STATE OF THE MANUFACTURING WORKFORCE STUDY

SHENANDOAH VALLEY WORKFORCE DEVELOPMENT BOARD

2019-2020

SVWDB
Shenandoah Valley Workforce Development Board

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EXECUTIVE SUMMARY

Introduction

This report is a collection of quantitative and qualitative data that details the workforce trends of the manufacturing industry in the Shenandoah Valley. It analyzes labor market information as well as feedback shared by manufacturers to better understand how the local workforce system can continue to support the needs of manufacturers and upskill talent across the Region.

The Shenandoah Valley Workforce Development Board (SVWDB) partnered with consultants, Thomas P. Miller and Associates, LLC (TPMA), to collect and analyze local trends in manufacturing. The report is divided into five sections:

1. Labor Market Data Analysis
2. Manufacturer Survey Analysis
3. Focus Group Summary
4. American Apprenticeship Initiative (AAI) Grant Summary
5. Recommendation

Detailed survey and focus group questions are located at the conclusion of this report in Appendices A and B, respectively.

Labor Market Data Analysis

The labor market data analysis section of this report provides an overview of the quantitative data relative to the manufacturing economy in the Shenandoah Valley. Definitions to some of those data fields and their contextual importance are listed below:

- Competitive Effect (CE): In shift share analysis, CE is the portion of regional growth that cannot be explained by either overall national growth or industry/occupation-specific trends. Rather, competitive effect is the growth or decline of a sector that is unique to the Shenandoah Valley Region, due to local factors.
- Location Quotient (LQ): Industry LQ provides a measure of how "concentrated" an industry is in a region compared to the nation, with a measure of 1.00 indicating the same concentration as the nation. In this analysis, LQs greater than 1.25 are considered to be a threshold for identifying an industry as relatively strong for the region's economic base. LQ is important because it identifies industry-bringing revenue to the Region. Industries with a high LQ typically are export industries and bring money into the Region versus circulating local dollars to the local economy.

In 2018, the manufacturing industry accounted for 13.47% of all jobs in the Shenandoah Valley Region, second only to Government (15.62%). The manufacturing sector also added the second most jobs of any industry over the last five years (1,781 jobs). Average annual earnings for manufacturing are $65,933 in the Region. It also has the highest location quotient of any sector (1.71), indicating that manufacturing is a relatively strong industry for the region's economic base.

The top manufacturing sub-sectors in the Shenandoah Valley Region are Food Manufacturing (10,654 jobs), Plastics and Rubber Products Manufacturing (4,380 jobs), Printing and Related

Support Activities (2,831 jobs), and Fabricated Metal Product Manufacturing (2,680 jobs). The manufacturing sub-sectors in the Region with a positive competitive effect (portion of regional growth that cannot be explained by national growth or industry/occupation-specific trends) include Plastics and Rubber Products Manufacturing (258 jobs); Nonmetallic Mineral Product Manufacturing (208 jobs); Apparel Manufacturing (159 jobs); Fabricated Metal Product Manufacturing (137 jobs); Food Manufacturing (103 jobs); Chemical Manufacturing (67 jobs); Textile Product Mills (29 jobs); Paper Manufacturing (2 jobs); and Primary Metal Manufacturing (2 jobs).

Half of the top 20 manufacturing sub-sectors in the Region are projected to experience an increase in jobs over the next five years. The greatest projected percentage increase in jobs by sub-sectors are Pharmaceutical Preparation Manufacturing (+58%); Laminated Plastics Plate, Sheet (except Packaging) and Shape Manufacturing (+37%); Fluid Milk Manufacturing (+18%); and Other Snack Food Manufacturing (+13%). The greatest percentage decrease in jobs by sub-sectors are Carpet and Rug Mills (-19%); Other Motor Vehicle Parts Manufacturing (-17%); Unlaminated Plastics Film and Sheet (except Packaging) and Shape Manufacturing (-15%).

Manufacturing wages in the Region are higher than the regional average. The average annual earnings for manufacturing in the Region are $65,933 which is $20,431 more than the regional average of all sectors in the Region. The average annual earnings for manufacturing in the Commonwealth are $74,166 which is $8,233 more than earnings for manufacturing in the Region.

The unemployment rate for manufacturing in the Region is 17%. The Region's unemployment rate is higher than that for the Commonwealth, which has a manufacturing unemployment rate of 8%. Nationally, the sector's unemployment rate is 10%.

The top manufacturing occupations within the manufacturing sector in the Shenandoah Valley Region include Assemblers and Fabricators, All Other, Including Team Assemblers (1,572 jobs); Meat, Poultry, and Fish Cutters and Trimmers (1,267 jobs); Packaging and Filling Machine Operators and Tenders (1,252 jobs); and First-Line Supervisors of Production and Operating Workers (1,213 jobs). Projections over the next five years indicate that Assemblers and Fabricators, All Other, Including Team Assemblers will experience the greatest decline in jobs (117) compared to Packaging and Filling Machine Operators and Tenders which is projected to add the most jobs (116). Median hourly wages for the top twenty manufacturing occupations range from $12.34 for Packers and Packagers, Hand to $44.02 for General and Operations Managers.

Educational attainment for entry-level manufacturing occupations indicated that nearly two-thirds of manufacturing jobs do not require a four-year degree and beyond. Only 6% of manufacturing occupations in the region require a postsecondary nondegree award or an Associate's degree.

The top manufacturing job titles in the Shenandoah Valley Region from December 2018 to December 2019 were CDL Drivers (170), Maintenance Mechanics (118), Sales Representatives (105), and Production Supervisors (102). The most frequent common manufacturing skills in job

postings include Management (23.7%), Operations (23.1%), Communications (20.1%), Leadership (19.1%), and Sales (18.0%).

Manufacturer Survey Analysis

A total of 56 respondents from various manufacturing sub-sectors participated in an online survey. About two-thirds of manufacturers who completed the survey employ a workforce of less than 250. Thirteen manufacturers employ a workforce of 1-50, eight employ 51-100, seventeen employ 101-250, seven manufacturers employ 251-500, three employ 501-1,000, and eight employ a workforce of over a thousand.

The most commonly identified pressing issues manufacturers faced regarding their workforce was lack of mechanical skills (28), lack of interest among younger workers (27), lack of basic work skills (26), employee retention/high turnover (23), and impending retirements (17).

The most commonly identified position that's most difficult to fill was Skilled Trade positions (32), followed by Entry-Level/Support positions (15), Technical positions (5), and Professional positions (2). In most cases, it takes 1-6 months to fill all position types (entry level/support, skilled trade, technical, and professional). For Entry Level/Support positions, one-third of respondents noted that it takes less than a month to fill those positions. The retention of talent for each of those positions is comparable, with the exception of Professional positions. The latter was identified as not being difficult for talent retention whereas the other three (Entry-Level/Support, Skilled Trade, and Technical positions) were identified as difficult for talent retention. The top factors identified in the survey contributing to the difficulty of talent retention are wage and benefits (32), lack of interest/commitment (14), hours/shift (12), competition for talent (12), attendance (11), lack of skills (11), and work environment (11).

From a list of 14 employability skills, Critical Thinking accounted for the greatest percentage share of difficult to find or very difficult to find responses (89%), followed by Dependability and Reliability (85%), Problem Solving (77%), and Initiative (74%). Employability skills that garnered the greatest percentage share of easiest to find or easy to find responses included Drug-Free (21%), Teamwork (15%), Customer-Centric (12%), Communication (12%), and Adaptability (12%). Customer Centric received the greatest percentage share of neither easy nor difficult to find (65%), followed by Teamwork (59%), Integrity (59%), and Communication (56%).

The most commonly identified resource to fill open positions are Online Job Postings (46), Employee Referrals (41), and Word of Mouth (40). These resources were also the most effective at recruiting talent.

Work-based learning programs are offered by manufacturers in the region. On-the-Job Training is offered by 36% of respondents, followed by Apprenticeships (28%), Paid Internships (19%), and Job Shadowing (16%). On-the-Job Training was identified as the most commonly effective work-based learning program, with 24 respondents identifying it as either effective or very effective. Job Shadowing was most commonly rated not effective or not at all effective, and also received the greatest number of unsure responses. Paid Internships was the only work-based learning program that received almost the same number of effective and not effective responses (10 and 13, respectively).

There is a significant portion of individuals who will reach retirement age in the next 10-15 years. Over half of the survey respondents indicated that they have started to create a plan to prepare for the exiting workforce. Those plans include cross-training of staff for knowledge sharing, identifying and hiring future leaders, and formalizing a succession plan. The most commonly identified hardest-to-fill positions of those exiting the workforce due to retirement are management (21), skilled and experienced workers (17), maintenance (11), logistics/shipping and receiving (6), and engineers (6).

Focus Group Summary

Three focus groups were facilitated across the Region with a small subset of manufacturers. Focus group participants identified the most common recruitment strategies as local newspapers, social media (e.g., Facebook, LinkedIn, etc.), word-of-mouth, referrals from co-workers to family and friends, online job search platforms (Indeed, CareerBuilder, Craigslist), temp agencies, radio advertisements, and billboards. Some of the most effective talent recruitment resources often include referrals and billboards, especially in more rural areas of the region.

One of the greatest challenges of talent recruitment is the lack of people in the region. Manufacturers in attendance were in agreement that a shortage of people – not just talent – is a strong contributor to recruitment obstacles. Additionally, the ongoing trend of "stealing talent" from one another has made it even more difficult to recruit and retain talent and has forced employers to increase wages.

Focus group participants identified the most common hiring challenge among unskilled labor was failure to pass a background check or drug screening. Engineers are the hardest-to-find skilled talent, but others include machinists, tool and die makers, CDL drivers, welders, fabricators, maintenance, and CNC operators. Inside sales representatives were also identified as hard-to-fill positions.

Manufacturers expressed a need for a talent attraction initiative. There are jobs available, but not enough candidates to fill them. The challenge has been not only recruiting talent to their companies, but also attracting talent to the Shenandoah Valley. Promoting regional assets that contribute to the quality of life has helped manufacturers attract talent from outside the region and outside the Commonwealth. However, availability of affordable housing has been a barrier for talent recruitment by some manufacturers in the Region.

Manufacturers in the focus groups acknowledge that a retiring workforce is expected in the near future, but many of those in the focus groups have not formalized a process for knowledge transfer by those retiring workers. Most of the knowledge-sharing, off-boarding practices have been informal and not documented.

Of the twenty focus group participants, less than half were registered apprenticeship sponsors. Many of those manufacturers cited the state of the economy as a primary reason for not becoming a sponsor. With low unemployment in the Region, Commonwealth, and nation, the number of available talent in the labor pool is limited and the demand for talent is high. These manufacturers are more concerned with filling job openings first, then training talent versus

training talent as a registered apprenticeship sponsor. Some manufacturers from the focus groups have considered becoming a registered apprenticeship sponsor but cite time commitment and capacity as primary concerns. Many of those manufacturers in the focus groups were unaware that staff from the Virginia Career Works – Shenandoah Valley Region are available to assist manufacturers specifically with this process.

Manufacturers from the focus groups who were registered apprenticeship sponsors offered programs in industrial maintenance, industrial manufacturing technician, machinist, fabricator, and electrician. The greatest benefit identified by those who do sponsor registered apprenticeship programs has been the ease of recruiting and retaining apprentices after they complete the program. These workers feel a sense of loyalty to the company and have developed personalized relationships with co-workers.

Manufacturers who participated in the focus groups shared best practices their company has considered or implemented in an effort to recruit and retain talent:

- Vacation-matching: experienced workers in manufacturing accumulate a significant amount of paid time off and risk losing that if changing jobs. This manufacturer has considered matching those vacation days in addition to their company's own benefits package.
- Targeted Recruitment of Women: childcare has been an on-going challenge for women in manufacturing. In an effort to address these challenges, subsidized or on-site childcare options have been considered.
- Modified Work Schedules: because the Shenandoah Valley Region is accustomed to enjoying the outdoor amenities, this manufacturer has opted to adjust the work schedule to reflect the industry's busy and slow times of business as well as work/life balance. A couple of manufacturers have scaled back to four-day work weeks during the slow business season, which runs concurrent with hunting season.

American Apprenticeship Initiative (AAI) Grant Summary

In 2015, the U. S. Department of Labor (DOL) made an historic and unprecedented investment in the future of the American workforce through a $175 Million American Apprenticeship Initiative (AAI) grant. Through a highly competitive proposal process, the Shenandoah Valley Workforce Development Board (SVWDB) received one of the 46 grants awarded to national, state, and local organizations. Focusing on the advanced manufacturing sector, the Valley to Virginia Initiative (V2V) Grant is one of the highest performing grantees and currently ranked 3rd in number of new registered apprenticeships. The SVWDB attributes its success to strength of partnerships, employer engagement, and innovative workforce solutions.

As of February 28, 2020, the SVWDB has enrolled over 1,035 new registered apprentices into the V2V Grant, which is slated to end June 30, 2021. These apprentices work for 90 companies throughout Virginia, 24 of whom did not have an apprenticeship program prior to the V2V grant, and 51 of whom expanded their apprenticeship program by adding a new occupation. Over 500 apprentices represent individuals from underrepresented populations, a key focus of the American Apprenticeship Initiative.

Recommendation

Data from this report helped shape the proposed recommendations for supporting manufacturing needs across the Shenandoah Valley Region. Those recommendations include:

- Talent Attraction: with low unemployment, the number of people available in the labor market is limited. This recommendation focuses on targeted hiring from populations that are often under recruited by employers, such as individuals with disabilities, individuals returning from incarceration, and non-English speaking workers. The Region should also leverage its regional assets to attract talent from outside of the Valley by partnering with local economic development organizations, education, and community-based organizations to develop a unified marketing brand that brands itself as the place to live and work.

- Improved Messaging of Registered Apprenticeship Programs: evident from the focus groups, manufacturers acknowledge the value apprenticeship programs offer, but how to become a registered apprenticeship sponsor is unclear to some of those who are not currently sponsors. The SVWDB should simplify the messaging to manufacturers of how to become a registered apprenticeship sponsor. One strategy to achieve this is to share success stories/experiences from manufacturers in the Region that have become sponsors.

- Succession Planning Support: The SVWDB can partner with manufacturers to develop a "succession plan toolbox," inclusive of common topics that captures institutional knowledge. This template for information sharing can be beneficial to manufacturers who have not yet created a formalized succession plan or know what to include in such a plan.

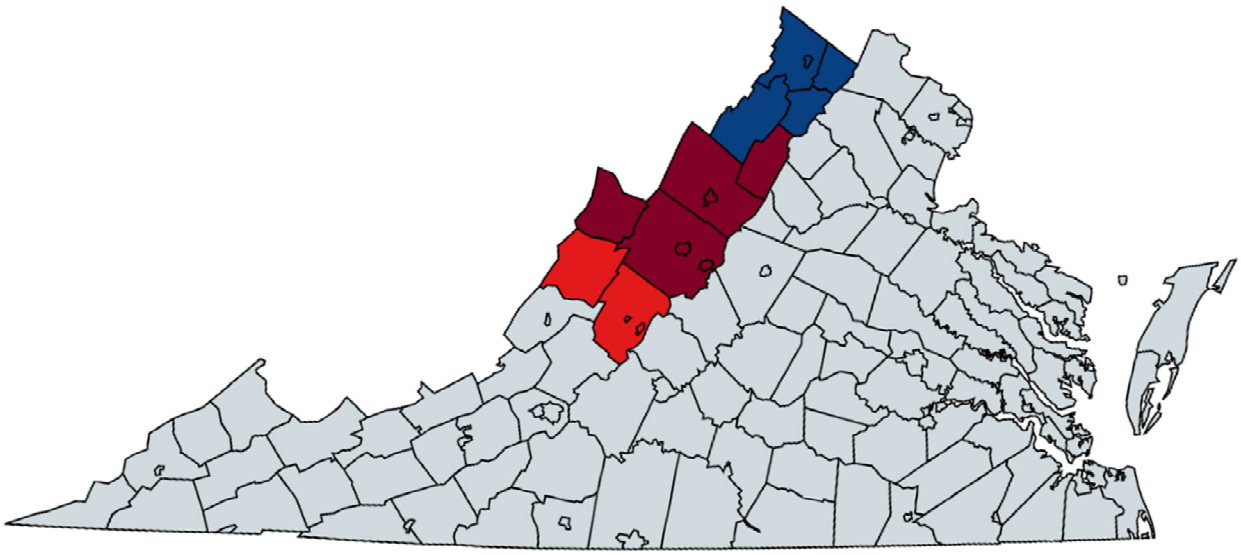
- Promote Career Awareness: targeting students in high schools to bring awareness to local manufacturing careers can lay the foundation for developing local talent. Offering more career pathways in manufacturing can provide talent with the opportunity to advance in their career while earning industry-recognized credentials. This will develop a skilled manufacturing workforce that meets the needs of the industry.

LABOR MARKET DATA ANALYSIS

The following labor market analysis details past, current, and projected trends in the regional labor market. By understanding the economic landscape of the Shenandoah Valley, partners of the talent ecosystem can make informed decisions on how to continue supporting the manufacturing industry based on readily available talent, in-demand occupations, in-demand technical and soft skills, and hiring companies.

The geographic parameters of the Shenandoah Valley Region include the counties of Augusta, Bath, Clarke, Frederick, Highland, Page, Rockbridge, Rockingham, Shenandoah, and Warren, and the cities of Buena Vista, Harrisonburg, Lexington, Staunton, Waynesboro, and Winchester. This report commonly refers to three sub-regions within the Shenandoah Valley for data comparison:

Northern Sub-Region	Central Sub-Region	Southern Sub-Region
• City of Winchester • Clarke County • Frederick County • Shenandoah County • Warren County	• City of Harrisonburg • City of Staunton • City of Waynesboro • Augusta County • Page County • Highland County • Rockingham County	• City of Buena Vista • City of Lexington • Bath County • Rockbridge County



Demographics

Nearly 44% of the Shenandoah Valley Region's population is between the working ages of 20 to 54 years of age, which is comparable to the measure within the three sub-regions. The Southern Sub-Region has a higher portion of individuals 65 years and older than the other sub-regions and the Shenandoah Valley Region as a whole. As the older population (55 to 64 years of age) prepares to exit the workforce due to retirement, the Shenandoah Valley region is well positioned to retain nearly half of its working age population in the workforce.

Table 1: Population by Age, 2018

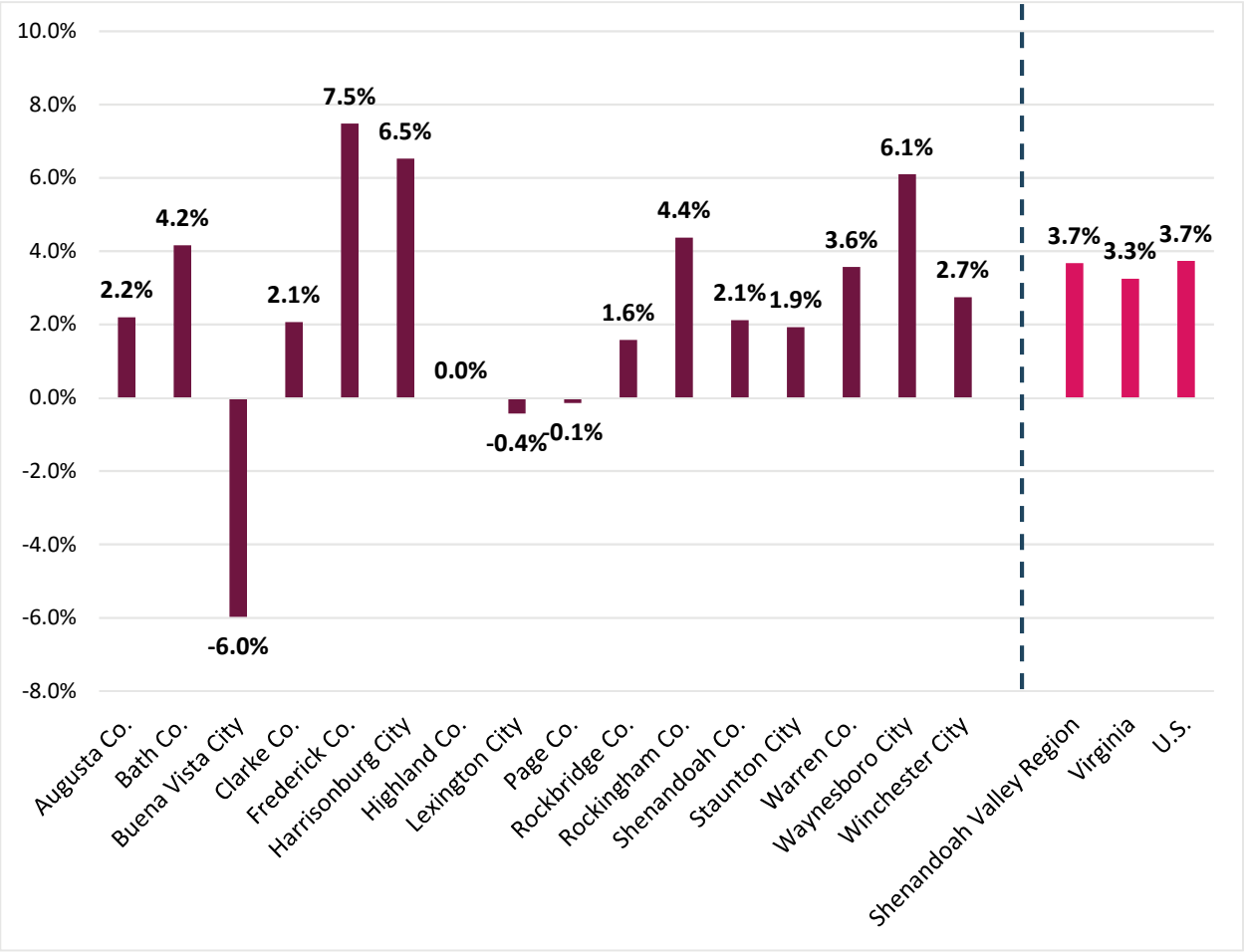
	Shenandoah Valley		Northern Sub-Region		Central Sub-Region		Southern Sub-Region	
	Pop.	% of Total	Pop.	% of Total	Pop.	% of Total	Pop.	% of Total
Under 5 years	30,190	5.6%	12,914	6.0%	15,724	5.5%	1,552	3.9%
5 to 19 years	99,256	18.5%	39,707	18.6%	52,577	18.5%	6,974	17.3%
20 to 34 years	106,351	19.8%	38,260	17.9%	59,866	21.1%	8,225	20.4%
35 to 54 years	130,351	24.2%	54,451	25.5%	67,451	23.7%	8,450	21.0%
55 to 64 years	72,907	13.6%	30,016	14.1%	37,190	13.1%	5,701	14.1%
65+ years	98,905	18.4%	38,142	17.9%	51,369	18.1%	9,395	23.3%
Grand Total	**537,962**	**100.0%**	**213,491**	**100.0%**	**284,176**	**100.0%**	**40,296**	**100.0%**

Source: Emsi 2019.3

Figure 1 below details population percent change over the last five years for each locality that makes up the Shenandoah Valley Region. The City of Buena Vista experienced the single greatest percentage decline in population between 2013-2018 at -6.0%, followed by the City of Lexington (-0.4%), and Page County (-0.1%). Frederick County experienced the greatest percentage increase (+7.5%), followed by the City of Harrisonburg (+6.5%) and the City of Waynesboro (+6.1).

