ 50,070
Cooks, institution and cafeteria	No formal educational credential	None	Short-term OJT*	\$ 35,640
Childcare workers	High school diploma or equivalent	None	Short-term OJT*	\$ 28,050
Customer service representatives	High school diploma or equivalent	None	Short-term OJT*	\$ 39,510
Healthcare social workers	Master's degree	None	Internship/residency	\$ 61,220
General and operations managers	Bachelor's degree	5 years or more	None	\$ 97,960
Massage therapists	Postsecondary nondegree award	None	None	\$ 52,000
Food servers, nonrestaurant	No formal educational credential	None	Short-term OJT*	\$ 28,790
Dental hygienists	Associate degree	None	None	\$ 76,870
Child, family, and school social workers	Bachelor's degree	None	None	\$ 47,800
Healthcare social workers	Master's degree	None	Internship/residency	\$ 61,220

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Table A-7: Education, Experience, and Training Requirements for High-Demand Occupations in Healthcare and Median Annual Pay y (cont.)

Occupation	Typical education needed for entry	Work experience in related occupation	Typical on-the-job training needed to attain competency	Columbus MSA median annual pay
General and operations managers	Bachelor's degree	5 years or more	None	\$ 97,960
Food servers, nonrestaurant	No formal educational credential	None	Short-term OJT*	\$ 28,790
Dental hygienists	Associate degree	None	None	\$ 76,870
Child, family, and school social workers	Bachelor's degree	None	None	\$ 47,800
Recreation workers	High school diploma or equivalent	None	Short-term OJT*	\$ 24,650
Bookkeeping, accounting, and auditing clerks	Some college, no degree	None	Moderate-term OJT*	\$ 45,850
Counselors, all other	Master's degree	None	None	\$ 42,380
Janitors and cleaners, except maids and housekeeping cleaners	No formal educational credential	None	Short-term OJT*	\$ 30,010
Social and community service managers	Bachelor's degree	Less than 5 years	None	\$ 68,670
Physician assistants	Master's degree	None	None	\$ 125,920
Maintenance and repair workers, general	High school diploma or equivalent	None	Moderate-term OJT*	\$ 46,540
Interviewers, except eligibility and loan	High school diploma or equivalent	None	Short-term OJT*	\$ 38,590
Pharmacists	Doctoral or professional degree	None	None	\$ 131,350
Psychiatric aides	High school diploma or equivalent	None	Short-term OJT*	\$ 40,390
Pharmacy aides	High school diploma or equivalent	None	Short-term OJT*	\$ 39,270
Health technologists and technicians, all other	Postsecondary nondegree award	None	None	\$ 41,420

*OJT: On-the-job training.

Table A-8: Education, Experience, and Training Requirements for High-Demand Occupations in Manufacturing and Median Annual Pay

Occupation	Typical education needed for entry	Work experience in related occupation	Typical on-the-job training needed to attain competency	Columbus MSA median annual pay
Miscellaneous assemblers and fabricators	High school diploma or equivalent	None	Moderate-term OJT*	\$39,930
Molding, coremaking, and casting machine SOT**, metal and plastic	High school diploma or equivalent	None	Moderate-term OJT*	\$36,140
Laborers and freight, stock, and material movers, hand	No formal educational credential	None	Short-term OJT*	\$35,980
First-line supervisors of production and operating workers	High school diploma or equivalent	Less than 5 years	None	\$62,110
Inspectors, testers, sorters, samplers, and weighers	High school diploma or equivalent	None	Moderate-term OJT*	\$44,210
Packers and packagers, hand	No formal educational credential	None	Short-term OJT*	\$35,960
Packaging and filling machine operators and tenders	High school diploma or equivalent	None	Moderate-term OJT*	\$38,660
Heavy and tractor-trailer truck drivers	Postsecondary nondegree award	None	Short-term OJT*	\$54,600
Sales representatives, wholesale and manufacturing, except technical and scientific products	High school diploma or equivalent	None	Moderate-term OJT*	\$67,680
Industrial machinery mechanics	High school diploma or equivalent	None	Long-term OJT*	\$61,150
Industrial truck and tractor operators	No formal educational credential	None	Short-term OJT*	\$45,100
Shipping, receiving, and inventory clerks	High school diploma or equivalent	None	Short-term OJT*	\$39,350
Extruding and drawing machine SOT**, metal and plastic	High school diploma or equivalent	None	Moderate-term OJT*	\$38,750
Maintenance and repair workers, general	High school diploma or equivalent	None	Moderate-term OJT*	\$46,540
Mixing and blending machine SOT**	High school diploma or equivalent	None	Moderate-term OJT*	\$45,400
General and operations managers	Bachelor's degree	5 years or more	None	\$97,960

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Table A-8: Education, Experience, and Training Requirements for High-Demand Occupations in Manufacturing and Median Annual Pay (cont.)