Over the last five years, the Shenandoah Valley Region's population experienced a 3.7% growth. This exceeds the Commonwealth of Virginia by 0.4% and is the same as the national population growth.

Figure 1: Population Percent Change, 2013-2018



Source: Emsi 2019.3

Though the poverty level in the Shenandoah Valley Region is lower than the nation, it exceeds the Commonwealth by 2.7 percentage points. Within the region, the poverty level is highest in the Southern Sub-Region (16.8%) and lowest in the Northern Sub-Region (9.7%). The Northern Sub-Region also has the largest median household income of the three sub-regions ($62,356), with a measure nearly $14,000 higher than the Central Sub-Region, which comes in second. The Shenandoah Valley Region's median household income is lower than the Commonwealth and nation's median household income, trailing Virginia by 25.3% and the United States by 11.0%.

As detailed in Table 2, the median age in the Shenandoah Valley Region of 41.3 years old is higher than the median age for the Commonwealth (38.0 years old) and the nation (37.8 years old), though the median age in the Southern Sub-Region is on par with the median age in the Commonwealth and nation. The Region also has a larger percentage of young individuals between the ages of 18-24 years than the Commonwealth and the nation.

Table 2: Demographic Characteristics

	Shenandoah Valley	Northern Sub-Region	Central Sub-Region	Southern Sub-Region	Virginia	USA
Median Household Income	$51,322	$62,356	$48,569	$42,345	$68,766	$57,652
Poverty Level	13.9%	9.7%	15.2%	16.8%	11.2%	14.6%
Median Age	41.3	41.8	42.7	38.5	38.0	37.8
% of Population 18-24 Years	11.6%	8.4%	13.3%	17.0%	9.8%	9.7%

Source: 2013-2017 American Community Survey 5-Year Estimates

A smaller portion of the population in the Shenandoah Valley Region has attained education beyond a two-year degree than the Commonwealth and the nation. Individuals with a two-year degree and beyond in the Shenandoah Valley account for 32.0%, which is 11.8 percentage points less than the state and 5.9 percentage points less than the nation. Each of the three sub-regions has a similar educational attainment profile to that of the Region. The Region exceeds both Commonwealth and national figures among those with an educational attainment of a high school diploma or less.

Table 3: 2018 Educational Attainment by Level

	SV Pop.	% of SV Pop.	% of North Pop.	% of Central Pop.	% of South Pop.	% of Virginia Pop.	% of US Pop.
Less than 9th Grade	27,433	7.5%	7.0%	8.0%	8.0%	5.5%	6.8%
9th – 12th Grade	29,212	7.9%	7.0%	8.0%	8.0%	6.4%	6.9%
High School Diploma	127,823	34.7%	34.0%	35.0%	36.0%	24.6%	27.6%
Some College	66,129	18.0%	19.0%	17.0%	19.0%	19.6%	20.7%
Associate's Degree	24,886	6.8%	8.0%	6.0%	6.0%	7.2%	8.0%
Bachelor's Degree	56,717	15.4%	15.0%	16.0%	13.0%	21.1%	18.6%
Graduate Degree or Higher	35,992	9.8%	10.0%	10.0%	11.0%	15.5%	11.3%

Source: Emsi 2019.3

Industry Analysis

Table 4 is a snapshot of all industries in the Shenandoah Valley Region at the 2-digit NAICS (North American Industry Classification System) level. Manufacturing is the second largest sector in the Region, experiencing a 5.7% growth, or 1,781 jobs added over the last five years. The only other sector to add more jobs between 2013-2018 was Educational Services (2,628 jobs). Projections into the next five years indicate a 3.0% growth for Manufacturing.

Of the top ten sectors for the Shenandoah Valley Region, Manufacturing is the highest-paying industry with annual average earnings of $65,933. It also has the highest location quotient (LQ) of any sector at 1.71. Industry LQ provides a measure of how "concentrated" an industry is in a region compared to the nation, with a measure of 1.00 indicating the same concentration as the nation.[1] In this analysis, LQs greater than 1.25 are considered to be a threshold for identifying an industry as relatively strong for the region's economic base. Sectors in the Shenandoah Valley that meet that threshold include Manufacturing; Agriculture, Forestry, Fishing, and Hunting; Educational Services; and Transportation and Warehousing.

Table 4: All Sectors in the Shenandoah Valley at the 2-Digit NAICS Level

Description	2018 Jobs	'13-'18 % Change	'18-'23 % Change	Annual Average Earnings	2018 LQ
Government	38,527	2.1%	3.8%	$60,393	1.04
Manufacturing	**33,226**	**5.7%**	**3.0%**	**$65,933**	**1.71**
Health Care and Social Assistance	29,460	5.6%	12.1%	$57,918	0.94
Retail Trade	27,164	0.3%	1.3%	$31,816	1.10
Accommodation and Food Services	23,306	7.3%	4.0%	$19,922	1.10
Construction	14,869	7.6%	3.0%	$50,771	1.07
Transportation and Warehousing	12,444	14.1%	7.3%	$58,095	1.38
Other Services (except Public Administration)	11,733	7.8%	8.9%	$27,644	1.01
Educational Services	9,501	38.2%	18.6%	$34,049	1.50
Administrative and Support and Waste Management and Remediation Services	9,441	0.2%	10.4%	$33,042	0.61
Professional, Scientific, and Technical Services	7,918	20.0%	15.9%	$65,781	0.49
Finance and Insurance	6,243	24.3%	12.6%	$69,254	0.63
Wholesale Trade	5,801	2.1%	3.6%	$60,561	0.64
Agriculture, Forestry, Fishing and Hunting	4,392	15.4%	11.1%	$38,076	1.53
Real Estate and Rental and Leasing	3,102	8.0%	3.4%	$49,810	0.75
Management of Companies and Enterprises	2,840	24.2%	6.8%	$86,312	0.80
Arts, Entertainment, and Recreation	2,731	(15.2%)	(0.1%)	$24,879	0.64
Information	2,675	(9.8%)	6.3%	$66,473	0.59
Utilities	710	19.7%	20.3%	$108,608	0.84

[1] LQ is calculated as [% of total local employment/% of total national employment]

Mining, Quarrying, and Oil and Gas Extraction	258	(7.2%)	(0.4%)	$62,095	0.25

Source: Emsi 2019.3

The following table is a look into the manufacturing sub-sectors in the Shenandoah Valley Region. Food Manufacturing is the top manufacturing sub-sector with over 10,500 jobs, followed by Plastics and Rubber Products Manufacturing (4,389 jobs), Printing and Related Support Activities (2,831 jobs), and Fabricated Metal Product Manufacturing (2,680 jobs). Food Manufacturing has the highest LQ of any manufacturing sub-sector in the region. Chemical Manufacturing, which has the fifth most manufacturing jobs in the region, has the highest average annual earnings at $114,017 and is projected to experience the greatest percentage increase in employment of any manufacturing industry in the Region over the next five years.

In shift share analysis, competitive effect is the portion of regional growth that cannot be explained by either overall national growth or industry/occupation-specific trends. Rather, competitive effect is the growth or decline of a sector that is unique to the Shenandoah Valley Region, due to local factors. The manufacturing sub-sectors in the Region with a positive competitive effect include Plastics and Rubber Products Manufacturing (258 jobs); Nonmetallic Mineral Product Manufacturing (208 jobs); Apparel Manufacturing (159 jobs); Fabricated Metal Product Manufacturing (137 jobs); Food Manufacturing (103 jobs); Chemical Manufacturing (67 jobs); Textile Product Mills (29 jobs); Paper Manufacturing (2 jobs); and Primary Metal Manufacturing (2 jobs). The three manufacturing sub-sectors with the lowest competitive effect, meaning these sub-sectors are less competitive based on local factors, are Transportation Equipment Manufacturing (-333 jobs); Wood Product Manufacturing (-248 jobs); and Furniture and Related Product Manufacturing (-168 jobs).

Table 5: Manufacturing Sub-Sector in the Shenandoah Valley at the 3-Digit NAICS Level

Description	2018 Jobs	'13-'18 % Change	'18-'23 % Change	Annual Average Earnings	2018 LQ	2018 CE
Food Manufacturing	10,654	11%	2%	$59,087	4.31	103
Plastics and Rubber Products Manufacturing	4,389	18%	1%	$74,041	3.97	258
Printing and Related Support Activities	2,831	(9%)	(4%)	$54,160	4.16	(109)
Fabricated Metal Product Manufacturing	2,680	8%	14%	$67,119	1.19	137
Chemical Manufacturing	2,017	8%	22%	$114,017	1.59	67
Wood Product Manufacturing	1,662	0%	2%	$49,156	2.57	(248)
Machinery Manufacturing	1,220	(7%)	1%	$81,431	0.72	(97)
Nonmetallic Mineral Product Manufacturing	1,085	38%	1%	$65,255	1.68	208
Beverage and Tobacco Product Manufacturing	943	33%	6%	$64,906	2.23	(40)
Miscellaneous Manufacturing	846	(11%)	(3%)	$84,653	0.86	(138)

Paper Manufacturing	777	(3%)	15%	$62,220	1.41	2
Transportation Equipment Manufacturing	756	(23%)	(18%)	$71,766	0.29	(333)
Furniture and Related Product Manufacturing	750	(10%)	4%	$42,543	1.19	(168)
Textile Product Mills	644	7%	(13%)	$41,638	3.46	29
Computer and Electronic Product Manufacturing	538	(10%)	(1%)	$71,762	0.33	(58)
Primary Metal Manufacturing	402	(5%)	(19%)	$60,041	0.70	(2)
Textile Mills	381	(6%)	6%	$64,050	2.23	(3)
Apparel Manufacturing	335	54%	9%	$39,043	1.76	159
Petroleum and Coal Products Manufacturing	218	2%	2%	$89,372	1.28	2
Electrical Equipment, Appliance, and Component Manufacturing	89	(49%)	19%	$74,307	0.15	(97)

Source: Emsi 2019.3

A deeper dive into manufacturing industries in the Shenandoah Valley Region is presented in Table 6. Poultry Processing, with 5,038 jobs, has the most jobs of any manufacturing industry. This is more than the next three industries combined – All Other Plastics Product Manufacturing; Books Printing; and Fluid Milk Manufacturing. However, Poultry Processing has the second lowest average annual earnings among the top 20 manufacturing industries at the 6-digit NAICS level. Each of these industries has a strong LQ above 1.25 with Books Printing and Confectionary Manufacturing from Purchased Chocolate having the highest at 57.33 and 20.29, respectively.

Half of the top 20 manufacturing sub-sectors in the Region are projected to experience an increase in jobs over the next five years, with Pharmaceutical Preparation Manufacturing showing the greatest projected increase at 58%. This industry experienced the greatest percentage increase of jobs over the last five years as well, with 1,557% growth and has the highest annual average earnings of any other top industry at $152,093. Four of the top five manufacturing industries in Table 6 are projected to experience a decline in jobs over the next five years, which could significantly impact the economic growth of the Region.

Table 6: Top 20 Manufacturing National Industries in the Shenandoah Valley at the 6-Digit NAICS Level

Description	2018 Jobs	'13-'18 % Change	'18-'23 % Change	Annual Average Earnings	2018 LQ
Poultry Processing	5,038	2%	(8%)	$48,095	13.89
All Other Plastics Product Manufacturing	2,064	21%	(7%)	$60,045	4.45
Books Printing	1,538	(8%)	(4%)	$55,860	57.33
Fluid Milk Manufacturing	1,277	50%	18%	$76,279	15.45
Commercial Printing (except Screen and Books)	1,122	(18%)	(9%)	$53,606	2.27

Confectionery Manufacturing from Purchased Chocolate	1,008	21%	2%	$80,231	20.29
Other Snack Food Manufacturing	846	6%	13%	$68,995	13.39
Pharmaceutical Preparation Manufacturing	812	1,557%	58%	$152,093	2.65
Fruit and Vegetable Canning	776	22%	11%	$48,929	8.76
Breweries	774	56%	12%	$71,085	6.49
Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	769	13%	2%	$86,964	5.81
Other Motor Vehicle Parts Manufacturing	621	(26%)	(17%)	$69,355	2.60
Corrugated and Solid Fiber Box Manufacturing	616	21%	12%	$62,572	4.21
Other Concrete Product Manufacturing	607	35%	(4%)	$63,466	7.06
Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing	581	(31%)	(15%)	$87,875	9.62
Carpet and Rug Mills	572	(2%)	(19%)	$42,822	12.06
Laminated Plastics Plate, Sheet (except Packaging), and Shape Manufacturing	494	211%	37%	$140,205	16.58
Surgical Appliance and Supplies Manufacturing	455	(17%)	(12%)	$114,251	2.92
Plastics Bottle Manufacturing	455	21%	0%	$61,315	9.08
Sawmills	435	(6%)	(6%)	$53,395	3.32

Source: Emsi 2019.3

As cited in Table 4: *All Industries Sectors in the Shenandoah Valley at the 2-Digit NAICS Level*, average annual earnings in the manufacturing sector are higher than the top ten sectors in the Region. Table 7 details the wage comparison for manufacturing jobs in the Region. The average annual earnings for manufacturing in the Region are $65,933 which is $20,431 more than the average of all sectors in the Region. The average annual earnings for manufacturing in the Commonwealth are $74,166 which is $8,233 more than earnings for manufacturing in the Region.

The unemployment rate for manufacturing in the Region is 17% and is relatively consistent across Sub-Regions. The Region's manufacturing unemployment rate is higher than that of the Commonwealth, which has a manufacturing unemployment rate of 8%. Nationally, the sector's unemployment rate is 10%.

Table 7: Wage Comparison[2]

	Manufacturing	Regional Average	Manufacturing Unemployment Rate
Shenandoah Valley Region	$65,933	$49,502	17%
Northern Sub-Region	$64,771	$51,926	17%
Central Sub-Region	$68,033	$48,152	17%
Southern Sub-Region	$52,438	$45,974	16%

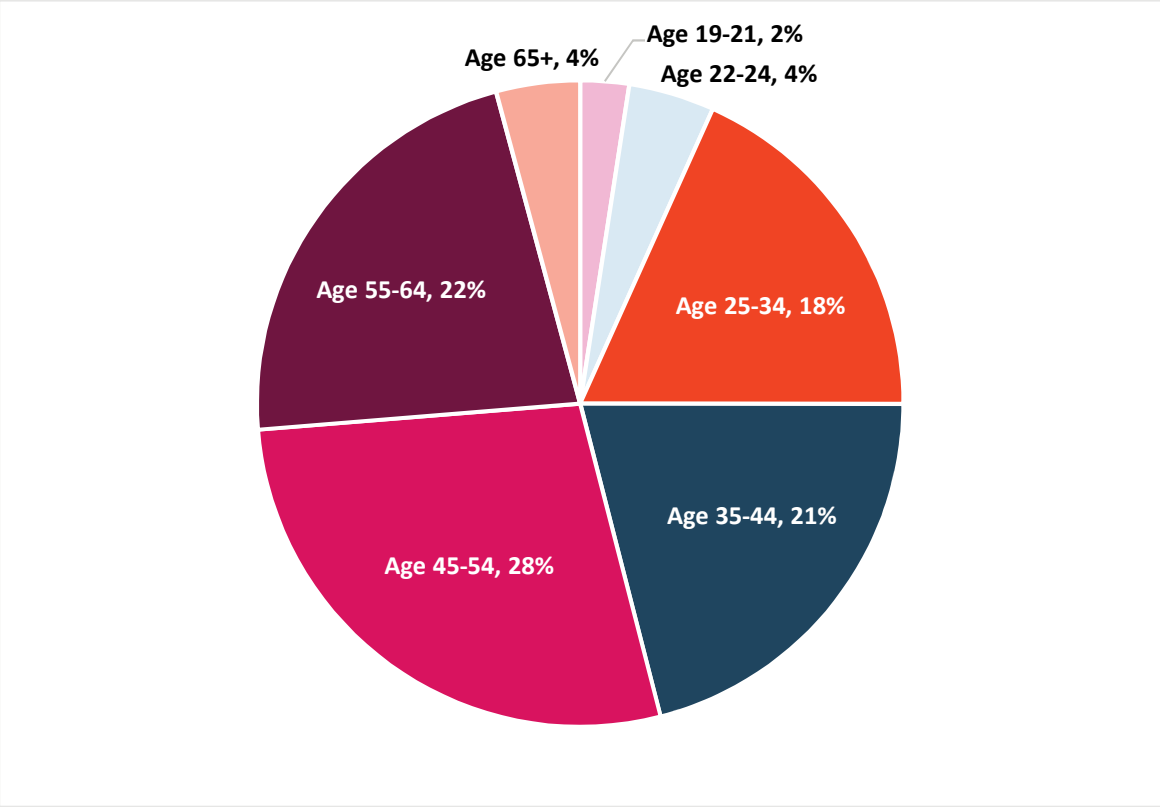
[2] These are non-loaded wages, exclusive of the monetary value of benefits. Emsi industry unemployment estimates are derived from four data sources: (1) Characteristics of the Insured Unemployed (U.S. Department of Labor); (2) Local Area Unemployment Statistics (U.S. Bureau of Labor Statistics); (3) Emsi final industry data; and (4) Current Population Survey (U.S. Census Bureau).

Virginia	$74,166	$68,372	8%
United States	$84,617	$66,902	10%

Source: Emsi 2019.3

Over a quarter of the manufacturing workforce in the Shenandoah Valley Region is between the ages of 45-54 (28%), followed by 55-64 (22%), and 33-54 (21%). As older workers prepare to exit the workforce over the next five to ten years, a talent pipeline to replace these workers will be critical. Only 6% of the manufacturing workforce in the Region is between the ages of 19-24.

Figure 2: Manufacturing Employment by Age



Source: Emsi 2019.3

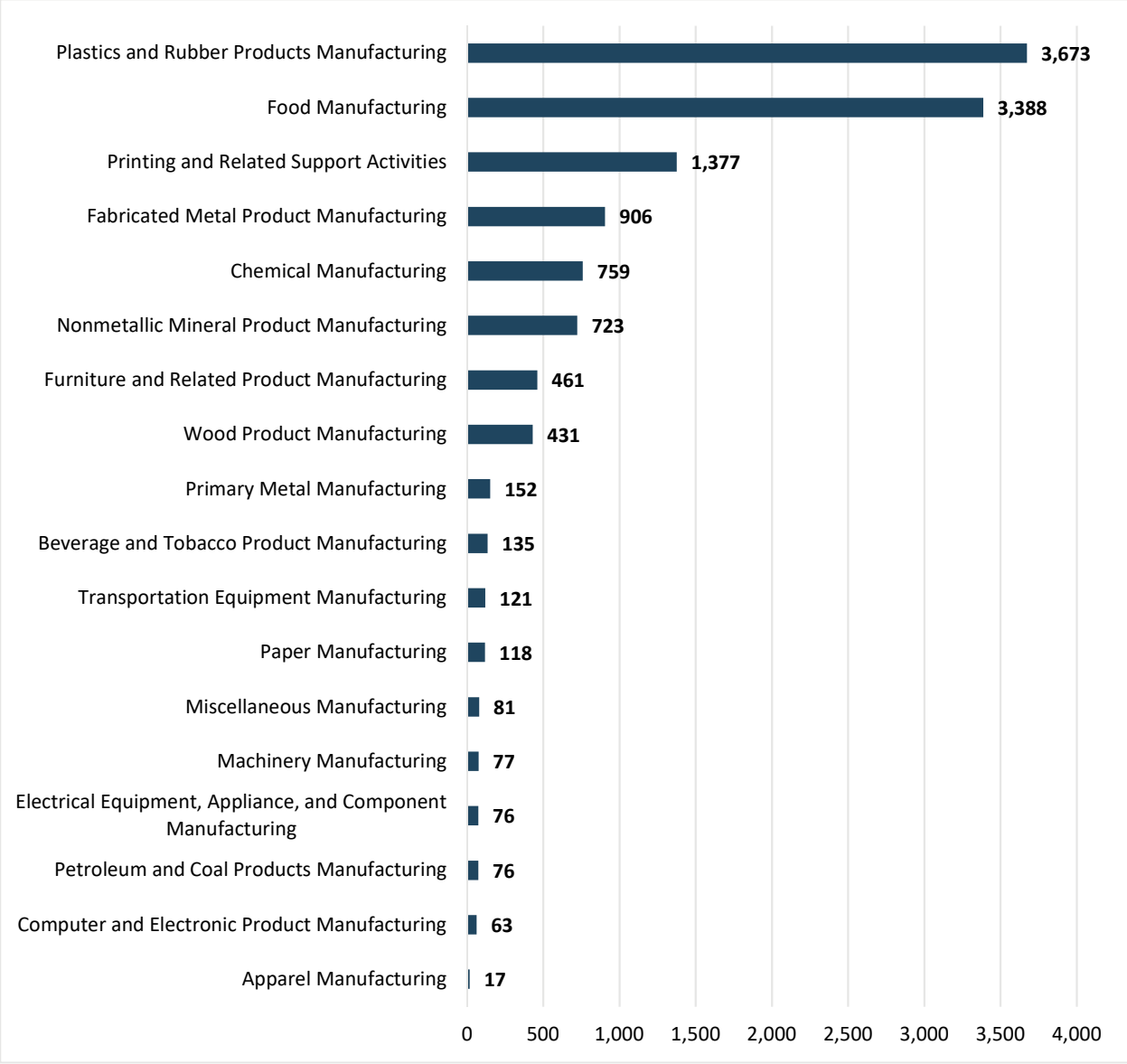
Northern Sub-Region

The top manufacturing industries at the 3-digit NAICS level in the Northern Sub-Region include Plastics and Rubber Products Manufacturing (3,673 jobs), Food Manufacturing (3,388 jobs), Printing and Related Support Activities (1,377 jobs), and Fabricated Metal Product Manufacturing (906 jobs). Each of these industries have experienced growth over the last five years and are projected to grow into 2023 with the exception of Printing and Related Support Activities which experienced a slight decline of 13 jobs since 2013.

Plastics and Rubber Products Manufacturing added the most jobs over the last five years (+931 jobs), followed by Chemical Manufacturing (+213 jobs) and Fabricated Metal Product Manufacturing (+170 jobs). The Northern Sub-Region has added 1,228 manufacturing jobs since

2013 and is projected to add 673 manufacturing jobs by 2023. Earnings for these manufacturing industries range from $20,000 for Apparel Manufacturing to $119,639 for Petroleum and Coal Products Manufacturing.

Figure 3: Manufacturing Employment in the Northern Sub-Region at the 3-Digit NAICS Level



Source: Emsi 2019.3

Data collection from Emsi and the Virginia Employment Commission depicted in Table 8 lists the top 15 companies in the Northern Sub-Region with the most manufacturing job postings from December 2018 to December 2019. Over that time period, American Woodmark Corporation had the most manufacturing job postings (226), followed by Thermo Fisher Scientific, Inc. (172), HP Hood, LLC (133), Newell Brands, Inc. (109) and Quad/Graphics Inc. (108). Median job posting duration for these companies lasted between 15 to 64 days. Median job posting duration measures how long a posting with that company has been active, indicating how difficult it is for

that company to fill. American Woodmark Corporation had the longest median posting duration (64 days) and Howell Metal Company had the shortest median posting duration (15 days).

Table 8: Top Companies in the Northern Sub-Region Posting Manufacturing Positions

Company	Unique Postings[3] Dec 2018-Dec 2019	Median Posting Duration Dec 2018-Dec 2019
American Woodmark Corporation	226	64 days
Thermo Fisher Scientific Inc	172	55 days
HP Hood LLC	133	54 days
Newell Brands Inc.	109	35 days
Quad/Graphics, Inc.	108	37 days
Monoflo International, Inc	61	40 days
The Heinz Kraft Company	45	45 days
Toray Plastics (America), Inc.	39	51 days
Packaging Corporation of America	39	37 days
LSC Communications, Inc.	37	31 days
Builders Firstsource, Inc.	35	32 days
Riddleberger Brothers, Inc.	33	49 days
Continental AG	32	54 days
Masco Corporation	31	51 days
Howell Metal Company	29	15 days

Source: Emsi 2019.3, Virginia Employment Commission, Economic Information Services

Central Sub-Region

The Central Sub-Region has more manufacturing jobs than the Northern and Southern Sub-Regions, totaling 18,745 jobs. The top manufacturing sub-sectors at the 3-digit NAICS level in the sub-region includes Food Manufacturing (7,226 jobs), Fabricated Metal Product Manufacturing (1,710 jobs), Printing and Related Support Activities (1,377 jobs), and Chemical Manufacturing (1,254 jobs). Of the top five manufacturing sub-sectors in the Central Sub-Region, two have experienced a decline in jobs over the last five years. Printing and Related Support Activities experienced a decline of 229 jobs while Chemical Manufacturing experienced a decline of 27 jobs. Projections into the next five years indicate Printing and Related Support Activities will continue its decline by 8%, however Chemical Manufacturing is projected to experience a 26% increase.

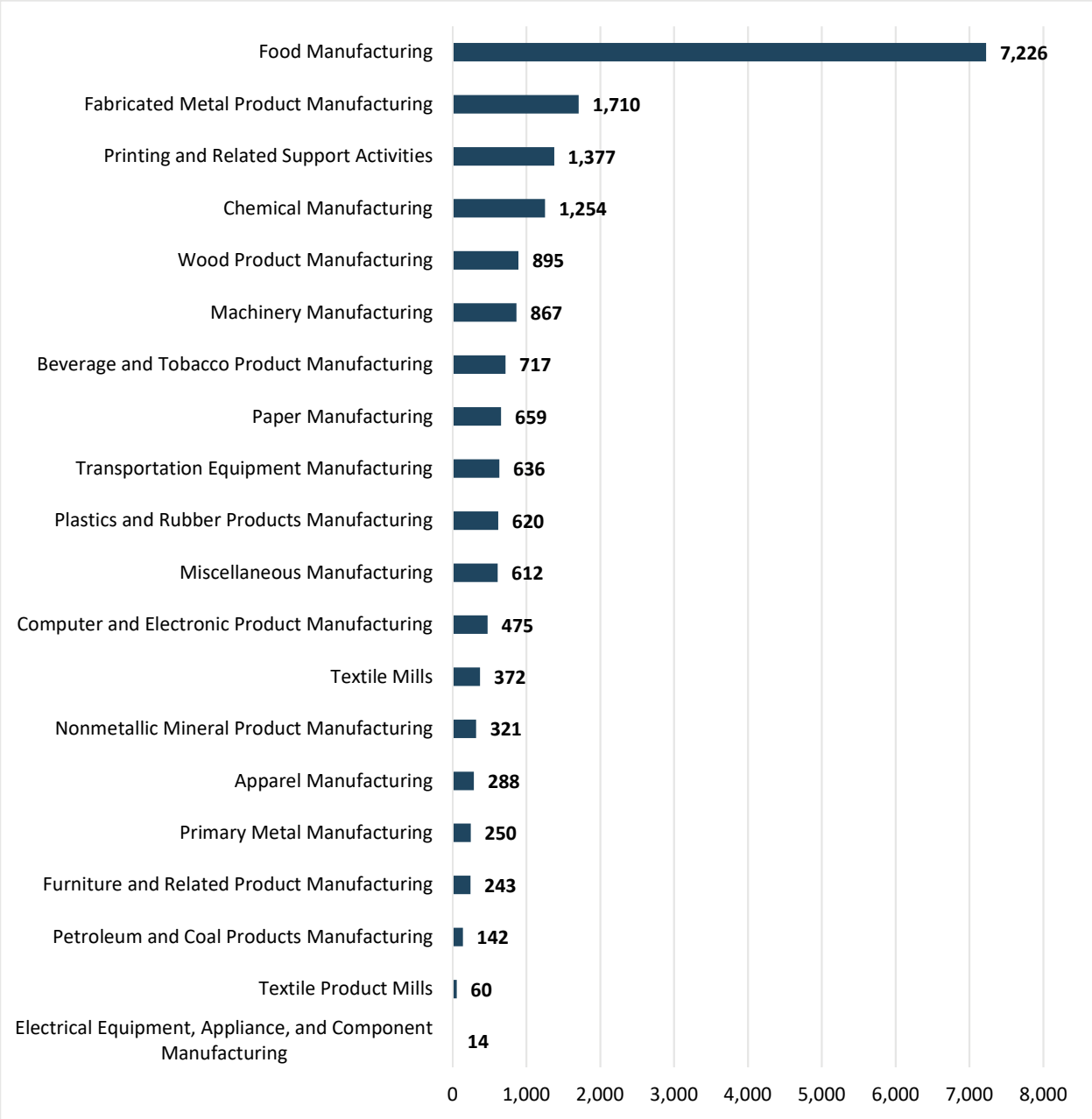
Over the last five years, Food Manufacturing added the most jobs (849) compared to Plastics and Rubber Related Products Manufacturing which experienced the greatest decline in jobs (282). The total number of jobs added between 2013-2018 was 666 and by 2023, the Central Sub-Region is projected to add an additional 294 jobs.

Half of the manufacturing sub-sectors in the Central Sub-Region have an LQ above 1.25. The highest LQ belongs to Food Manufacturing (5.49) followed by Textile Mills (4.08) and Beverage

[3] Unique Job Postings refers to the number of de-duplicated job postings advertised by different companies in career sites and job boards.

and Tobacco Product Manufacturing (3.19). Earnings for manufacturing sub-sectors range from $35,970 for Textile Product Mills to $131,374 for Chemical Manufacturing, respectively.

Figure 4: Manufacturing Employment in the Central Sub-Region at the 3-Digit NAICS Level



Source: Emsi 2019.3

The top 15 companies in the Central Sub-Region with the most manufacturing job postings from December 2018 to December 2019 are listed in Table 9. Over that time period, Merck & Co., Inc. had the most job openings (360) followed by LSC Communications, Inc. (120), Perdue Farms, Inc. (119), and Daikin Applied (107). Median job posting duration for these companies lasted

between 29 to 62 days. Daikin Applied had the longest median posting duration (62 days) and Perdue Farms, Inc. had the shortest median posting duration (29 days).

Table 9: Top Companies in the Central Sub-Region Posting Manufacturing Positions

Company	Unique Postings Dec 2018-Dec 2019	Median Posting Duration Dec 2018-Dec 2019
Merck & Co., Inc.	360	36 days
LSC Communications, Inc.	120	35 days
Perdue Farms Inc.	119	29 days
Daikin Applied	107	62 days
Packaging Corporation of America	101	38 days
Masonite International Corporation	82	37 days
McKee Foods Corporation	78	39 days
Graphic Packaging Holding Company	73	52 days
Schlosser Forge Company	72	56 days
Pilgrim's Pride Corporation	68	36 days
The Coca-Cola Company	56	53 days
Tenneco Inc.	56	54 days
The Hershey Company	49	59 days
Cintas Corporation	48	40 days
Riddleberger Brothers, Inc.	46	53 days

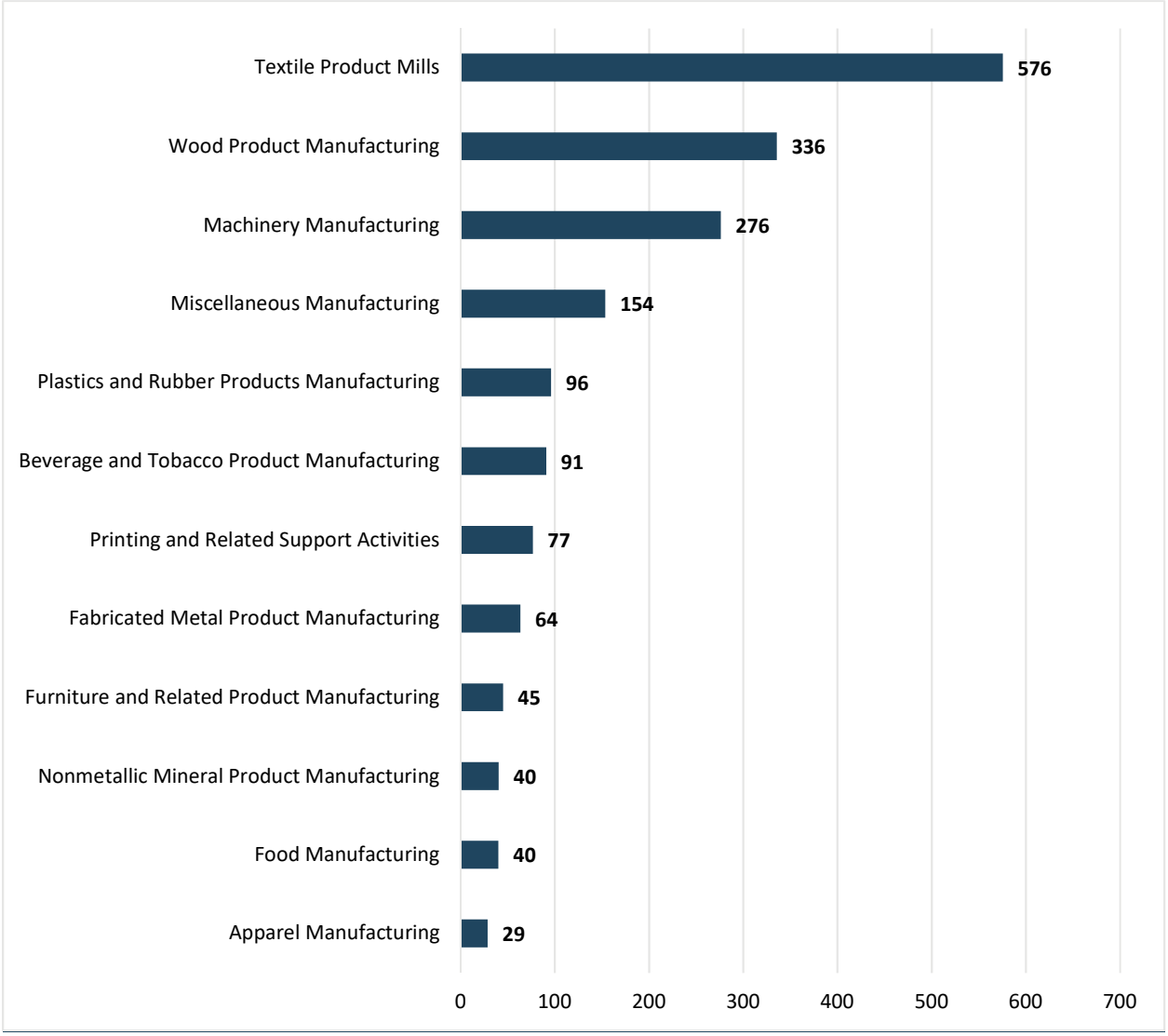
Source: Emsi 2019.3; Virginia Employment Commission, Economic Information Services

Southern Sub-Region

With 1,828 jobs, the Southern Sub-Region has less manufacturing jobs than the Northern and Central Sub-Regions, respectively. The top three manufacturing sub-sectors in the sub-region, Textile Product Mills (576 jobs), Wood Product Manufacturing (336 jobs), and Machinery Manufacturing (276 jobs), have experienced a decline in jobs over the last five years and all three are projected to continue that decline into 2023. Machinery Manufacturing, which experienced the greatest decline in manufacturing jobs over the last five years, has the second-highest average annual earnings among manufacturing sub-sectors in the Central Sub-Region at $76,217. Only Beverage and Tobacco Product Manufacturing added more than 30 jobs since 2013, however Printing and Related Support Activities is the only manufacturing sub-sector projected to add more than 30 jobs over the next five years.

Most of the manufacturing sub-sectors in the Southern Sub-Region have an LQ above 1.25. Textile Product Mills has the largest LQ of any manufacturing sub-sector in any sub-region at 44.29.

Figure 5: Manufacturing Employment in the Southern Sub-Region at the 3-Digit NAICS Level



Source: Emsi 2019.3

The top 15 companies in the Southern Sub-Region with the most manufacturing job postings from December 2018 to December 2019 are listed in Table 10. The number of manufacturing job postings in the Southern Sub-Region was less than in the Northern and Central Sub-Regions, but the amount of time the job posting remained unfilled was also less than the Northern and Central Sub-Region, with the exception of postings by Advanced Drainage Systems, Inc., which had a median posting duration of 74 days. Between December 2018 and December 2019, Mohawk Industries, Inc. had the most manufacturing job postings (71), followed by Modine Manufacturing Company (46), Munters Corporation (21), The Sherwin-Williams Company (18), and Advanced Drainage Systems, Inc. (17). Median job posting duration for these top 15 companies lasted between 5 to 74 days. Raytheon Company had the shortest time duration for jobs being filled.

Table 10: Top Companies in the Southern Sub-Region Posting Manufacturing Positions

Company	Unique Postings Dec 2018-Dec 2019	Median Posting Duration Dec 2018-Dec 2019
Mohawk Industries, Inc.	71	51 days
Modine Manufacturing Company	46	57 days
Munters Corporation	21	14 days
The Sherwin-Williams Company	18	38 days
Advanced Drainage Systems, Inc.	17	74 days
Schwan's Company	16	33 days
Anheuser-Busch Companies, Inc.	16	29 days
The Mohawk Manufacturing Company	12	39 days
Everbrite, LLC	11	29 days
Lockheed Martin Corporation	11	45 days
Packaging Corporation of America	10	33 days
Hobby Lobby Stores, Inc.	10	14 days
Raytheon Company	9	5 days
Stella-Jones Corporation	9	34 days
The Coca-Cola Company	8	34 days

Source: Emsi 2019.3; Virginia Employment Commission, Economic Information Services

Occupational Analysis

The top occupations within the manufacturing sector in the Shenandoah Valley Region include Assemblers and Fabricators, All Other, Including Team Assemblers (1,572 jobs); Meat, Poultry, and Fish Cutters and Trimmers (1,267 jobs); Packaging and Filling Machine Operators and Tenders (1,252 jobs); and First-Line Supervisors of Production and Operating Workers (1,213 jobs). Among the top twenty manufacturing occupations, four have experienced a decline in jobs over the last five years: Assembler and Fabricators, All Other, Including Team Assemblers; Meat, Poultry, and Fish Cutters and Trimmers; Helpers—Production Workers; and Slaughters and Meat Packers. Slaughterers and Meat Packers experienced the greatest decline in jobs from 2013 to 2018 (123) followed by Helpers—Production Workers (117). Food Batchmakers was the only manufacturing occupation to add over 200 jobs over the last five years and is projected to add 86 jobs by 2023.

Projections over the next five years indicate that Assemblers and Fabricators, All Other, Including Team Assemblers will experience the greatest decline in jobs (117) compared to Packaging and Filling Machine Operators and Tenders which is projected to add the most jobs (116).

Median hourly earnings for the top twenty manufacturing occupations range from $12.34 for Packers and Packagers, Hand to $44.02 for General and Operations Managers.

Table 11: Top 20 Manufacturing Occupations in the Shenandoah Valley at the 5-Digit SOC Level

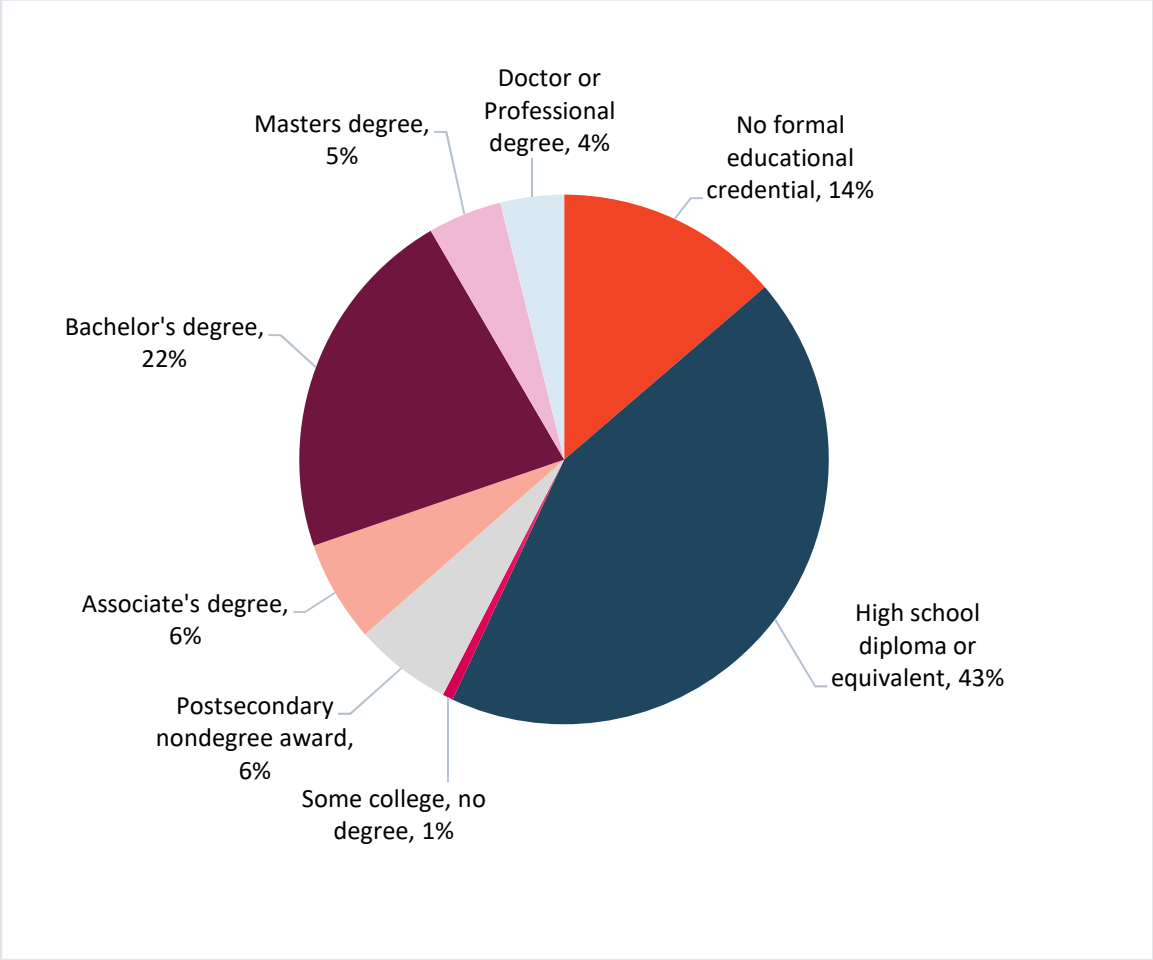
Description	2018 Jobs	'13-'18 % Change	'18-'23 % Change	Median Hourly Wage
Assemblers and Fabricators, All Other, Including Team Assemblers	1,572	(6.2%)	(7.4%)	$14.28
Meat, Poultry, and Fish Cutters and Trimmers	1,267	(2.8%)	(7.8%)	$14.00
Packaging and Filling Machine Operators and Tenders	1,252	16.2%	9.3%	$16.44
First-Line Supervisors of Production and Operating Workers	1,213	10.7%	4.7%	$28.12
Laborers and Freight, Stock, and Material Movers, Hand	1,011	18.4%	4.8%	$13.91
Industrial Machinery Mechanics	878	26.3%	7.3%	$24.28
Inspectors, Testers, Sorters, Samplers, and Weighers	831	16.2%	0.6%	$18.14
Food Batchmakers	777	59.2%	11.1%	$15.00
Helpers--Production Workers	675	(14.8%)	2.5%	$13.85
Heavy and Tractor-Trailer Truck Drivers	655	18.2%	2.1%	$18.71
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	634	8.2%	5.4%	$28.73
Slaughterers and Meat Packers	599	(17.0%)	(7.0%)	$14.24
Maintenance and Repair Workers, General	563	4.5%	4.6%	$17.78
Industrial Truck and Tractor Operators	557	7.1%	5.2%	$16.53
Printing Press Operators	542	2.5%	1.8%	$18.80
Shipping, Receiving, and Traffic Clerks	514	16.0%	2.9%	$15.32
General and Operations Managers	461	2.7%	6.7%	$44.02

Packers and Packagers, Hand	448	(16.1%)	6.0%	$12.34
Office Clerks, General	416	5.1%	(1.4%)	$14.59
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	391	34.4%	1.0%	$16.58

Source: Emsi 2019.3

An analysis of occupations within the manufacturing sector at the 5-Digit SOC level reveals that over half of those occupations do not require an education beyond a high school diploma or even a formal educational credential. Only 6% of manufacturing occupations in the region require either a postsecondary nondegree award or an Associate's degree. Nearly one-third of those occupations require a four-year degree and beyond. Because a significant percentage of manufacturing occupations do not require some type of educational attainment beyond a high school diploma, some on-the-job training is required for workers to successfully complete their job safely and effectively.