Occupation	Typical education needed for entry	Work experience in related occupation	Typical on-the-job training needed to attain competency	Columbus MSA median annual pay
Industrial truck and tractor operators	No formal educational credential	None	Short-term OJT*	\$45,100
Shipping, receiving, and inventory clerks	High school diploma or equivalent	None	Short-term OJT*	\$39,350
Extruding and drawing machine SOT**, metal and plastic	High school diploma or equivalent	None	Moderate-term OJT*	\$38,750
Maintenance and repair workers, general	High school diploma or equivalent	None	Moderate-term OJT*	\$46,540
Mixing and blending machine SOT**	High school diploma or equivalent	None	Moderate-term OJT*	\$45,400
General and operations managers	Bachelor's degree	5 years or more	None	\$97,960
Welders, cutters, solderers, and brazers	High school diploma or equivalent	None	Moderate-term OJT*	\$48,010
Cutting, punching, and press machine SOT**, metal and plastic	High school diploma or equivalent	None	Moderate-term OJT*	\$40,790
Multiple machine tool SOT**, metal and plastic	High school diploma or equivalent	None	Moderate-term OJT*	\$41,130
Customer service representatives	High school diploma or equivalent	None	Short-term OJT*	\$39,510
Office clerks, general	High school diploma or equivalent	None	Short-term OJT*	\$39,050
Woodworking machine SOT**, except sawing	High school diploma or equivalent	None	Moderate-term OJT*	\$38,500
Production workers, all other	High school diploma or equivalent	None	Moderate-term OJT*	\$36,710
Helpers--production workers	High school diploma or equivalent	None	Short-term OJT*	\$39,570
Chemical equipment operators and tenders	High school diploma or equivalent	None	Moderate-term OJT*	\$50,330
Production, planning, and expediting clerks	High school diploma or equivalent	None	Moderate-term OJT*	\$49,460
Coating, painting, and spraying machine SOT**	High school diploma or equivalent	None	Moderate-term OJT*	\$45,210

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Table A-8: Education, Experience, and Training Requirements for High-Demand Occupations in Manufacturing and Median Annual Pay (cont.)

Occupation	Typical education needed for entry	Work experience in related occupation	Typical on-the-job training needed to attain competency	Columbus MSA median annual pay
Stockers and order fillers	High school diploma or equivalent	None	Short-term OJT*	\$38,600
Industrial engineers	Bachelor's degree	None	None	\$97,960
Machinists	High school diploma or equivalent	None	Long-term OJT*	\$47,250
Industrial production managers	Bachelor's degree	5 years or more	None	\$100,450
Bookkeeping, accounting, and auditing clerks	Some college, no degree	None	Moderate-term OJT*	\$45,850
Molders, shapers, and casters, except metal and plastic	High school diploma or equivalent	None	Long-term OJT*	\$37,530
Extruding, forming, pressing, and compacting machine SOT**	High school diploma or equivalent	None	Moderate-term OJT*	\$46,340
Sawing machine SOT**, wood	High school diploma or equivalent	None	Moderate-term OJT*	\$36,220
Computer numerically controlled tool operators	High school diploma or equivalent	None	Moderate-term OJT*	\$62,840

*OJT: On-the-job training. **SOT: Setters, operators, and tenders.

Table A-9: Education, Experience, and Training Requirements for High-Demand Occupations in Finance and Insurance and Median Annual Pay

Occupation	Typical education needed for entry	Work experience in related occupation	Typical on-the-job training needed to attain competency	Columbus MSA median annual pay
Customer service representatives	High school diploma or equivalent	None	Short-term OJT*	\$39,510
Claims adjusters, examiners, and investigators	High school diploma or equivalent	None	Long-term OJT*	\$63,080
Insurance claims and policy processing clerks	High school diploma or equivalent	None	Moderate-term OJT*	\$48,010
Insurance sales agents	High school diploma or equivalent	None	Moderate-term OJT*	\$58,500
Insurance underwriters	Bachelor's degree	None	Moderate-term OJT*	\$78,160
Software developers	Bachelor's degree	None	None	\$108,760
First-line supervisors of office and administrative support workers	High school diploma or equivalent	Less than 5 years	None	\$61,780
Financial managers	Bachelor's degree	5 years or more	None	\$132,710

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Table A-9: Education, Experience, and Training Requirements for High-Demand Occupations in Finance and Insurance and Median Annual Pay (cont.)