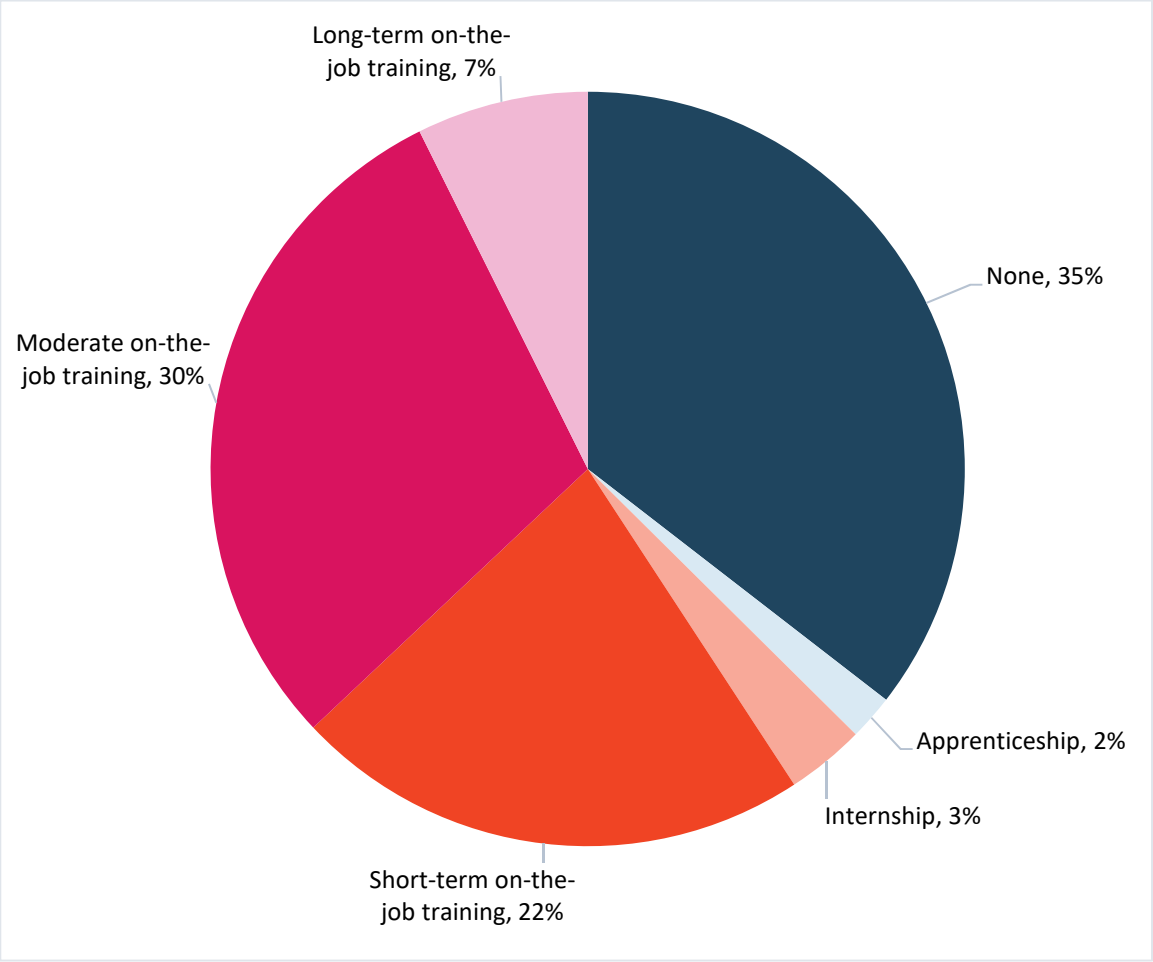
Figure 6: Typical Entry-Level Education for All Manufacturing Occupations in the Shenandoah Valley Region



Source: Emsi 2019.3

Nearly 60% of all manufacturing occupations in the Region require some level of on-the-job training whether it is short-term, moderate-term, or long-term. Only 5% of manufacturing occupations require an internship or apprenticeship, however, 35% do not require any form of on-the-job training.

Figure 7: Typical On-the-Job Training for All Manufacturing Occupations in the Shenandoah Valley Region



Source: Emsi 2019.3

Job Posting Analytics

From December 2018 to December 2019, the Shenandoah Valley Region had 5,578 manufacturing job postings with an overall median job posting duration lasting 36 days. Table 12 shows the top companies in the Shenandoah Valley Region with the most manufacturing job postings from December 2018 to December 2019. Merck & Co., Inc. had the greatest number of manufacturing job postings throughout those thirteen months (364) and had a median posting duration of 36 days, which matches that of the region. Following Merck & Co., Inc. are American Woodmark Corporation (228 postings), Thermo Fisher Scientific Inc. (176 postings), LSC Communications, Inc. (157 postings), and Packaging Corporation of America (150 postings).

The median posting duration of these top 20 companies ranged from 33 days (LSC Communications, Inc.) to 62 days (Daikin Applied). Other companies with shorter than average posting durations include Perdue Farms, Inc. (31 days), LSC Communications, Inc. (33 days), and Newell Brands, Inc. (35 days).

Table 12: Top Companies in the Shenandoah Valley Region Posting Manufacturing Positions

Company	Unique Postings Dec 2018-Dec 2019	Median Posting Durations Dec 2018-Dec 2019
Merck & Co., Inc.	364	36 days
American Woodmark Corporation	228	61 days
Thermo Fisher Scientific Inc.	176	54 days
LSC Communications, Inc.	157	33 days
Packaging Corporation of America	150	38 days
HP Hood LLC	133	54 days
Perdue Farms Inc.	126	31 days
Quad/Graphics, Inc.	121	37 days
Masonite International Corporation	110	37 days
Newell Brands Inc.	109	35 days
Daikin Applied	107	62 days
The Coca-Cola Company	85	51 days
Riddleberger Brothers, Inc.	79	53 days
McKee Foods Corporation	78	39 days
Graphic Packaging Holding Company	73	52 days
Schlosser Forge Company	72	56 days
Mohawk Industries, Inc.	71	51 days
Pilgrim's Pride Corporation	68	36 days
Monoflo International, Inc.	61	40 days
Builders Firstsource, Inc.	59	37 days

Source: Emsi 2019.3, Virginia Employment Commission, Economic Information Services

Data collection from Emsi and the Virginia Employment Commission identified the top manufacturing job postings by SOC code as identified in Table 13. In the Shenandoah Valley Region, the greatest number of manufacturing job postings by occupation include First-Line Supervisors of Production and Operating Workers (353), Industrial Engineers (334), Heavy and Tractor-Trailer Truck Drivers (271), Maintenance and Repair Workers, General (184), and Stock Clerks and Order Fillers (167).

Table 13: Top Manufacturing Job Occupations Posted in the Shenandoah Valley Region

Occupation	Number of Postings
First-Line Supervisors of Production and Operating Workers	353
Industrial Engineers	334
Heavy and Tractor-Trailer Truck Drivers	271
Maintenance and Repair Workers, General	184
Stock Clerks and Order Fillers	167
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	145
Helpers--Production Workers	115
Automotive Service Technicians and Mechanics	111
Industrial Production Managers	104
Production Workers, All Other	100
Customer Service Representatives	99
Packaging and Filling Machine Operators and Tenders	94
Laborers and Freight, Stock, and Material Movers, Hand	92
Retail Salespersons	90
Computer User Support Specialists	77
Industrial Truck and Tractor Operators	75
Industrial Machinery Mechanics	73
First-Line Supervisors of Retail Sales Workers	62
First-Line Supervisors of Office and Administrative Support Workers	62
Computer Occupations, All Other	59

Source: Emsi 2019.3, Virginia Employment Commission, Economic Information Services

Rather than a focus on the jobs by SOC code, Table 14 identifies the top manufacturing jobs in the Shenandoah Valley by job titles. Job posting data is collected by Emsi and the Virginia Employment Commission to identify the job titles listed in manufacturing job postings. Commercial Driver's License (CDL) Drivers was the most common manufacturing job title listed in job openings (170). While this job is not a strictly manufacturing-only job, it demonstrates the high demand employers have for CDL Drivers, including within the manufacturing industry.

Other common manufacturing job titles in the Shenandoah Valley Region include Maintenance Mechanics (118), Sales Representatives (105), Production Supervisors (102), and Retail Sales Associates (93).

Table 14: Top Manufacturing Job Titles in the Shenandoah Valley Region

Manufacturing Job Titles	Number of Postings
Commercial Driver's License (CDL) Drivers	170
Maintenance Mechanics	118
Sales Representatives	105
Production Supervisors	102
Retail Sales Associates	93
Machine Operators (Production)	91
Maintenance Technicians (Installation, Maintenance, and Repair)	87
Truck Drivers	79
Press Operators	57
Material Handlers (Transportation and Material Moving)	57
Quality Assurance Engineers (Architecture and Engineering)	56
Customer Service Representatives (Office and Administrative Support)	51
Warehouse Workers (Office and Administrative Support)	46
Forklift Operators	46
Route Sales Representatives	46
Project Managers (Management)	42
General Labor Operations Workers	42
Production Managers (Production)	39
Production Workers	38
Design Engineers (Architecture and Engineering)	36

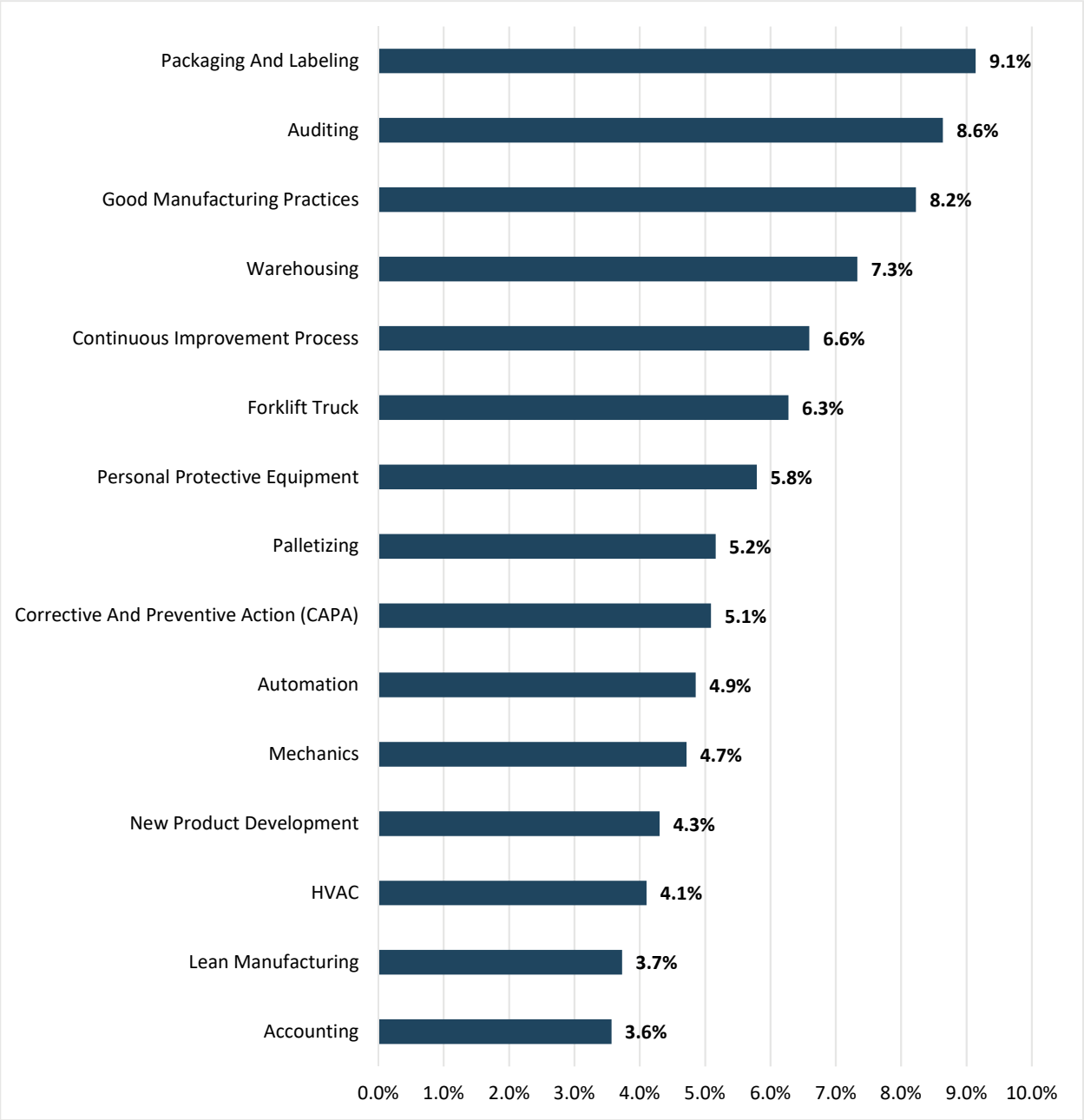
Source: Emsi 2019.3, Virginia Employment Commission, Economic Information Services

Harvesting data from online job postings can provide an indication of the skills that manufacturers are seeking. It must be emphasized that while job postings data are helpful for providing a snapshot of demand for certain skill sets, it is an imperfect tool since job postings themselves are typically highly concentrated in a small number of fields. Hence, job postings data have inherent biases toward fields where online recruitment is the primary mode of finding new workers.

Figure 8 lists the top manufacturing hard, or technical, skills found in job postings in the Shenandoah Valley Region. Packaging and Labeling was the most common manufacturing hard skill in job postings (9.1%), followed by Auditing (8.6%), Good Manufacturing Practices[4] (8.2%), and Warehousing (7.3%).

[4] Good Manufacturing Practices or GMP refers to an adherence to regulations set forth by the U.S. Food and Drug Administration that require manufacturers to ensure that their products are safe, pure, and effective.

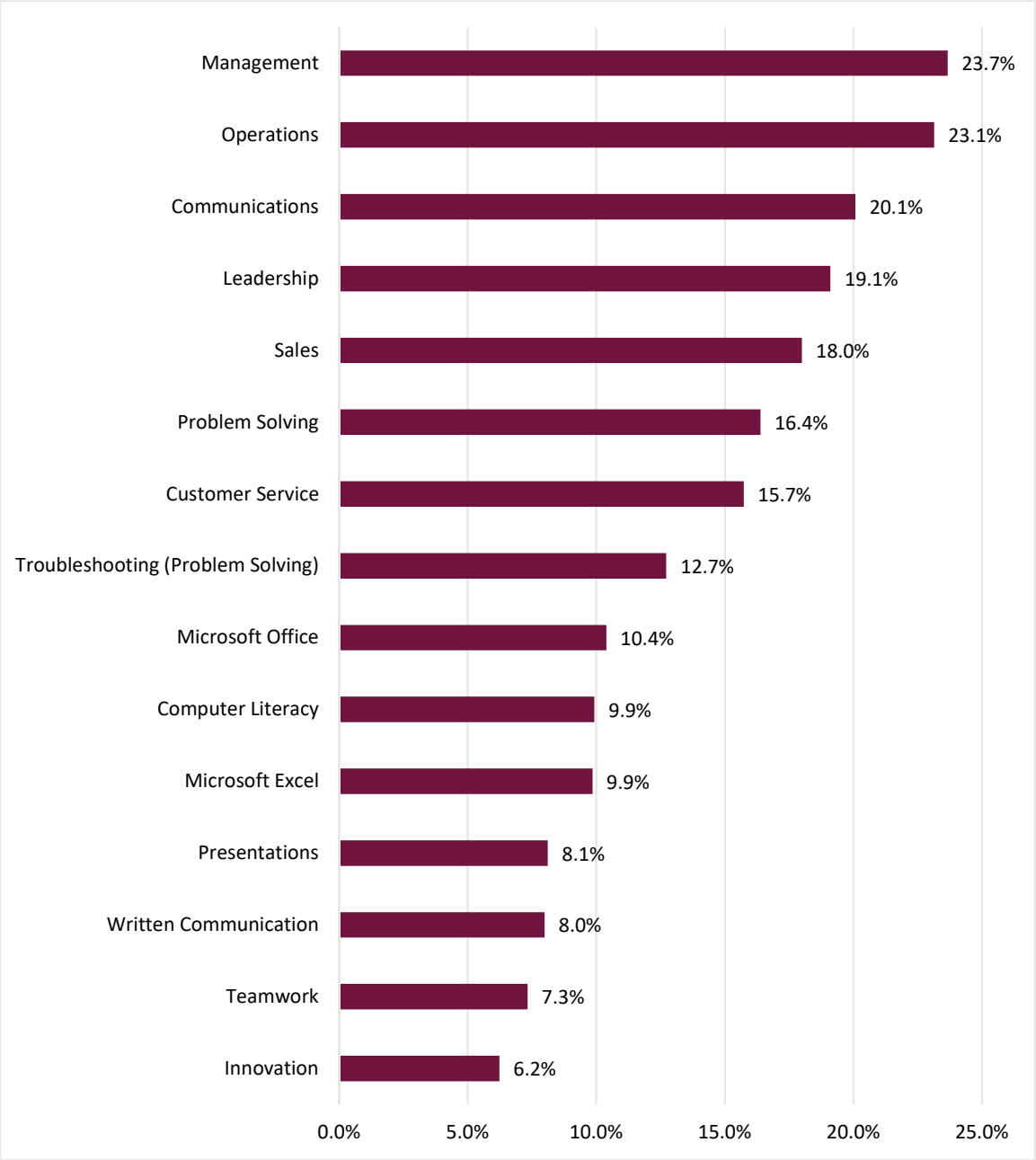
Figure 8: Frequency of Top Manufacturing Hard Skills in Job Postings



Source: Emsi 2019.3

Figure 9 lists the frequency of top common skills in manufacturing job postings in the Shenandoah Valley Region. The most frequent common manufacturing skills in job postings include Management (23.7%), Operations (23.1%), Communications (20.1%), Leadership (19.1%), and Sales (18.0%).

Figure 9: Frequency of Top Manufacturing Common Skills in Job Postings



Source: Emsi 2019.3

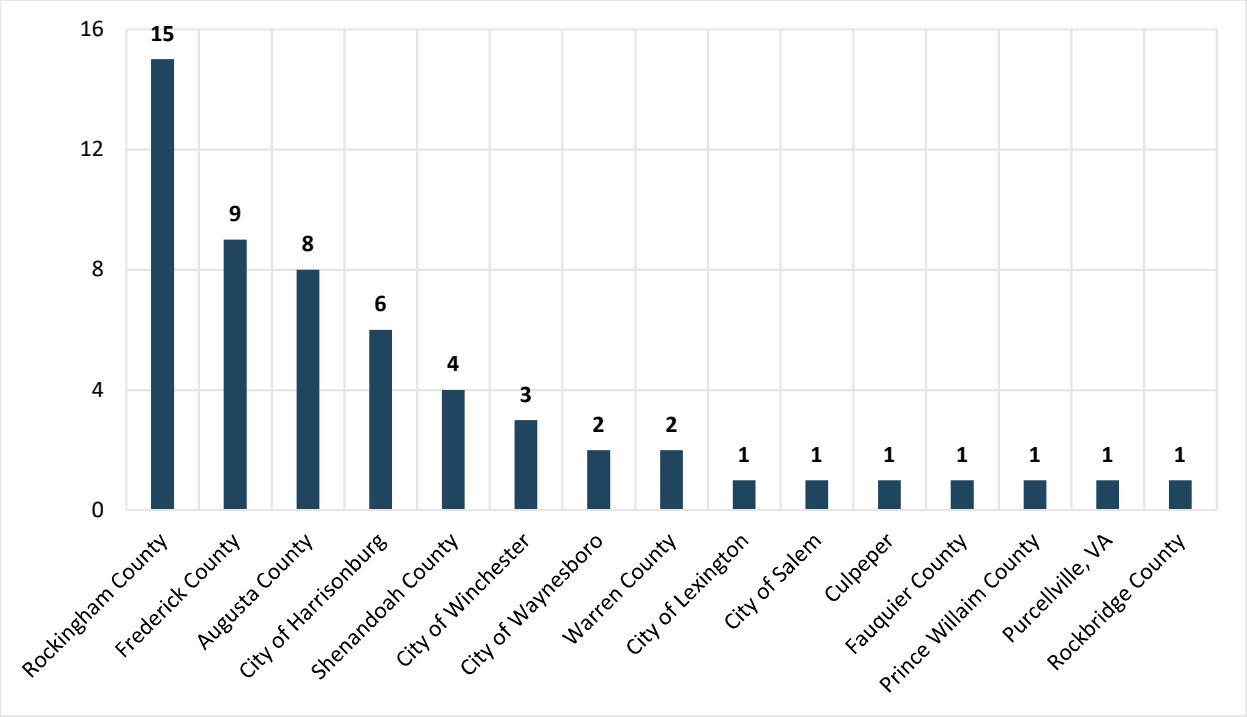
MANUFACTURER SURVEY ANALYSIS

An electronic survey was distributed by the SVWDB to 145 manufacturers across the Shenandoah Valley to identify challenges facing manufacturers in the region, including skill shortages, hiring concerns, employer needs, work-based learning opportunities, and partnership potential with education and training partners.[5] The survey was sent to manufacturing representatives who were either in a leadership position (CEO, President, Vice-President), or those directly involved in the hiring process (Human Resources, Hiring Managers). The survey remained open for 30 days and three reminder emails were sent by SVWDB after week 1, 2, and 3 to encourage participation.

Background Information

A total of 56 manufacturers completed the survey.[6] When asked the primary location of their organization within the Shenandoah Valley region, the most common response among survey participants identified Rockingham County (15), followed by Frederick County (9), Augusta County (8), and the City of Harrisonburg (6).

Figure 10: Primary Location of Respondent's Manufacturing Organization



Participants were asked to identify the type of manufacturing that best represents their organization's line of work. The top manufacturing sub-sectors that were identified were Fabricated Metal Product Manufacturing (13), Food Manufacturing (5), and Plastics and Rubber

[5] Although 145 emails were sent to manufacturers, five emails returned undeliverable. A copy of the survey may be found in Appendix A.

[6] TPMA gleaned the data and removed responses that did actually begin the survey, but rather opened it, which is counted as a survey participant. The total number of responses removed was 7.

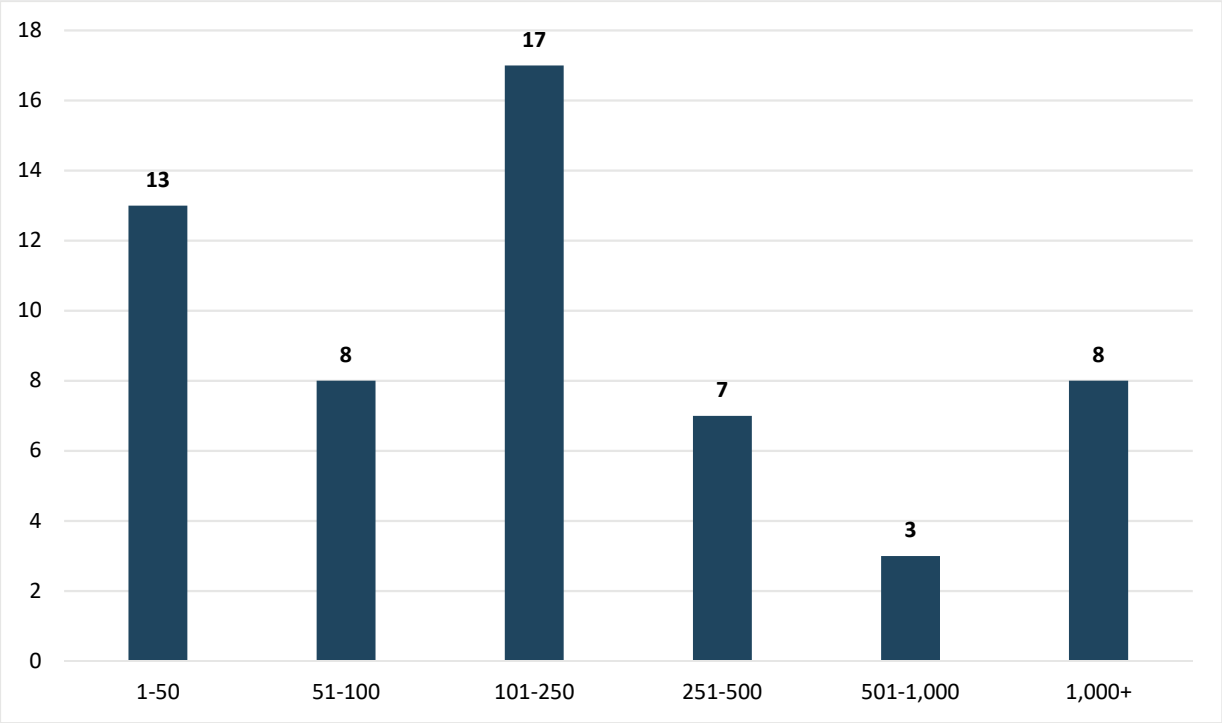
Products Manufacturing (5). The option "Other" was selected by nineteen participants and included manufacturing sub-sets or related industries such as construction, composite manufacturing, manufacturing maintenance, or manufacturing contractors.

Table 15: Types of Manufacturing Identified by Respondents

Manufacturing	Count
Fabricated Metal Product Manufacturing	13
Food Manufacturing	5
Plastics and Rubber Products Manufacturing	5
Transportation Equipment Manufacturing	4
Electrical Equipment, Appliance, and Component Manufacturing	3
Printing and Related Support Activities	3
Wood Product Manufacturing	3
Beverage and Tobacco Product Manufacturing	2
Primary Metal Manufacturing	2
Computer and Electronic Product Manufacturing	1
Chemical Manufacturing	1
Furniture and Related Product Manufacturing	1
Paper Manufacturing	1
Other	19

About two-thirds of manufacturers who completed the survey employ a workforce of less than 250. Thirteen manufacturers employ a workforce of 1-50, eight employ 51-100, seventeen employ 101-250, seven manufacturers employ 251-500, three employ 501-1,000, and eight employ a workforce of over a thousand. Fabricated Metal Product Manufacturing and Plastics and Rubber Products Manufacturing accounted for the greatest number of responses for organizations employing a full-time staff of 101-250 employees, the most common response. Less than a quarter of respondents identified employing a full-time workforce of 1-50 employees. Those manufacturers stem from Beverage and Tobacco Product Manufacturing, Fabricated Metal Product Manufacturing, Food Manufacturing, Paper Manufacturing, and Furniture and Related Product Manufacturing, and Wood Product Manufacturing.

Figure 11: Number of Full-Time Staff Employed



Respondents were also asked if they employed a part-time staff. Thirty-two respondents said they do hire a part-time staff and of those respondents, thirty employ a total workforce of 1-50, one employs 51-100, and one employs more than 1,000.

Figure 12: Most Pressing Workforce Issues Overall

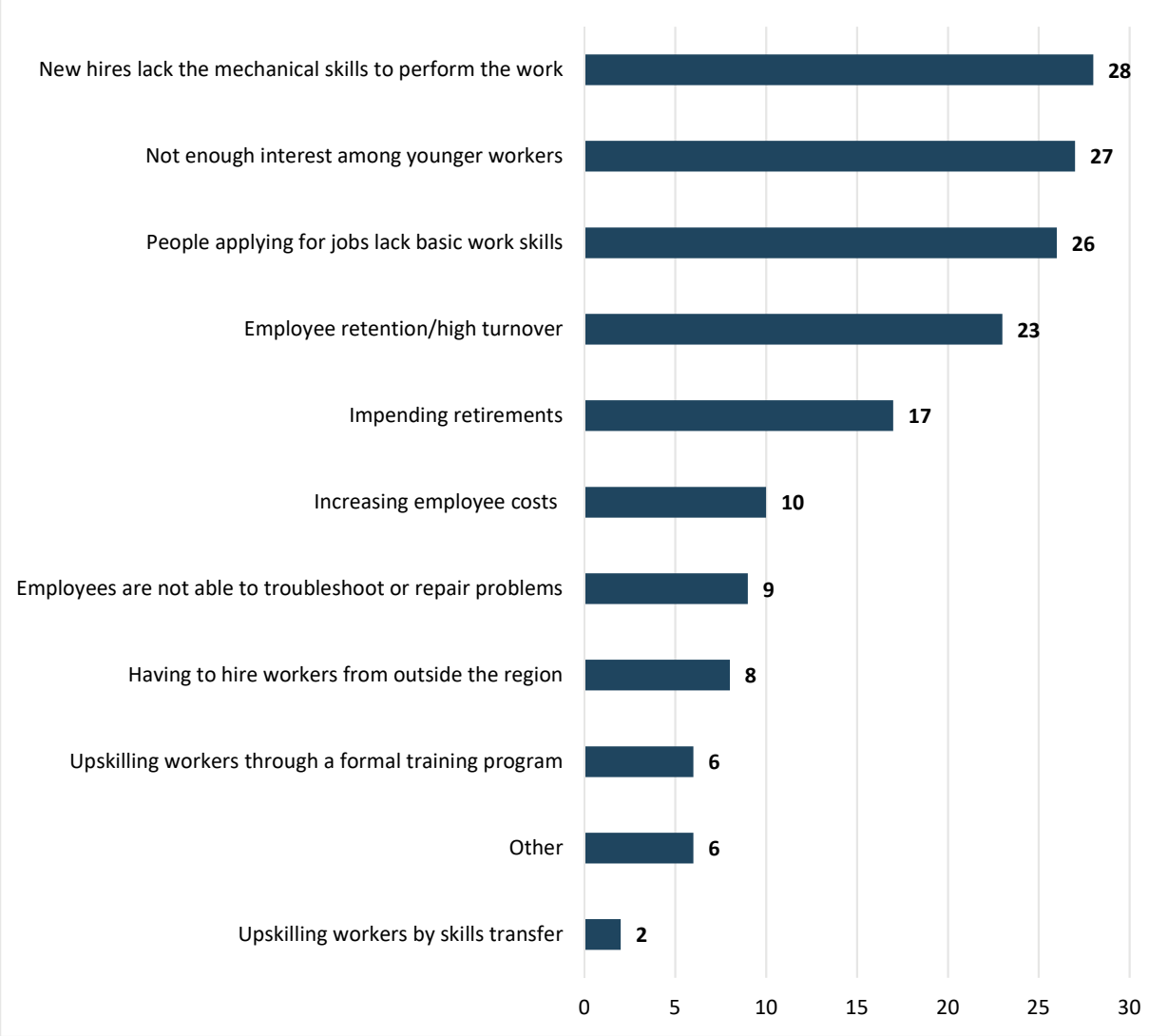


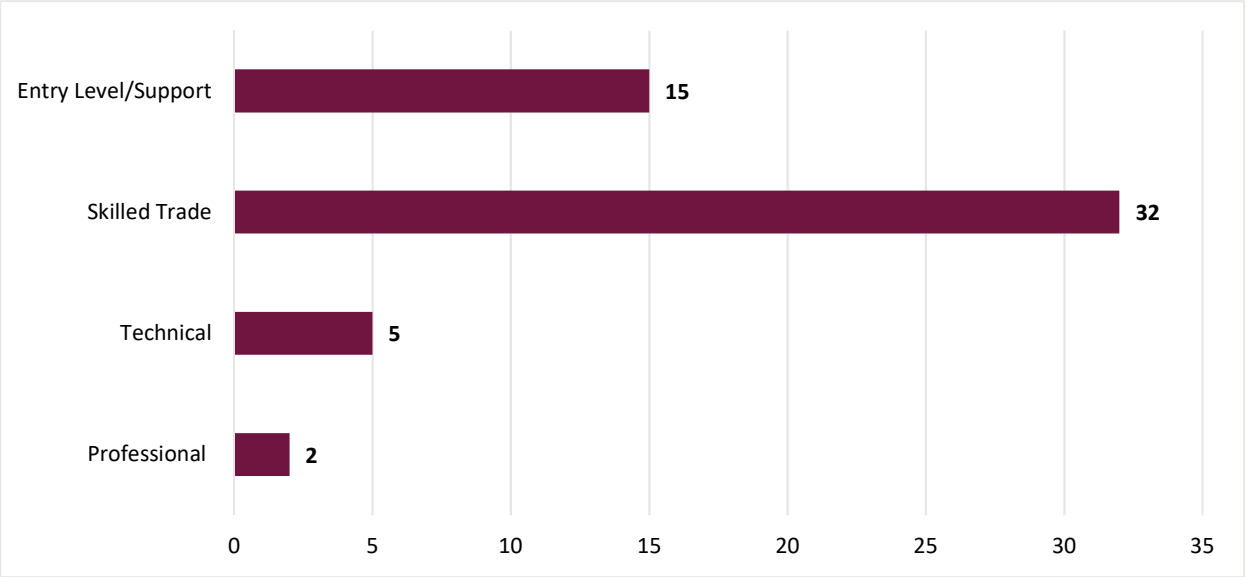
Figure 12 represents the most pressing issues manufacturers face regarding their workforce. The lack of mechanical skills and basic work skills (soft skills) were among the most commonly selected issues by respondents. Perhaps what is more indicative is the number of respondents who cited a lack of interest among younger workers (27) and impending retirements (17). The pipeline for talent in manufacturing is weakened, not only by the missing skills necessary to perform the work, but also by a lack of interest by those who could backfill the positions of aging workers who are anticipated to retire in the coming years.

Selections for "Other" included lack of experienced skilled workers and inability to show up consistently for work.

Hiring, Recruiting, and Retaining

Participants identified Skilled Trade positions as the most difficult to fill – more than all other position types combined. Entry-Level/Support positions collected half as many responses with 15, followed by Technical positions (5) and Professional positions (2).

Figure 13: Position Type Most Difficult to Fill



In short-answers, respondents identified the following specific positions that are hardest to fill.[7]

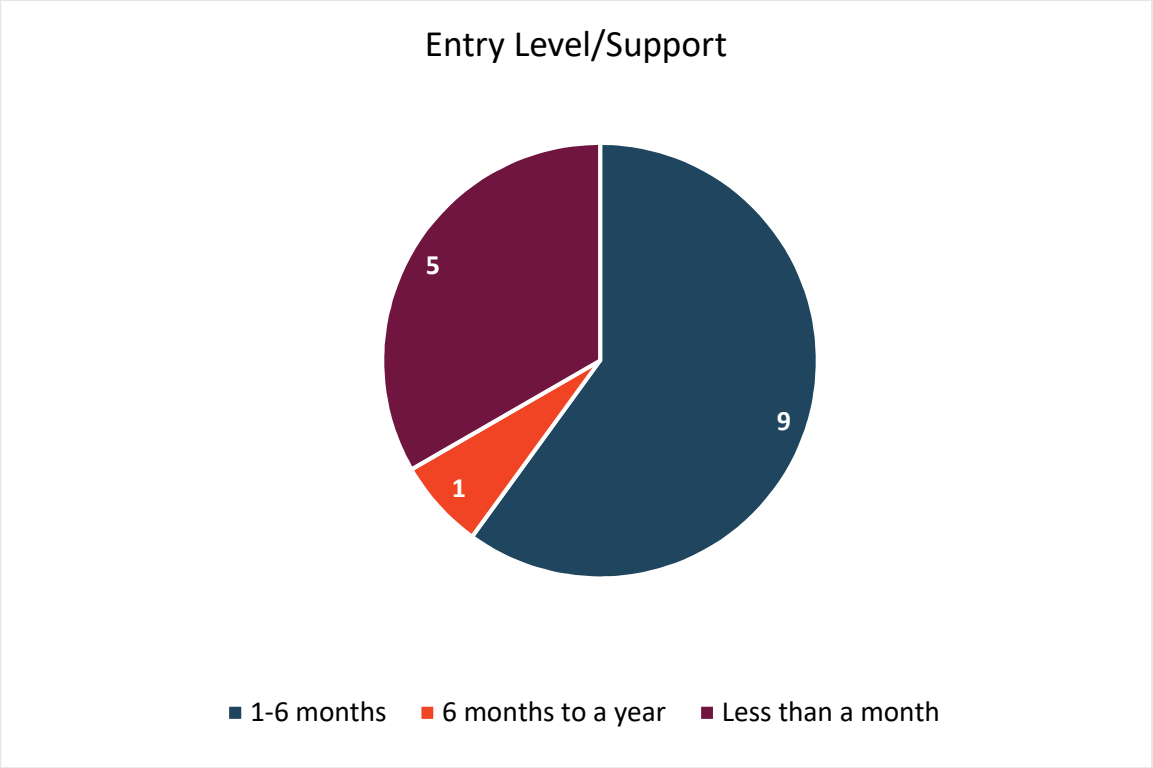
Table 16: Top Hardest To Fill Positions By Position Type

Entry Level/Support	Skilled Trade	Technical	Professional
Light Equipment Operator (5)	Electrician (8)	Engineers (3)	Management (3)
Operator (3)	Maintenance (7)	Operators (3)	Electrician (1)
Production (2)	Welder (7)	Others (1)	

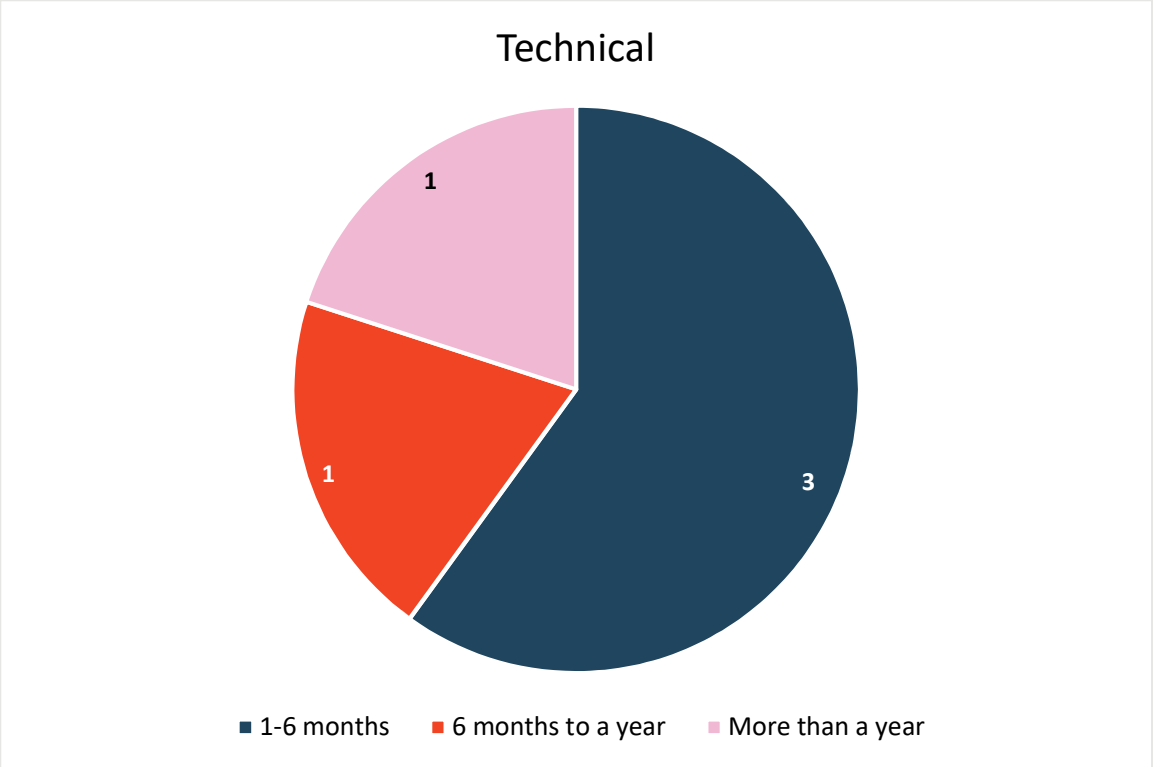
In most cases, it takes 1-6 months to fill all position types (entry level/support, skilled trade, technical, and professional). For Entry Level/Support positions, one-third of respondents noted that it takes less than a month to fill those positions. In comparison, only 6% of Skilled Trade positions get filled in that time frame.[8]

[7] A full list of the hardest to fill positions by position type can be viewed in Appendix A.
[8] Technical Positions and Professional Positions did not garner any counts for taking less than 1 month to fill positions.