Occupation	Typical education needed for entry	Work experience in related occupation	Typical on-the-job training needed to attain competency	Columbus MSA median annual pay
Management analysts	Bachelor's degree	Less than 5 years	None	\$81,700
General and operations managers	Bachelor's degree	5 years or more	None	\$97,960
Title examiners, abstractors, and searchers	High school diploma or equivalent	None	Moderate-term OJT*	\$55,070
Computer systems analysts	Bachelor's degree	None	None	\$100,890
Accountants and auditors	Bachelor's degree	None	None	\$76,660
Business operations specialists, all other	Bachelor's degree	None	None	\$72,050
Office clerks, general	High school diploma or equivalent	None	Short-term OJT*	\$39,050
Market research analysts and marketing specialists	Bachelor's degree	None	None	\$65,770
Computer and information systems managers	Bachelor's degree	5 years or more	None	\$135,720
Bookkeeping, accounting, and auditing clerks	Some college, no degree	None	Moderate-term OJT*	\$45,850
Secretaries and administrative assistants, except legal, medical, and executive	High school diploma or equivalent	None	Short-term OJT*	\$41,830
Loan interviewers and clerks	High school diploma or equivalent	None	Short-term OJT*	\$47,220
Lawyers	Doctoral or professional degree	None	None	\$114,230
Managers, all other	Bachelor's degree	Less than 5 years	None	\$122,900
Financial and investment analysts	Bachelor's degree	None	None	\$81,500
Human resources specialists	Bachelor's degree	None	None	\$64,910
Securities, commodities, and financial services sales agents	Bachelor's degree	None	Moderate-term OJT*	\$74,730
Computer user support specialists	Some college, no degree	None	Moderate-term OJT*	\$48,650
Registered nurses	Bachelor's degree	None	None	\$78,920
Training and development specialists	Bachelor's degree	Less than 5 years	None	\$64,260
Insurance appraisers, auto damage	Postsecondary nondegree award	None	Moderate-term OJT*	\$68,120**
Actuaries	Bachelor's degree	None	Long-term OJT*	\$104,580
Tellers	High school diploma or equivalent	None	Short-term OJT*	\$36,410

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Occupation	Typical education needed for entry	Work experience in related occupation	Typical on-the-job training needed to attain competency	Columbus MSA median annual pay
Project management specialists	Bachelor's degree	None	None	\$93,970
Sales managers	Bachelor's degree	Less than 5 years	None	\$127,260
Compliance officers	Bachelor's degree	None	Moderate-term OJT*	\$74,480

*OJT: On-the-job training. **Ohio median wage; Columbus MSA wage not available.

Appendix B: O*NET Definitions of Knowledge, Skill, and Ability Attributes²⁴

Knowledge

Administration and Management: Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

Administrative: Knowledge of administrative and office procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and workplace terminology.

Biology: Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.

Building and Construction: Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.

Chemistry: Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.

Communications and Media: Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.

Computers and Electronics: Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Customer and Personal Service: Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

Design: Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

Economics and Accounting: Knowledge of economic and accounting principles and practices, the financial markets, banking, and the analysis and reporting of financial data.

Education and Training: Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.

Engineering and Technology: Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

²⁴ O*NET OnLine. (2023). <https://www.onetonline.org>.

English Language: Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Food Production: Knowledge of techniques and equipment for planting, growing, and harvesting food products (both plant and animal) for consumption, including storage/handling techniques.

Geography: Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.

Law and Government: Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.

Mathematics: Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Mechanical: Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

Medicine and Dentistry: Knowledge of the information and techniques needed to diagnose and treat human injuries, diseases, and deformities. This includes symptoms, treatment alternatives, drug properties and interactions, and preventive health-care measures.

Personnel and Human Resources: Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.

Philosophy and Theology: Knowledge of different philosophical systems and religions. This includes their basic principles, values, ethics, ways of thinking, customs, practices, and their impact on human culture.

Physics: Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.

Production and Processing: Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.

Psychology: Knowledge of human behavior and performance; individual differences in ability, personality, and interests; learning and motivation; psychological research methods; and the assessment and treatment of behavioral and affective disorders.

Public Safety and Security: Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

Sales and Marketing: Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.

Sociology and Anthropology: Knowledge of group behavior and dynamics, societal trends and influences, human migrations, ethnicity, cultures, and their history and origins.

Telecommunications: Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.

Therapy and Counseling: Knowledge of principles, methods, and procedures for diagnosis, treatment, and rehabilitation of physical and mental dysfunctions, and for career counseling and guidance.

Transportation: Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.

Skills

Active Learning: Understanding the implications of new information for both current and future problem-solving and decision-making.

Active Listening: Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Complex Problem Solving: Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Coordination: Adjusting actions in relation to others' actions.

Critical Thinking: Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.

Equipment Maintenance: Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.

Equipment Selection: Determining the kind of tools and equipment needed to do a job.

Instruction: Teaching others how to do something.