Figure 14 Typical Time to Fill Positions By Position Type[9]



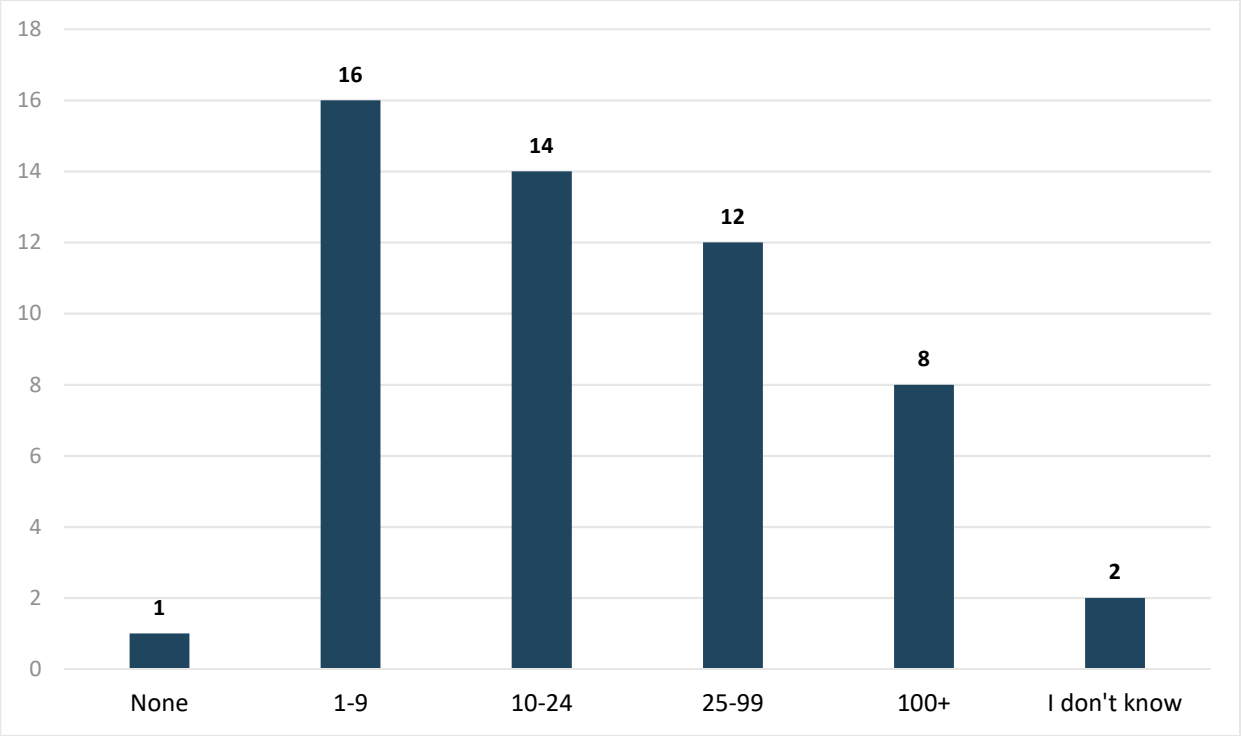
[9] Professional Positions are not included in this figure because they only yielded two responses: 1-6 months (1), and 6 months to a year (1).



The graphs in Figure 14 reveal that most talent is recruited and hired within six months or less. As indicated in Figure 12, employee retention/high turnover continues to be one of the most pressing issues overall manufacturers face.

The number of new employees that are hired annually range between 1-99 among respondents. Most employers who participated in the survey hire between 1-9 employees annually, followed by 10-24 employees and 25-99 employees. Eight respondents hire more than 100 employees annually.

Figure 15: Number of New Employees Hired Annually



From a list of 14 employability skills, the skills identified as difficult or very difficult to find by the greatest percentage of respondents included Critical Thinking (89%), Dependability and Reliability (85%), Problem Solving (77%), and Initiative (74%).[10] Employability skills that garnered the highest percentage of easiest to find or easy to find responses included Drug-Free (21%), Teamwork (15%), Customer-Centric (12%), Communication (12%), and Adaptability (12%). Customer Centric received the greatest percentage share of neither easy nor difficult to find (65%), followed by Teamwork (59%), Integrity (59%), and Communication (56%).

[10] Survey participants were asked to identify the top three technical skills that are most difficult to find when hiring. TPMA compiled the results and categorized the findings.

Figure 16: Ranking of Employability Skills That Are Most Difficult to Find

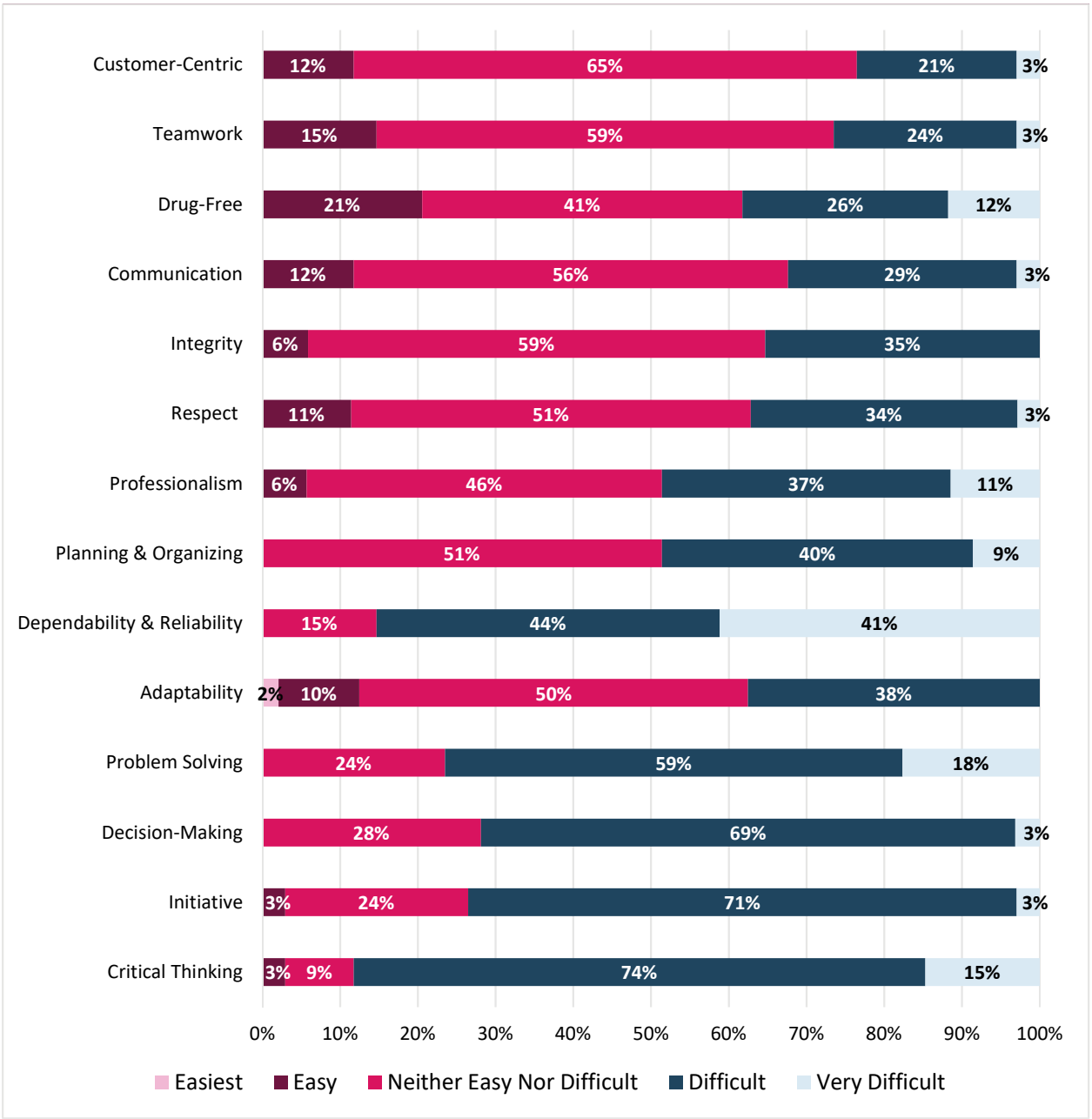
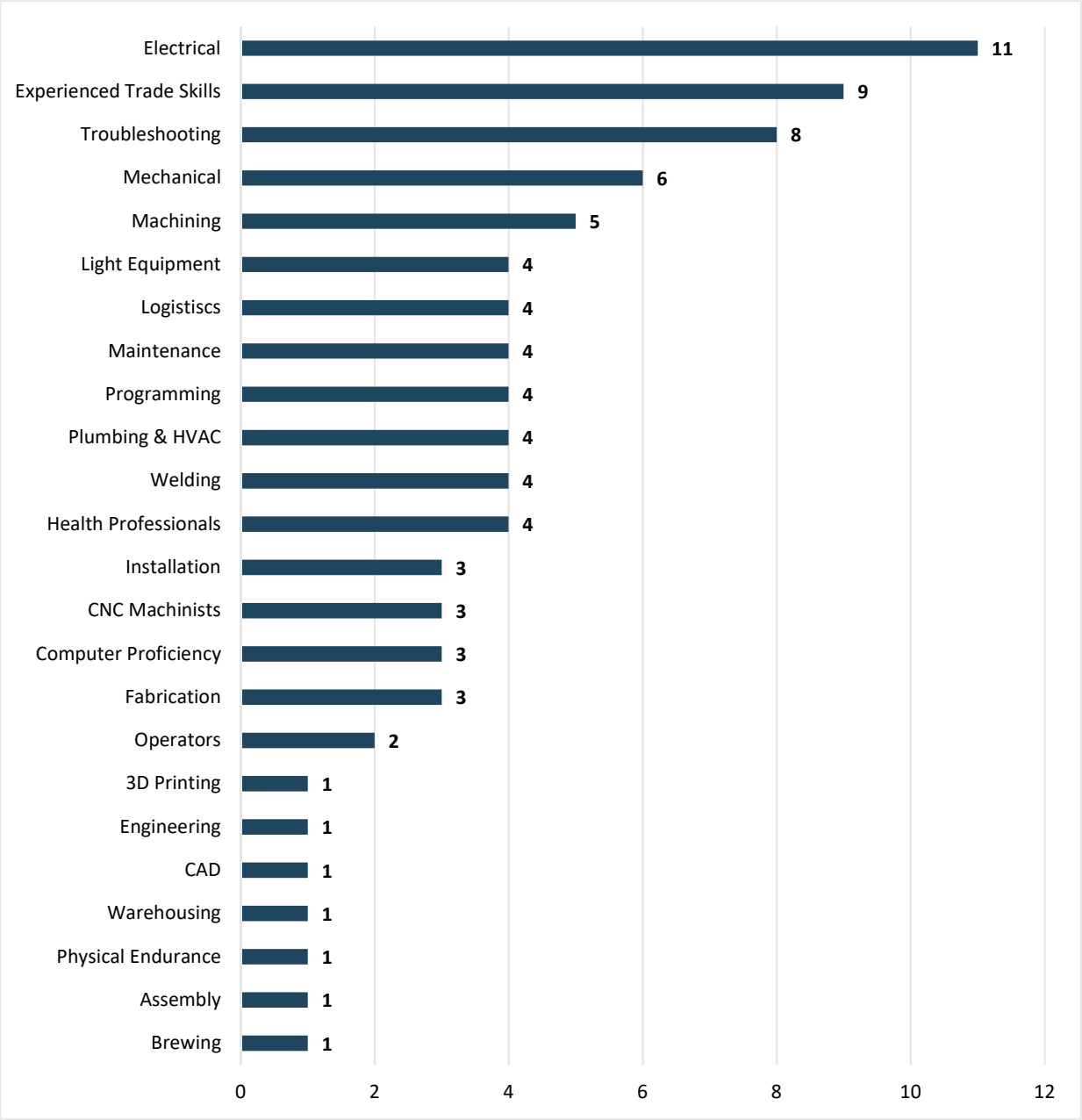


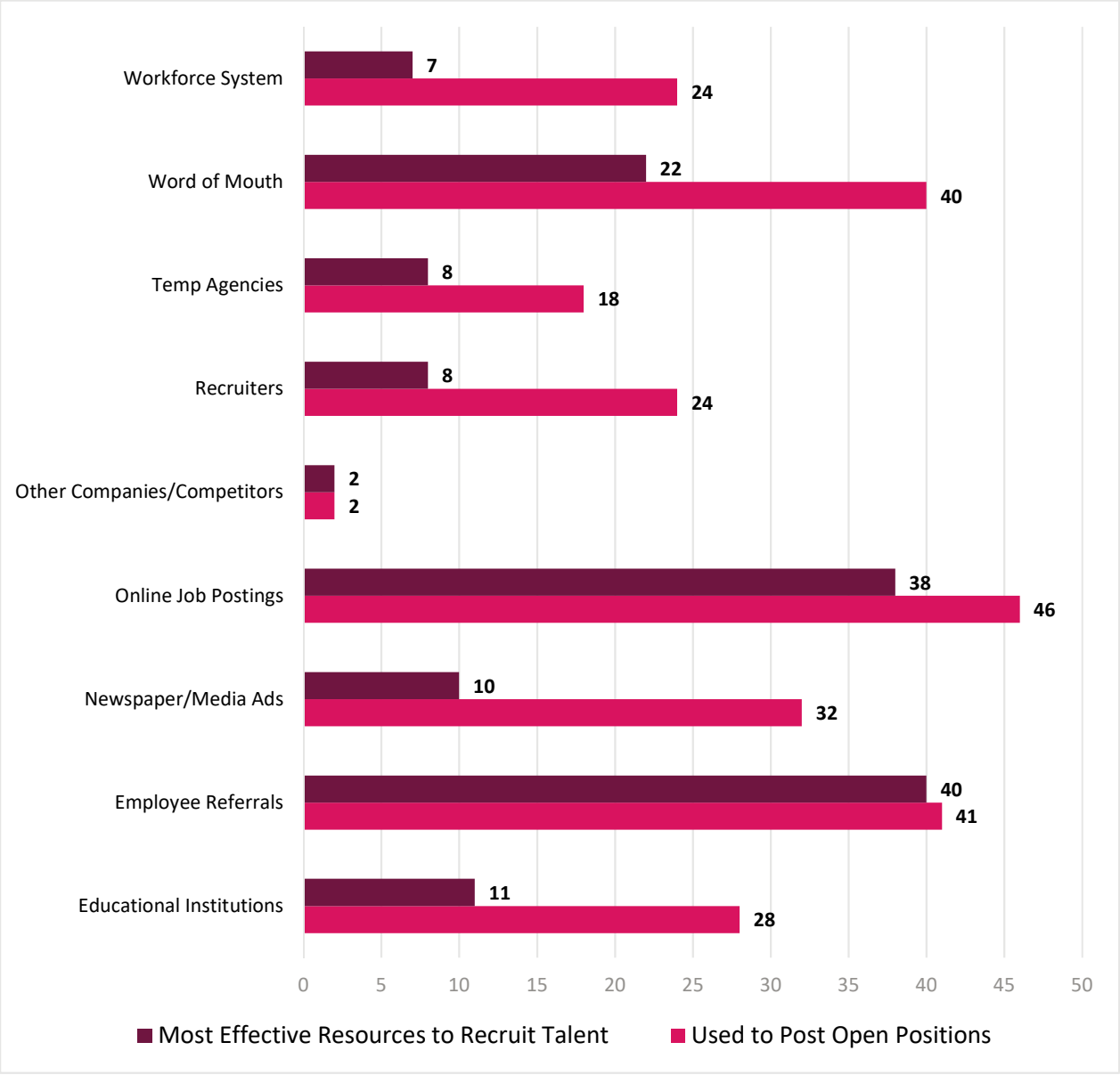
Figure 17: Top Technical Skills Most Difficult to Find When Hiring



Respondents use a variety of resources to post open positions within their company. The most commonly used resources are Online Job Postings (46), Employee Referrals (41), and Word of Mouth (40). These resources were also the most effective at recruiting talent. The graph in Figure 18 shows the resources most commonly used compared to their relative effectiveness. Some of the greatest differences in resources used versus those most effective include

Workforce System (24/7), Newspaper/Media Ads (32/10), Educational Institutions (28/11), and Recruiters (24/8).[11]

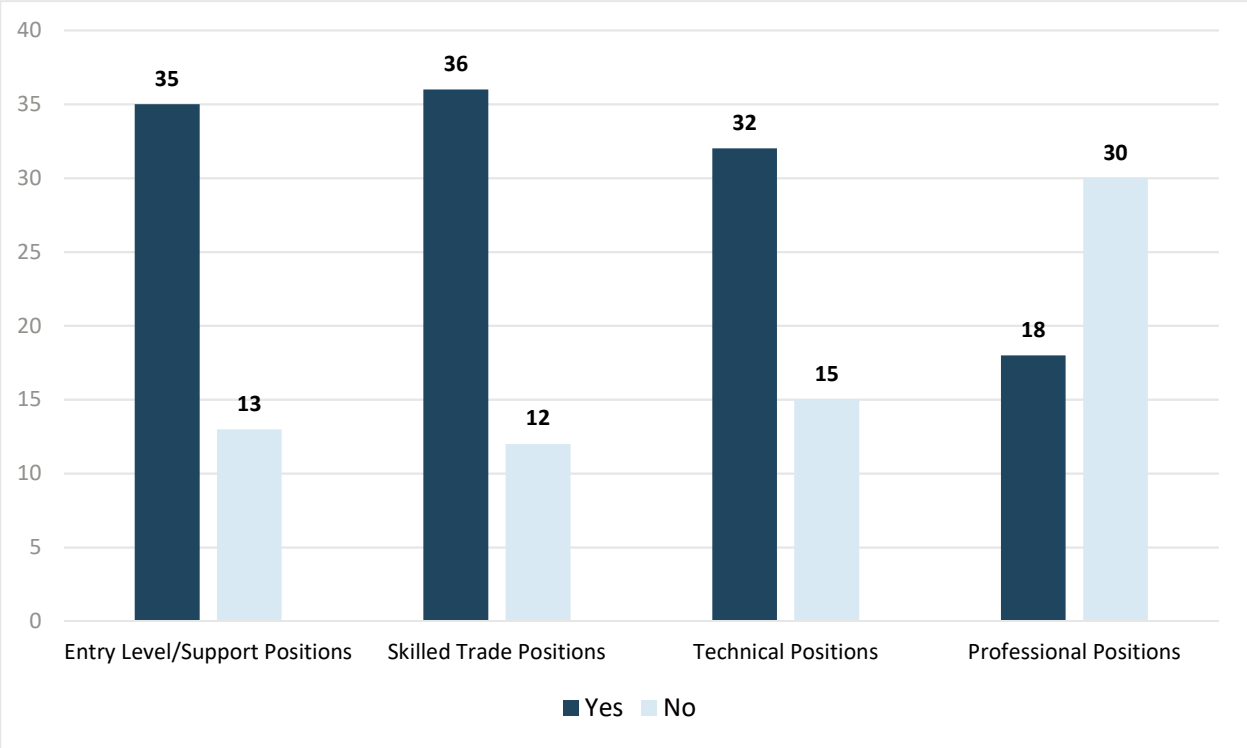
Figure 18: Comparison of Resources Used To Recruit Talent and Their Effectiveness



The retention of talent is an issue among respondents across position types, with the exception of Professional positions. Entry Level/Support positions, Skilled Trade positions, and Technical positions received comparable responses in terms of retention challenges, but with Professional positions, those challenges decline among respondents.

[11] The survey did not define "Workforce System." The definition of the workforce system was more defined and discussed in focus groups with manufacturers, which is detailed further in this report.

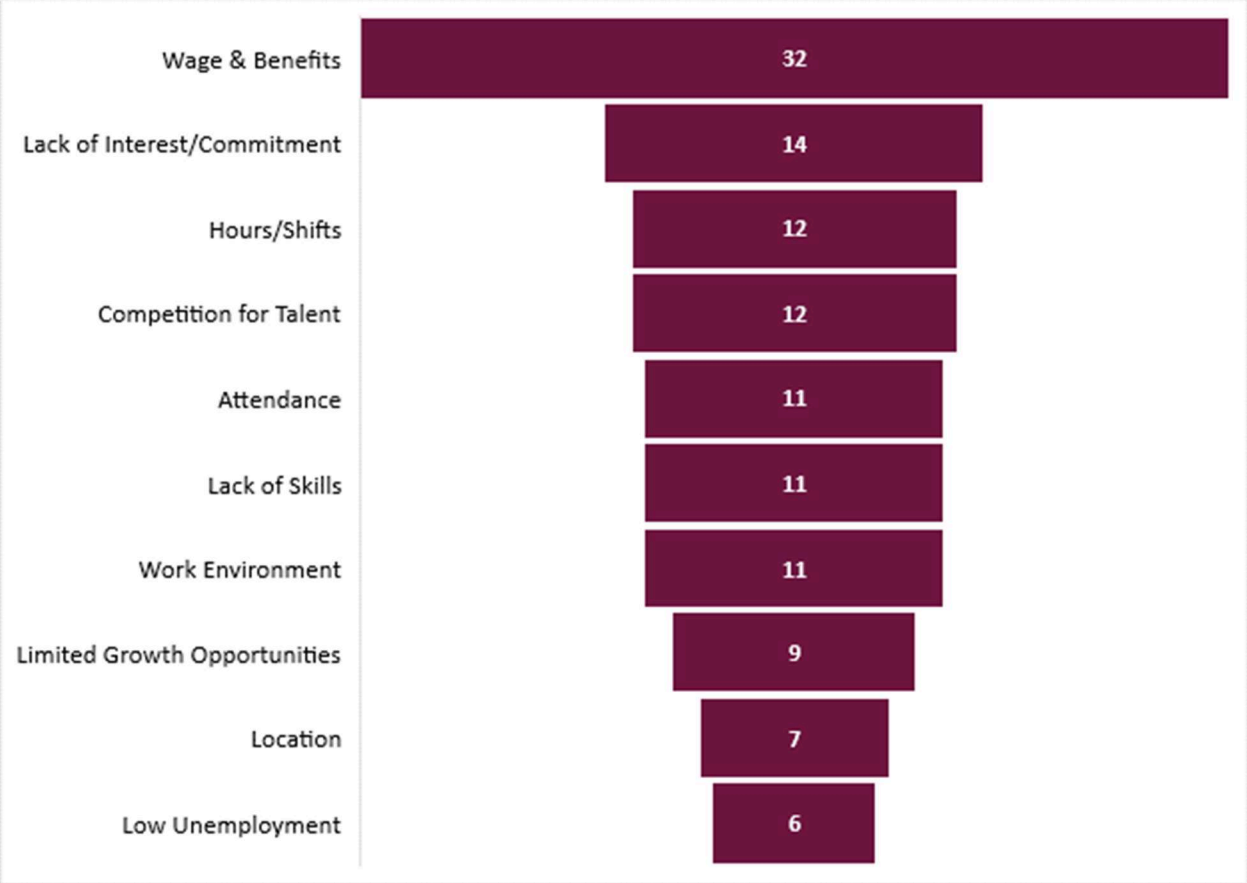
Figure 19: Retainment Difficulty by Position Type



The top factors identified in the survey contributing to the difficulty of retaining talent are wage and benefits (32), lack of interest/commitment (14), hours/shift (12), competition for talent (12), attendance (11), lack of skills (11), and work environment (11).[12] In comparison to Figure 12: Most Pressing Issues Overall, the lack of mechanical and basic skills were among the most selected issues by respondents and Increasing employee costs were in the middle. Although these may be pressing issues overall, employee wage and benefits are the main factors to talent leaving.

[12] Survey participants were asked to identify the top three factors contributing to the difficulty of retaining talent. TPMA compiled the results and categorized the findings.

Figure 20: Top Factors Contributing to the Difficulty of Retaining Talent

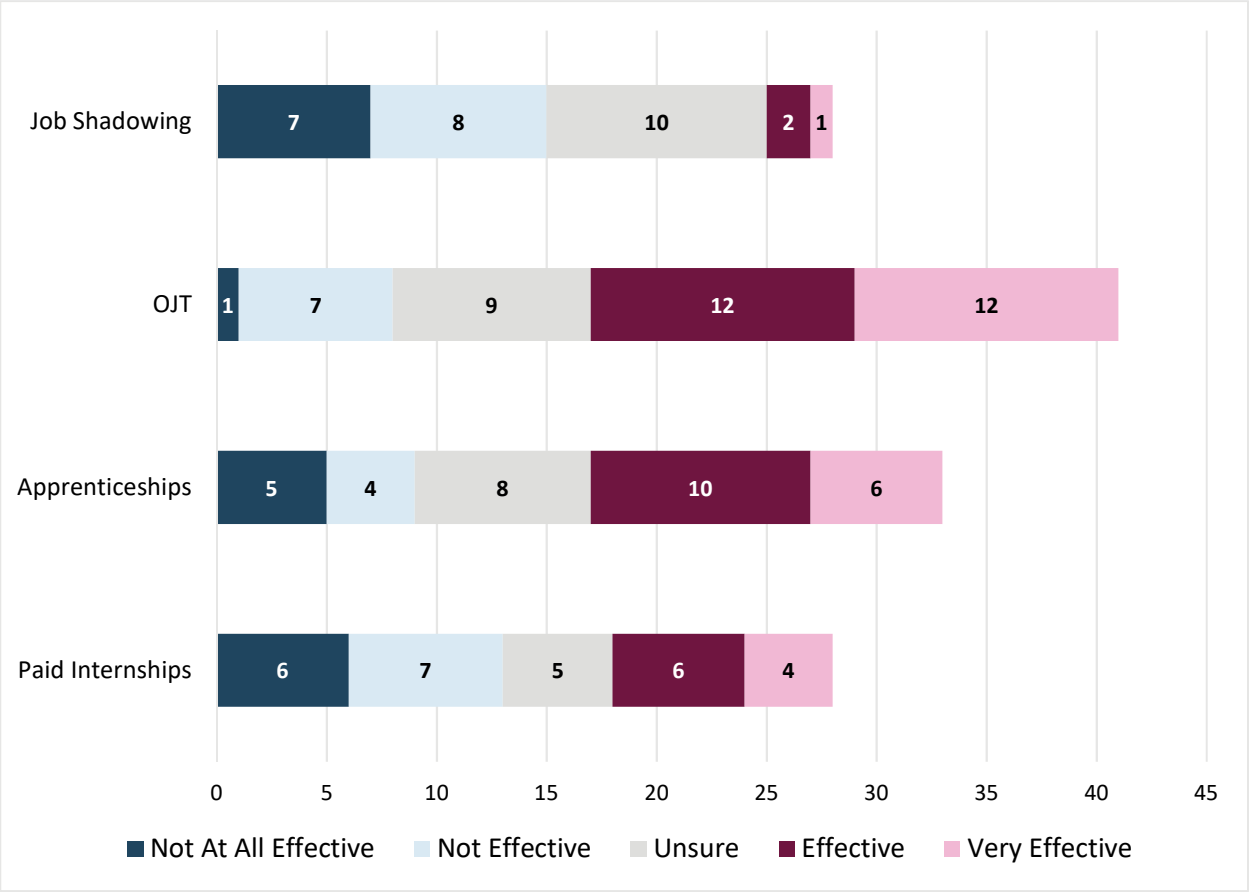


Training Talent

Work-based learning programs are offered by manufacturers in the region. On-the-Job Training is offered by 36% of respondents, followed by Apprenticeships (28%), Paid Internships (19%), and Job Shadowing (16%). Two respondents selected "Other" which included career exploration and mentorship opportunities. Career and Technical Education (CTE) Providers were identified as the most common partners for work-based learning programs, followed by 2-Year Educational Institutions (21%), Adult Education (AE) Providers (18%), High Schools (16%), and 4-Year Educational Institutions.

The level of effectiveness for these work-based learning programs vary.

Figure 21: Work-Based Learning Program Effectiveness



On-the-Job Training was identified as the most commonly effective work-based learning program, with 24 respondents identifying it as either effective or very effective. Job Shadowing was most commonly rated not effective or not at all effective, and also received the greatest number of unsure responses. Paid Internships was the only work-based learning program that received almost the same number of effective and not effective responses (10 and 13, respectively).

In order to improve some of the work-based learning programs that manufacturers offer, respondents indicated a need for improved, formalized training programs with capital to support and sustain them. 86% of respondents offer some type of education/training program for career advancement. Those programs include tuition reimbursement (29%), access to training/education programs (28%), classroom training (on- or off-site) (24%), and leadership or management training (19%).

Workforce Succession

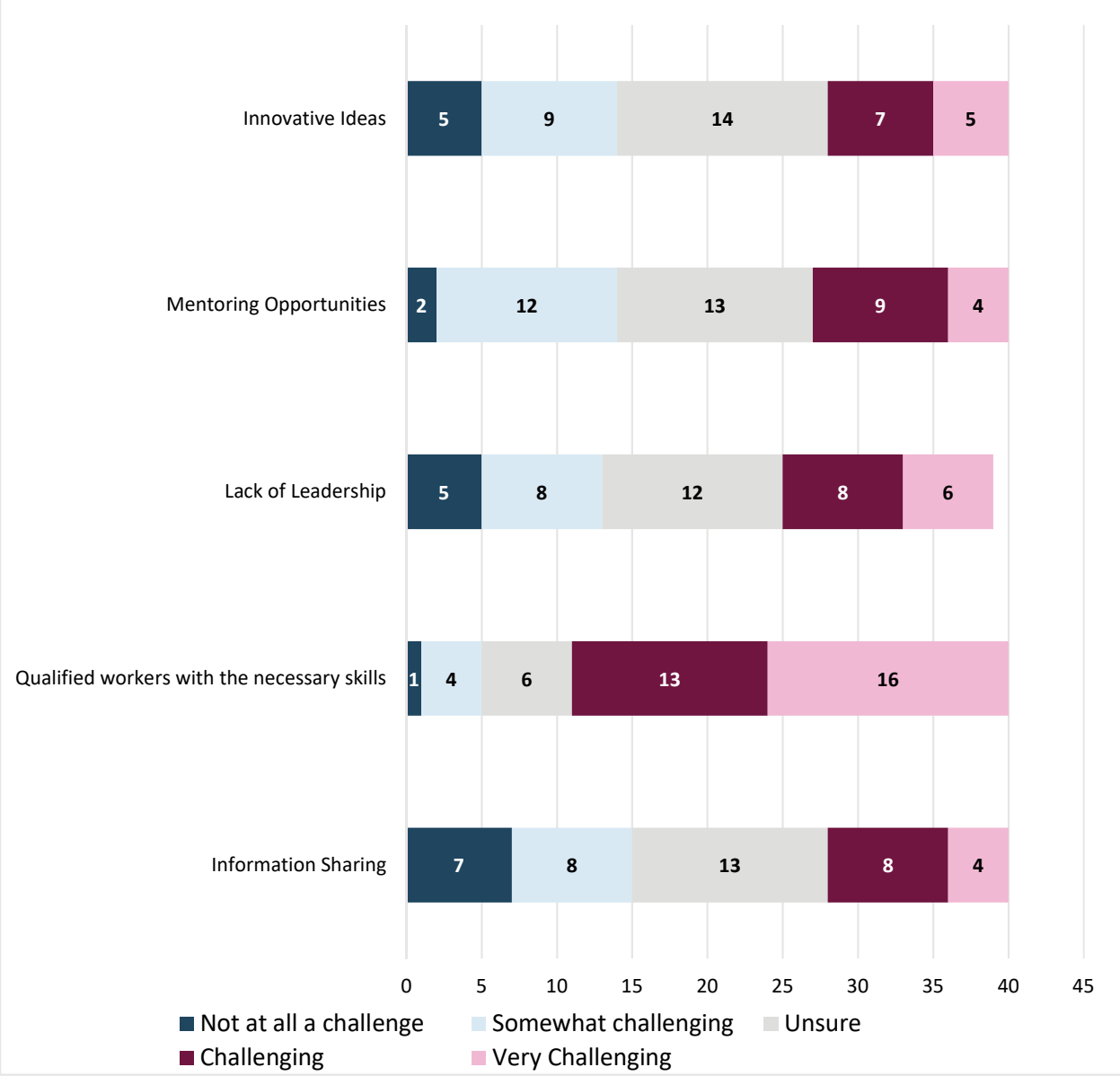
A portion of individuals will reach retirement age in the next 10-15 years. As cited previously in Table 1, 13.6% of the Region's population is between the ages of 55-64.[13] Out of 44 survey

[13] Emsi 2019.3

respondents, 26 have started to create a plan to prepare for the exiting workforce. Those plans include cross-training of staff for knowledge sharing, identifying and hiring future leaders, and formalizing a succession plan.

The greatest challenge faced by respondents is finding qualified workers with the necessary skills to replace those exiting the workforce. Other challenges include lack of leadership, mentoring opportunities, innovative ideas, and information sharing.

Figure 22: Challenges Faced by Employers from Exiting Workforce Due to Retirement



Some of the more specific positions that respondents indicated will be hard-to-fill as retirements occur include Management (21), Skilled & Experienced Workers (17), Maintenance (11), Logistics/Shipping & Receiving (6), and Engineers (6).[14]

Table 17: Hardest-To-Fill Positions of Those Exiting the Workforce Due to Retirement

Management (21)	Skilled and Experienced Workers (17)
Maintenance (11)	Other (8)
Logistics/Shipping & Receiving (6)	Engineers (6)
Service & Sales (5)	Accountants/Clerical Staff (4)
Technicians (4)	Electricians (4)
Machine Operators (4)	Welders (3)
HVAC & Plumbing (2)	Mechanics (2)
Tool & Die Makers (2)	

[14] Survey participants were asked to identify the top three hardest-to-fill positions of those exiting the workforce. TPMA compiled the results and categorized the findings.

FOCUS GROUP SUMMARY

To gain a better understanding of the specific needs of manufacturers by sub-region (Northern, Central, Southern), three (3) focus groups were facilitated with a small subset of manufacturers over the course of two days. These engagement activities were designed to supplement and validate the findings from the survey. Each focus group lasted approximately 90 minutes and centered on three topic areas: Talent Attraction, Development, and Retention; Work-Based Learning Opportunities; and Best Practices. A full list of focus group questions can be found in Appendix B: Focus Group Questions.

Talent Attraction, Development, and Retention

Talent recruitment strategies identified in focus groups mirror some of those identified in the survey: local newspapers, social media (e.g., Facebook, LinkedIn, etc.), word-of-mouth, referrals from co-workers to family and friends, online job search platforms (Indeed, CareerBuilder, Craigslist), temp agencies, radio advertisements, and billboards. Some of the most effective talent recruitment resources often include referrals and billboards, especially in more rural areas of the region; however, manufacturers have become more intentional with their recruitment efforts based on the position type and the region's demographics. Because the region has multi-cultural populations, manufacturers have targeted community centers, churches, and Spanish-speaking radio stations to recruit talent. Several manufacturers in attendance cited success with these types of efforts, but the challenge has been the lack of talent readily available in the region.

One of the greatest challenges facing talent recruitment is the lack of people in the region. Manufacturers in attendance were in agreement that a shortage of people – not just talent – is a strong contributor to recruitment obstacles. Additionally, the ongoing trend of "stealing talent" from one another has made it even more difficult to recruit and retain talent and has forced employers to increase wages.

In the focus groups, there was not agreement over the easiest-to-fill positions. Some manufacturers in attendance cited unskilled labor as the easiest-to-fill position whereas other manufacturers in attendance indicated challenges with hiring unskilled labor. The most common challenges identified in focus groups were failing to pass a background check or drug screening. A lack of interest in these positions is also a common challenge for talent recruitment. Participants stated that skilled talent is scarce as many workers in the region do not possess the technical skills required. Manufacturers have attempted to address that issue by hiring talent that are driven and reliable and providing on-the-job training to obtain those technical skills. Engineers are the hardest-to-find skilled talent, but others include machinists, tool and die makers, CDL drivers, welders, fabricators, maintenance, and CNC operators. Inside sales representatives were also identified as hard-to-fill positions. Recruiting managerial or professional positions have typically been the most difficult position type to fill according to focus group attendees. It is not uncommon for manufacturers to hire a recruiter to find talent, which is often from out-of-state.

Manufacturers expressed a need for a talent attraction initiative. There are jobs available, but not enough persons to fill them. The challenge has been not only recruiting talent to their

companies, but also attracting talent to the Shenandoah Valley. Manufacturers cited regional assets that make the Shenandoah Valley a desirable place to live, including quality school systems, safety, outdoor leisure activities, and historical trails. However, availability of affordable housing has been a barrier for talent recruitment by some manufacturers in the Region.

By leveraging the resources available through the workforce development system, manufacturers can alleviate some of the hiring challenges they often experience. Only half of those who participated in the focus groups partner with or utilize services from Virginia Career Works – Shenandoah Valley Region. Those who do engage with the career center have relied on front-line staff to help them with talent recruitment, job fairs, and training grants. Also, they have worked with SVWDB staff to support their registered apprenticeship programs, including the Valley 2 Virginia (V2V) American Apprenticeship Initiative grant. Some manufacturers have leveraged services from workforce partners, namely the Virginia Department of Aging and Rehabilitative Services (DARS) for referrals and Virginia Employment Commission (VEC) for recruiting events.

Manufacturers acknowledge that a considerable number of their workforce are expected to retire in the next three to five years, but preparations for that exiting workforce have not been formalized by many manufacturers. Most of the knowledge-sharing, off-boarding practices have been informal and not documented. As several manufacturers explained, the knowledge-sharing practices typically include new, younger talent job-shadowing for 4-6 weeks. One manufacturer has created a mentorship program where workers who have retired, or are soon-to-retire, are paired with young talent for several weeks to help guide their use of equipment and skills and to share lessons learned. This strategy has been successful, though pairing personalities has been key to ensuring information is given and absorbed effectively. One manufacturer that participated in a focus group has begun taking the steps of documenting a tutorial guide. They anticipate video recording experienced workers on how to perform certain jobs.

Cross-training experienced workers with inexperienced workers has been achieved due in part to the fact that these soon-to-retire workers have an affinity towards the work. Some workers have opted to work part-time instead of full retirement to ensure knowledge is shared with their replacement. These workers are accommodating to employers because they realize replacement talent is scarce. Manufacturers indicated that there is a sharp contrast between the passion and commitment of experienced workers and young talent. Most younger workers do not take as much pride in manufacturing as older workers, which has become a barrier to recruiting and retaining talent in the industry.

Work-Based Learning

Manufacturers who participated in the focus groups were aware of the benefits registered apprenticeship programs offered to talent as well as employers. Of the twenty focus group participants, less than half were registered apprenticeship sponsors. The conversational focus then shifted to understand why manufacturers were not yet registered apprenticeship sponsors, especially after acknowledging the return on investment they provide to their labor pool.

Many of those manufacturers cited the state of the economy as a primary reason for not becoming a sponsor. With low unemployment in the Region, Commonwealth, and nation, the number of available talent in the labor pool is limited and the demand for talent is high. These manufacturers are more concerned with filling job openings first, then training talent versus training talent as a registered apprenticeship sponsor.

Some manufacturers from the focus groups have considered becoming a registered apprenticeship sponsor but cite time commitment and capacity as primary concerns. These manufacturers do not have staff available to manage the apprenticeship program, however there is a misunderstanding of what it takes to become a registered apprenticeship sponsor. Front-line staff from the Virginia Career Works – Shenandoah Valley Region are available to assist manufacturers specifically with this process – a resource not completely known to these manufacturers. Instead, these manufacturers have created their own type of work-based learning programs (i.e., internships, mentorships, and job shadowing). Enrollment for these work-based learning programs have typically been 1-4 students annually.

Manufacturers from the focus groups who were registered apprenticeship sponsors offered programs in industrial maintenance, industrial manufacturing technician, machinist, fabricator, and electrician. The greatest benefit identified by those who do sponsor registered apprenticeship programs has been the ease of recruiting and retaining apprentices after they complete the program. These workers feel a sense of loyalty to the company and have developed personalized relationships with co-workers. As noted earlier, a barrier to retaining younger talent in the industry has been the lack of commitment and interest compared to experienced workers. Sponsoring registered apprenticeship programs has started to address this barrier. These workers have an appreciation toward the company and its willingness to train them, and as a result, have a working knowledge on that company's particular equipment. Rather than migrating outside of the Region for employment in manufacturing, these workers have the opportunity for employment with a local manufacturer who has committed to up-skilling them and investing in their professional future.

Focus group attendees indicated that a challenge for enrollment in work-based learning programs has been eliminating the stigma tied to manufacturing. One manufacturer has begun internal discussions around externships with teachers to introduce them to the reality of the industry versus the perception. Garnering understanding, support and buy-in from parents is also part of those internal discussions. Manufacturers realize parents want their child to attend a 4-year university in order to secure a high-paying job, but the reality is that those jobs exist in manufacturing – and they do not always require a four-year degree. Informing both parents and teachers of the manufacturing workplace environment, in-demand skills, educational and training requirements, and potential earnings helps employers promote manufacturing as an appealing industry that is in search of local talent.

Best Practices

Manufacturers shared best practices their company has considered or implemented in an effort to recruit and retain talent. One manufacturer considered offering vacation-matching as a way to attract experienced workers. These workers often accumulate a significant amount of paid

time off from their long tenure with a company and do not want to risk losing those earned days off for a new career opportunity. This manufacturer has considered matching those vacation days in addition to their company's own benefits package.

Some manufacturers have targeted recruiting of women, but childcare has been a barrier to overcome. In an effort to address these challenges, subsidized or on-site childcare options have been considered.

The Shenandoah Valley residents have an affinity toward outdoor recreational activities that are available throughout the region. Manufacturers acknowledge this and have considered modifying the work schedule to reflect the industry's busy and slow times of business as well as work/life balance. Though in its early stages, a couple manufacturers have scaled back to four-day work weeks during the slow business season, which runs concurrent with hunting season. Early signs of this change have shown an increase in worker morale and more commitment during busy season.

Table 18: Focus Group Key Takeaways by Sub-Region

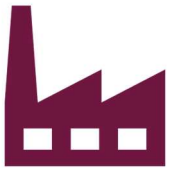
Northern Sub-Region	Central Sub-Region	Southern Sub-Region
• Best recruitment strategies include word-of-mouth and referrals • Recruits passing a drug test has been the greatest barrier to recruitment • Most in-demand positions include control engineers, welders, sales, fabricators, and CNC operators • Retention not a major challenge • Training performed in-house and by vendors • Basic math skills and knowing how to read a tape measure are the top missing technical skills • Knowledge-sharing practices are typically informal cross-training • Participation in WOW (Worlds of Work) and have had great success • Many apprenticeships are performed in-house • Have considered modifying work schedule to attract new talent • Significant need for soft skills development and training at high school level	• Referral programs are the best recruitment strategies • Co-ops and internships with Virginia Tech and James Madison University • Talent will jump jobs for slight pay increase • Have begun efforts to recruit talent from Middle River Regional Jail prior to release • Partnering with Wilson Workforce and Rehabilitation Center for training (successful) • Difficult to find soldering skills and soft skills • Hired retired workers part-time to help with knowledge-sharing • Manufacturers have not engaged often with registered apprenticeship programs because of a lack of capacity • Preference of hiring local talent but open to the idea of bussing in talent from outside the region • Hire a number of culturally-diverse talent but their schedule is difficult to	• Best recruitment strategies include billboards and Spanish-speaking resources (churches, newspapers, radio, grocery stores) • Talent stealing occurs frequently by larger manufacturers, thus issues with talent retainment • Cannot find new talent: most of their workforce have 15+ years of experience • Machinists, electrical engineers, packaging engineers, and tool and die techs are most in-demand • There is an entrepreneurial spirit in many workers and they only work in manufacturing for insurance and benefits • Training provided in-house, Ramsey Skills Assessment, IBM Kenexa • Knowledge-sharing is typically through cross-training or train-at-the-hip • Some manufacturers have apprenticeship programs (registered and non-registered)

	balance – they prefer to go out of country for multiple weeks at a time throughout the year	• Preference of hiring local talent

AMERICAN APPRENTICESHIP INITIATIVE (AAI) GRANT

In 2015, the U. S. Department of Labor (DOL) made an historic and unprecedented investment in the future of the American workforce through a $175 Million American Apprenticeship Initiative (AAI) grant. Through a highly competitive proposal process, the Shenandoah Valley Workforce Development Board (SVWDB) received one of the 46 grants awarded to national, state, and local organizations. Focusing on the advanced manufacturing sector, the Valley to Virginia Apprenticeship Initiative (V2V) Grant is one of the highest performing grantees, currently ranked 3rd in number of new registered apprenticeships nationally. The SVWDB attributes its success to strength of partnerships, employer engagement, and innovative workforce solutions.