Judgment and Decision Making: Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Learning Strategies: Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things.

Management of Financial Resources: Determining how money will be spent to get the work done, and accounting for these expenditures.

Management of Personnel Resources: Motivating, developing, and directing people as they work, identifying the best people for the job.

Mathematics: Using mathematics to solve problems.

Monitoring: Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Negotiation: Bringing others together and trying to reconcile differences.

Operation and Control: Controlling operations of equipment or systems.

Operations Analysis: Analyzing needs and product requirements to create a design.

Operations Monitoring: Watching gauges, dials, or other indicators to make sure a machine is working properly.

Persuasion: Persuading others to change their minds or behavior.

Programming: Writing computer programs for various purposes.

Quality Control Analysis: Conducting tests and inspections of products, services, or processes to evaluate quality or performance.

Reading Comprehension: Understanding written sentences and paragraphs in work-related documents.

Repairing: Repairing machines or systems using the needed tools.

Service Orientation: Actively looking for ways to help people.

Social Perceptiveness: Being aware of others' reactions and understanding why they react as they do.

Speaking: Talking to others to convey information effectively.

Systems Analysis: Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

Systems Evaluation: Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.

Time Management: Managing one's own time and the time of others.

Troubleshooting: Determining causes of operating errors and deciding what to do about [them].

Writing: Communicating effectively in writing as appropriate for the needs of the audience.

Abilities

Arm-Hand Steadiness: The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position.

Auditory Attention: The ability to focus on a single source of sound in the presence of other distracting sounds.

Category Flexibility: The ability to generate or use different sets of rules for combining or grouping things in different ways.

Control Precision: The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.

Deductive Reasoning: The ability to apply general rules to specific problems to produce answers that make sense.

Depth Perception: The ability to judge which of several objects is closer or farther away from you, or to judge the distance between you and an object.

Dynamic Strength: The ability to exert muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue.

Extent Flexibility: The ability to use short bursts of muscle force to propel oneself (as in jumping or sprinting), or to throw an object.

Far Vision: The ability to see details at a distance.

Finger Dexterity: The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.

Flexibility of Closure: The ability to identify or detect a known pattern (a figure, object, word, or sound) that is hidden in other distracting material.

Fluency of Ideas: The ability to come up with a number of ideas about a topic (the number of ideas is important, not their quality, correctness, or creativity).

Hearing Sensitivity: The ability to detect or tell the differences between sounds that vary in pitch and loudness.

Inductive Reasoning: The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Information Ordering: The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Manual Dexterity: The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.

Mathematical Reasoning: The ability to choose the right mathematical methods or formulas to solve a problem.

Multi-Limb Coordination: The ability to coordinate two or more limbs (for example, two arms, two legs, or one leg and one arm) while sitting, standing, or lying down. It does not involve performing the activities while the whole body is in motion.

Near Vision: The ability to see details at close range (within a few feet of the observer).

Number Facility: The ability to add, subtract, multiply, or divide quickly and correctly.

Oral Comprehension: The ability to listen to and understand information and ideas presented through spoken words and sentences.

Oral Expression: The ability to communicate information and ideas in speaking so others will understand.

Originality: The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem.

Perceptual Speed: The ability to quickly and accurately compare similarities and differences among sets of letters, numbers, objects, pictures, or patterns. The things to be compared may be presented at the same time or one after the other. This ability also includes comparing a presented object with a remembered object.

Problem Sensitivity: The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing that there is a problem.

Rate Control: The ability to time your movements or the movement of a piece of equipment in anticipation of changes in the speed and/or direction of a moving object or scene.

Reaction Time: The ability to quickly respond (with the hand, finger, or foot) to a signal (sound, light, picture) when it appears.

Response Orientation: The ability to choose quickly between two or more movements in response to two or more different signals (lights, sounds, pictures). It includes the speed with which the correct response is started with the hand, foot, or other body part.

Selective Attention: The ability to concentrate on a task over a period of time without being distracted.

Spatial Orientation: The ability to know your location in relation to the environment or to know where other objects are in relation to you.

Speech Clarity: The ability to speak clearly so others can understand you.

Speech Recognition: The ability to identify and understand the speech of another person.

Stamina: The ability to exert yourself physically over long periods of time without getting winded or out of breath.

Static Strength: The ability to exert maximum muscle force to lift, push, pull, or carry objects.

Trunk Strength: The ability to use your abdominal and lower back muscles to support part of the body repeatedly or continuously over time without "giving out" or fatiguing.

Visual Color Discrimination: The ability to match or detect differences between colors, including shades of color and brightness.

Visualization: The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged.

Written Comprehension: The ability to read and understand information and ideas presented in writing.

Written Expression: The ability to communicate information and ideas in writing so others will understand.