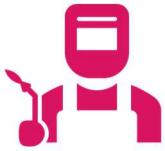
Success by the Numbers (as of 03/01/2020):



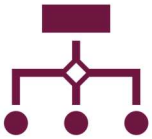
90 Employers

24 New Apprenticeship Programs

500 Individuals from Underrepresented Populations



1,035 New Registered Apprentices



51 Expanded Apprenticeship Programs

138 Registered Apprenticeship Completions

Technical education was pursued by apprentices at nearly a dozen educational and training institutions, including:

- Blue Ridge Community College
- Blue Ridge Community & Technical College, West Virginia
- Byers Technical Center
- Charlottesville Albemarle Technical Education Center
- Dabney S. Lancaster Community College
- Lord Fairfax Community College

- Massanutten Technical Center
- Valley Career and Technical Center
- Wilson Workforce and Rehabilitation Center

In addition to educational and training institutions, in-house instruction, including curriculum from NCCER, Tooling U, and Penn Foster are being utilized.

Partnership

SVWDB has a long history of regional initiatives with workforce partners. For the V2V Apprenticeship Initiative, partners included federal grant projects, state agencies, and community agencies including:

- The Career Pathways for Individuals with Disabilities Grant (CPID), a federal grant supporting a group of vocational rehabilitation (VR) agencies in Virginia to enhance career pathways for individuals with disabilities
- Wilson Workforce Rehabilitation Center (WWRC), a state agency and the only comprehensive vocational and medical center in Virginia
- The Virginia Manufacturers Association
- The Virginia Department of Labor and Industry, Division of Registered Apprenticeship
- Numerous educational institutions
- Nearly 100 employers

Leadership

As one of the highest performing AAI grantees, the SVWDB provided technical assistance to other grantees including:

- Presentations at national grantee meetings
- Workshops at national conferences for industry associations (National Association of Workforce Boards; National Association of Workforce Development Professionals)
- Testimony before the U. S. House of Representatives, Sub-Committee hearing
- Contributions to grantee webinars

SVWDB was chosen for evaluation by the USDOL and the Office of Inspector General chose only the SVWDB to visit to inform their review of the U.S. DOL's administration of the American Apprenticeship Initiative. On a state level, the V2V Team informed state policy for incorporation of apprenticeship into the local workforce development boards and provided support for other local workforce development boards throughout the state.

Innovations

The V2V Grant team worked with employers and partners to create innovative workforce solutions for employers including a pre-apprenticeship for individuals with disabilities in the WWRC Manufacturing Technology Training program, and a boot camp model to help attract and retain entry manufacturing workers moving them into registered apprenticeship with the Hershey Company. To help increase awareness for apprenticeships, registered apprentices were showcased in a local TV feature, "inDemand Jobs." Innovations were noted in the national

magazine of the Society of Human Resource Managers, *HR MAGAZINE, Spring 2019;* in the Spring 2019 issue of *VIRGINIA BUSINESS,* and the *VIRGINIA ECONOMIC REVIEW.*

RECOMMENDATIONS

Qualitative and quantitative data has shed light on how the Shenandoah Valley can continue to support manufacturing. The following recommendations were developed based on feedback from manufacturers and shared best practices – both regionally and nationally – that can be leveraged by the SVWDB to address talent needs in the industry.

Talent Attraction

In 2018, the average annual unemployment rate for the Commonwealth was 3.0% and 3.7% for the nation. The unemployment rate regionally, statewide, and nationally has made the current economy a worker's market. Low unemployment provides talent the opportunity to explore various career paths regardless of industry. Because of this, opportunities in manufacturing should be marketed to populations that are not regularly targeted by recruiters. These include individuals with disabilities, individuals returning from incarceration, and non-English speaking workers. These groups are not commonly hired by employers due to their barriers, whether it is physical, mental, or cultural. However, if provided the opportunity, these groups could help fill entry-level positions that are in-demand by manufacturers.

The Shenandoah Valley has significant regional assets that could be leveraged to attract talent from outside the Region, and even the Commonwealth. These assets include quality school systems, safety, outdoor leisure activities, and historical trails. Partnering with local economic development organizations, education, community-based organizations, and others, the Region can develop a unified marketing brand that brands itself as the place to live and work.

Improved Messaging of Registered Apprenticeship Programs

The value of apprenticeship programs is acknowledged by those focus group attendees who are participating in apprenticeships, however, there is a misunderstanding of what it takes on the part of manufacturers to become a registered apprenticeship sponsor. In order to address this challenge, the SVWDB should simplify the messaging to manufacturers of how to become a registered apprenticeship sponsor. Manufacturers who are not currently sponsors explained in focus groups that they do not have the internal capacity to manage a registered program. The reality is that the SVWDB has the expertise to support manufacturers who decide to sponsor such programs, eliminating this perceived burden. To further support those efforts, the SVWDB could share success stories from other manufacturers who are registered apprenticeship sponsors to shed light on what is required of them as a sponsor and how the workforce system is able to support their program.

Succession Planning Support

In the next 10-15 years, a portion of the manufacturing workforce will be preparing for retirement. Data from the survey and focus groups indicated that several manufacturers are cognizant of this reality but have yet to formalize a succession plan to transfer knowledge and expertise to the incumbent workforce. The SVWDB can partner with manufacturers to develop a "succession plan toolbox," inclusive of common topics that captures institutional knowledge. This template for information sharing can be beneficial to manufacturers who have not yet created a formalized succession plan or know what to include in such a plan.

Promote Career Awareness

One of the greatest assets to the Region is its workforce and it is important to continually develop that talent. Focus group findings revealed that the K-12 school systems in the Region are just one of the strengths of the Region. By promoting local career awareness to high school students, the Region can improve it talent retention efforts. Development of career pathways in manufacturing can provide young talent with the opportunity to explore career options in manufacturing, sharpen their skills, and obtain industry-recognized credentials.

APPENDIX A: OPEN-ENDED SURVEY RESPONSES

Question: What top three Entry Level/Support positions are hardest to fill?

Associate	Machine Operator
Baler Operator/Forklift Driver	Maintenance
Brewing	Material Handler (2)
Electrician	Mechanic (2)
Feed mill	Operator (3)
Finishing Assistants	Packager
Forklift Operator	Packaging Line Operator
General Production Worker	Production (2)
Hatchery	Stacker Support
Hoist Driver (2)	Technician
Light Equipment Operator	Warehouse Operator
Line Worker	

Question: What top three Skilled Trade positions are hardest to fill?

3-Year Apprentice	Machine Operator (3)
Airframe & Powerplant Mechanic	Machinist (3)
Avionics/Electrical Tech	Maintenance (5)
CDL Drivers (2)	Maintenance Mechanic
CNC Machinist	Mechanic (3)
CNC Operator	Mechanical Maintenance
Commercial HVAC Mechanic	Onsite Foreman
Commercial HVAC Tech	Pipe Welder (2)
Commercial Plumbers	Pipefitting (2)
Electrical Engineering	Plumber (2)
Electrical Foreman	Plumber's Helper
Electrician (8)	Plumbing Tech
PLC Techs	Production Operators
Electro-Mechanical Tech (3)	Project Management
Experienced Apprentices Electricians	Service Diagnostics
Experienced Electricians	Service Install
Experienced Welder	Service Plumber
Fabricator	Sheet Metal Mechanic
Forklift Drivers (3)	Sheet Metal Tech
General Maintenance	Skilled Glazier
Hazmat	Steel Fabrication Fitter
HVAC	Steel Fabrication Welder
HVAC Tech	Superintendent
Industrial Tradesman	Technical
Journeyman Electricians	Tool & Die Maker (3)
Laser Operator	Truck Drivers
Lead Electrician	Welder (3)

Lift Truck Operator

Question: What top three Technical positions are hardest to fill?

3D CAD Drafters	Machine Operators
Crane Operators	Maintenance
Design Engineers	Molder
Electrician	Operator/Production
Engineer (2)	Project Managers
HVAC Service Tech	Sheet Metal Duct Installer
Journeyman	Sheet Metal Fabricator

Question: What top three Professional positions are hardest to fill?

Construction Project Managers	Electricians
Construction Superintendent	Estimator
Continuous Improvement Positions	

Question: List the top 3 technical skills that are most difficult to find when hiring.

3D Printing and Prototyping
Ability to lead construction crew
Ability to follow instructions
Ability to lift and work in heat
Ability to manage construction metalwork projects from quote through installation.
Ability to read a tape measure
Ability to read drawings (blueprints)
Ability to reproduce accuracy
Ability to set-up, program, & operate CNC lathes and mills
Ability to take architectural level drawings and create detailed fabrication level drawings.
Advanced Electrical - PLC's
Allied health professionals--PT, OT, Speech, Medical Laboratory
Applicants understanding how to use equipment in a fast-paced environment
Applicants with reach truck experience
Applicants with warehousing experience
Assembly
Attention to detail
Basic knowledge to run/drive a forklift
Basic Math
Basic trade skills
Brewing
CAD
CNC Programming
CNC Setup/Operation
Computer knowledge

Computer Proficiency
Computer Program Skills
Control wiring
Critical Thinking
Customer service
Decision Making (2)
Dependability and Reliability (2)
Driving
Driving experience for an 18-wheeler
Driving Forklift
Driving Tractor Trailer
Electrical (5)
Electrical Troubleshooting
Electrician (2)
Electrician-mechanical
Electricians licensed in West Virginia
Engineering
Experience
Experienced Trade Skills (3)
Fabrication
Gas Fitting
General Mathematic/Problem-Solving Skills
HVAC/R (2)
Hydraulic Troubleshooting
Industrial Maintenance
Industrial mechanical
Initiative (2)
Installation/modification
Integrity
Journey Men License
Knowledge of Industries
Large welds
Listening Skills
Machine operator
Machining (2)
Machinist (2)
Maintenance (2)
Maintenance Mechanic
Math skills (2)
Measurement
Mechanic
Mechanical (2)
Mechanical Aptitude
Mechanical/HVAC
Metal fabrication, not just welding
Metal/composite fabrication

Operator
Operators skilled
Patients
Personal Attributes
Physicians
Planning
PLC Programming (2)
Plumbing
Preplanning thinking ahead
Problem Solving (3)
Process Technician
Program knowledge
Programming
Read Tape Measure
Refrigerant handling
Registered nurses
Respectful
Shipping
Site installation of custom metalwork.
Soft Skills (2)
System troubleshooting
Time management
Troubleshooting (6)
Welding (2)
Work experience
Workplace Etiquette

Question: What are the top 3 factors contributing to the difficulty of retaining talent?

$$$$
10-hour shifts
Absenteeism
Advancement
Attendance (2)
Attendance; missed time due to transportation or babysitting challenges
Benefits (6)
Better benefits
Business location
Candidates lack responsibility - commitment to work
Compensation (3)
Competition (2)
Competition for labor
Competition for talent
Competition in marketplace
Competition in the industry

Competitive Pay
Competitive wages & benefits
Cost of Training & Development Tools
Culture
Dependability
Dependability/accountability
Entry level new employees not really knowing what they really want to be doing career wise.
Experienced Tradesman
External factors related to our industry
Find work elsewhere if they become unhappy
Flexibility
Good job market (2)
Growth & Development in Entry Level Roles
Growth in surrounding geographic area's
Higher pay
Hours (2)
Income
Industry (Dirt)
Initiative
Initiative to work or grow
Intensely competitive labor market
Job site locations
Knowledge
Lack of available computer training
Lack of commitment
Lack of interest
Lack of motivation it seems in some candidates
Lack of skills & abilities
Lack of soft skills from employees
Lack of technical skill locally
Lack of training pipeline (i.e. very few around that can train younger people before they come into us)
Lengthy path to professional status
Licensed
Location (2)
Low unemployment rate (2)
Management
Meaningful work
Money (2)
More employers in the area hiring than ever before.
New hires prefer to work only day-shift and not nights and/or prefer not to be held accountable in labor mgt.
No desire to work in the trade
Off/Night shift requirements for new hires
On Call Hours
Opportunities for Advancement

Opportunities to grow
Outside competition
Overnight out of town travel for Field Service department.
Pay (6)
Pay and benefits
Pay better elsewhere
Per Diem
Physical demands
Position Growth
Reliability & Accountability of entry level employees
Reliability/showing up
Retaining training
Rising wages in non-technical industries
Salary (2)
Selection
Size of company
Skilled
Soft skills
Soft Skills (Timeliness)
Spouse/significant other employment out of region
Temptation to move on
They ding work that they don't have to get dirty doing
They want top-pay at entertainment levels
Today's workforce lacks overall employer loyalty
Transportation
Type of work
Type of work; may be too fast-paced or overwhelming
Vacation time offered
Valid Driver's License
Very low unemployment rate
Wages (4)
Weekend Work
Wide variety of competitor opportunities regionally and around the country
Won't or don't have enough skilled training
Work environment (3)
Work Ethic
Work habits of the individual - safety, attendance, tardiness, etc.
Work life balance (2)
Work schedule

Question: What could be implemented to improve work-based learning activities across your organization?

5s Training
Additional apprenticeship opportunities

Additional external training opportunities
Additional Labor to enable trainees time to train - budgets don't allow for this
Additional Training structure
After work classes
Assistance in locating applicants
Better communication about opportunities
Better knowledge of the programs
Better organization from within our own company
Better pay for apprentices
Better pipeline to fill the activity positions
Better understanding among team
Building the case for and better articulating the many benefits of WBL with key players/decision makers
Educational offers
Employees with interest in continued schooling
External Workshops to gain new skills both technical and soft
Finding places to partner with
Formalized training program
Grants
Grow the program
High Schoolers and adult learners with better foundation of service excellence and communication soft skills
High Schools and Technical center councilors to job shadow half to full days to understand the industry better
Incentives to learn
Internal acceptance of work based learning as a recruiting opportunity
Internal Subject Matter Expert Training
Internships for local college or even high school students
Local learning opportunities specific to our trade
Mentorships
Milestone Skills assessment
More access to educational programs
More candidates
More specialty departments participation (e.g., IT, Cyber security, HVAC, Laboratory)
Need support and engagement from employees who will be willing to help train
Need support and engagement from site leadership/department managers
Need to develop a structure and commit to a program with a local educational institution
Need to have better way of promoting Coop and Internships in the schools so students know what is available. Need centralized system across school division in regions
Needs to be a school, similar to the truck driving school, for reach truck forklift operators
Organized Apprenticeship
Paid incentives for schooling
Partner with outside company to provide more in depth on the job training
people
Push the technical schools instead of college
Restructure workforce initiatives internally to help employees grow with their position

rotation
Schools need to ensure that their top students are getting the work based experiences. Need to create incentives for the work based opportunities.
Staff specific to instructing
Stronger starting technical foundation
Supervisors encouragement
Support from local High Schools and Technical center educate students and the benefits of working in a Trade
Support from local High Schools and Technical center to job shadow/internship per semester
Teach math in public school
The amount of people interested in work based learning activities
This job is incredibly simple. I don't believe training is the issue here. It takes about 20 minutes to learn
Training assistance
Transparency to companies that create training products
Utilizing online training
Wage assistance
Working on this now through our mentorship program

Question: What is included in your organization's plan (for the exiting workforce due to retirement)?

Apprenticeship program, succession planning
Bi-annual review of bench strength and defined criteria that all can review to know what requirements to move into new roles
Cross-training amounts current team members, sourcing for their back fill and getting everyone trained before the retirement takes place
Documenting existing BDP's -- recruiting now for the future
Expansion
Find young talent and use upcoming retirees to train them
Hire and train new employees
Hiring future leaders and mentoring them
Hiring to replace
Hiring younger people and training them up
Management Positions - succession plan designating candidates for growth. Each manager must develop a plan for backfilling their position, whether it is internal candidate and providing growth opportunities or whether it is an external candidate and the requirements
Mentoring
Our workforce is incredibly young. 95% of the company is under 35
Part-time work
Possibly having the trainee shadow the retiree
Replacement training before retirement
Reviewing our bench and making plans on ensuring associates are being trained in advance
Selective leadership education
Shop Floor Employees - designating potential candidates for promotional opportunities and providing them internal and external training opportunities

SOP of job instructions
Start looking for replacements a year in advance
Succession Plan
Succession planning and skill training
Succession plans; over hire strategies; community partnerships building the pipeline to first time and ongoing employment
Training a replacement prior to the departure of the retiree
Training existing staff
Training programs and outreach initiatives to get younger workers trained and interested in the trade
Trying to have someone ready to fill the spot of the retiring employee
We are working with local secondary school systems and post-secondary institutions to provide coops and internships for trades, professions and technical positions on an ongoing basis

Question: What do you believe are/will be the top 3 hardest-to-fill positions of those exiting the workforce due to retirement?

Accounting/Bookkeeping	Mechanics (2)
Airframe and Powerplant Technicians	Metal Fabricator
Apprentices	Nutrition Services
CAD designer	Office management
Career oriented labor with the drive to learn a skill set	Office Personnel
Carpenters	Office/clerical staff
CDL Drivers	Operations Manager
Change Management	Operator Leads
CNC Lathe setup and operations	Packers
Controllers (in-house accounting)	Pilot
Dependability	Plant Manager
Design Engineer	Plumbers
Desirable workforce	Production Manager
Drivers (2)	Production Planning
Electrical (2)	Project Management
Electrician (2)	Project Management/Engineering
Engineers (5)	Project managers
Environmental services	Reach truck operators
Experienced Trades (2)	Registered Nurses
Facilities Maintenance	Safety
Field Service Crew Leaders	Sales (2)
Foreman (3)	Senior Press Operator
General Labor	Service technicians (3)
Human Resources	Sheet metal fabricators
HVAC/R	Sheet metal technicians
Industrial Technician	Skilled maintenance roles

Key Leadership positions	Skilled mechanic
Knowledge	Skilled operators
Leadership (2)	Skilled Trade (3)
Long-term employees who wish to stay long enough to learn the entire trade	Superintendent/Supervisory (2)
Machine Operators (4)	Technical
Maintenance (6)	Technology
Maintenance Manager	Tool and Die Maker (2)
Maintenance Tech	Top level management
Maintenance/Facilities	Welding (3)
Management positions	Work habits
Mechanical Maintenance	

Question: Please provide 2-3 recommendations for how the Shenandoah Valley Workforce Development Board can help you with your manufacturing workforce needs.

Additional educational opportunities
Assist in identifying additional pools of workers that can be trained and developed to meet growing needs.
Assist with reaching schools. student, parents.
Be a catalyst for continued Apprenticeship development in region
Budget Friendly Quarterly Workshops on soft skills/technical skills
Career change programs
Career Fair for high school students, similar to WoW! event for 7th graders
Community grant programs for those who want technical training but can't afford it.
Conduct survey on paid time off
Conduct survey on vacation time grants in manufacturing
Continue to assist with programs to stabilize and grow the local workforce
Continue to be a partner when looking for help
Continue to be a resource for local businesses
Continue to build the case for support
Continue V2V Program
Develop basic skills course- teach tape reading, add fractions, reading blueprints for adults. Several people enter the workforce without these skills, and many manufactures could use these.
Don’t give up!
Education about the need/opportunity in trades to younger generation
Emphasis on training for the trades
Events/Activities to highlight manufacturing job openings - i.e. Career Fairs, Career Days, etc.
Formal training and certification in Six Sigma, or other lean manufacturing disciplines
Funding Incentives for Employers and Employees
Help facilitate a connection with those in the community that train future manufacturing workforce
Help provide examples of other programs that have structure in their processes and have proven to be successful

Help those in community colleges and tech schools align with companies for internships or externships
Help train kids on soft skills.
Help train kids to know they can have a good career in trade jobs, not just college.
Increase awareness of technical career opportunities
Increased collaboration between HS, community college, and 4-year college
Increased exposure to skilled candidates
Increased focus on the importance of the trades
Increased focused on relevant technical skills in local vocational schools
Increased information on trade work to High School students
Instead of sending emails and letters go visit the companies and get in front of them
Interviewing Skills
Learning and Educational opportunities at the High School level for knowledge kids don't have to go to college. Technical skills are available too.
Make on-site training available for all shifts and affordable for struggling companies
More information or encouragement for these positions at the high school level
More practical hands-on training in skilled trade areas in local high schools, technical centers
More skilled training for trades
More specific wage and benefit surveys
More training opportunities for young adults
Offer scholarships or grants for people to go to school to learn the skills needed
Partner with community resources that help develop a talent pipeline from a young age
Partner with schools to get kids educated on career opportunities
Partnering with organizations on classroom/on the job training style training for trade skills such as welding, electrical, etc.
Programs for both adult and youth trainees
Provide education grants
Provide leadership in the development of talent pipeline and coordination with school systems and educational institutions in the region.
Provide training to get applicants trained on forklifts in advance of applying for positions.
Recruitment resources for technical and entry level positions
Resources related to educational courses and internship programs
Resume development
The SVWDB is operating as needed
Utilizing your services

Question: Is there anything else you would like to share? Please provide comments below.

Eliminating the stigma attached to working in the trades is critical.
Supplying information to the community/schools for students or young adults of options that are available to them. Bring awareness back to the trade industry.
Thank you for trying to help.
We are a general contractor, not a manufacturer. We hire some skilled trades, but the majority of our work is subcontracted.

APPENDIX B: FOCUS GROUP QUESTIONS

Talent Attraction, Development, and Retention

1. How is your organization currently recruiting talent?
    a. Is talent readily available in your region or do you have to expand your talent search?
    b. What kind of talent does your organization need in the immediate (entry vs. experienced)?
    c. What specific positions?
2. Does your organization have to upskill talent to get them the skills necessary for the job?
    a. Who provides training?
    b. What technical skills are missing? Soft skills?
3. Has your organization developed a strategy for knowledge-sharing from soon-to-retire workers?
    a. If so, what is the process for skills transfer?
    b. Is that process effective? If not, what is missing?

Work-Based Learning Opportunities

1. Is your organization a registered apprentice sponsor?
    a. If yes, for how long? How many apprentices has your organization trained?
    b. If no, why?
2. Has your organization experienced a return-on-investment (ROI) from its apprenticeship program?
    a. If yes, can you describe the ROI?
    b. If no, why?

Best Practices

1. Are you aware of industry best practices around upskilling talent that can help improve workforce development programs?
2. What makes these best practices?

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