10-2-2013

A Comprehensive Analysis of the Current and Future Talent Needs for the TALENT 2025 Region

George Erickcek
W.E. Upjohn Institute for Employment Research, erickcek@upjohn.org

Brian Pittelko
W.E. Upjohn Institute for Employment Research

Claudette Robey
W.E. Upjohn Institute for Employment Research, robey@upjohn.org

Bridget F. Timmeney
W.E. Upjohn Institute for Employment Research, timmeney@upjohn.org

Upjohn Institute Technical Report

Citation

Erickcek, George A., Brain Pittelko, Claudette, Robey, and Bridget F. Timmeney. 2013. "A Comprehensive Analysis of the Current and Future Talent Needs for the TALENT 2025 Region." Report prepared for TALENT 2025. https://doi.org/10.17848/rpt205

Upjohn Institute Technical Report

2013

A Comparative Analysis of the Current and Future Talent Needs for the TALENT 2025 Region

George A. Erickcek
Brian Pittelko
Claudette Robey
Bridget Timmeney

6/25/2013

W.E. UPJOHN INSTITUTE
for Employment Research

W.E. UPJOHN INSTITUTE
FOR EMPLOYMENT RESEARCH

A Comprehensive Analysis of the Current and Future Talent Needs for the TALENT 2025 Region

Project Team:

George A. Erickcek
Brian Pittelko
Claudette Robey
Bridget Timmeney

W.E. Upjohn Institute for Employment Research
300 S. Westnedge Avenue
Kalamazoo, MI 49007
269-343-5541

June 25, 2013

Table of Contents

Figures

Tables

Executive Summary

This report is the summary of a six-month research effort to assist TALENT 2025, a unique business-led regional effort, in its goal "to dramatically improve the quality and quantity of the region's talent to meet increasingly more complex and diverse workforce needs."

The objective of this research effort is to identify the challenges facing employers in the TALENT 2025 region in attracting the skilled workforce they need to be competitive today and for the next decade. It is an exercise that required an examination of both demand and supply forces that determine the current and future employment conditions facing the region. In particular, will the region's employers continue to produce new products and services that are demanded by international, national, and regional markets and, thereby, generate the demand for high-skilled and professional workers? Will regional service providers, especially medical, keep up with the changing demand for services caused by demographic shifts? And, at the same time will the region be able to attract, retain, and grow the talent needed for these high-growth industries?

The timing of this report coincides with the state of Michigan's increased effort to insure that its workforce development activities are demand driven and meet the needs of the regions' employers. The report's findings support this statewide initiative and its data analysis may prove useful in providing direction for the state's efforts in West Michigan.

The primary purpose of this information will be used to further the dialogue between the region's businesses and its education and training community.

The following are the key findings of the research effort:

- In 2013, we estimate that 46 percent of total employment in the TALENT 2025 region is directly dependent upon the sale of its produced goods or services to out-of-region customers, and in 2025 this percentage is forecast to decrease to 43 percent. From 2013 to 2025 the demand from these economic base employers for high-skilled talent will increase by 15.1 percent, for medium-skill occupations 14.6 percent. Their demand for low-skill occupations will increase by only 1.3 percent. In short, by 2025 the region's export base will require a higher level of talent to both stay globally competitive and to provide employment opportunities for low-skilled workers.
- The education profile of the TALENT 2025 region will change dramatically in the coming decade, if the region's economic base industries will continue to successfully compete in the international marketplace. The percentage of working age adults who successfully complete a post-secondary degree will need to grow from its current level of 33.4 percent to 43 percent by 2025.
- Today, however, the economic profile of the TALENT 2025 region looks no different from that of similar metropolitan areas. While it is true that the TALENT 2025 region's workforce has been identified as one of the most productive in the nation, it does not appear to be ready to face the workplace challenges of the coming decade.
- Surveyed employers identified the following three workforce issues as the most challenging: managing diversity issues in the workplace, being able to find workers with

the appropriate skills and training for the job, and being able to attract workers from other areas to relocate to the region or state.

- The traits that surveyed companies identified as the most challenging to find among potential new hires were leadership skills and technical skills. Finding workers willing to work flexible hours and finding workers with graduate degrees were also named as challenging to hiring efforts.
- Universities and community colleges were noted as the top entities most helpful to companies in meeting workforce needs. Private training institutions were also cited as beneficial in helping to fulfill workforce needs.
- When asked to look out to the next five to eight years, employers who participated in focus group sessions identified soft skills, technical skills, flexibility, and ability to adapt to a changing work environment as skills most important to their companies today and in the future. Participants also cited the need for employees to be proficient in multiple skill sets (e.g., analytical, leadership, technical), particularly in entry-level positions—"a higher skill set at a lower level." For employers, the focus group members identified the need to help employees develop more quickly on the job due to the increasing pace and complexity of the workplace. Finally, the group agreed that employers and employees would need to be willing to change with global competition and be able to adapt as companies alter policies, practices, and products based upon the economic impacts of international competition.
- Interviewed employers, when asked to identify the workforce skills and abilities (technical or otherwise) that were most important to their company today for entry and mid-career employees, ranked technical skills first, followed by soft skills, and the abilities relative to company culture as the third most important skills/abilities for entry and mid-career employees.
- When asked what educators could do to improve the readiness of the students to enter the workforce, they identified:
    - Students need more training in math, statistics and analysis, science, technology, engineering, robotics, automation, root-cause analysis, troubleshooting, and mechanical plant equipment maintenance (high school and college levels).
    - Software, technology, and technical equipment in high schools and colleges should mirror what is being used in industry today (keep it current).
    - More courses in computer-based applications (Auto CAD, CNC) should be offered and should be aligned specific to industry needs (high school and college levels).
    - As much as possible, broaden student exposure to global issues when teaching at the high school and college levels.
    - Continue and/or add WorkKeys® certification in high school.
- Poverty leaves children at a disadvantage starting school. It puts children at risk for poorer health, behavior, and skills at the start of kindergarten than their counterparts growing up in better economic conditions. Early childhood interventions, especially high-quality preschool, yield benefits in academic achievement, behavior, educational progression and attainment, delinquency and crime, and labor market success, among other domains.
- Third-grade reading proficiency has an important predictive value for future academic success, including high school graduation. Students not reading at grade level by third

grade are four times more likely to leave high school without a diploma than children who are proficient readers.

- Middle school is a time of critical preparation for high school and beyond, providing the cognitive, content, and social skills necessary for future success.
- Unfortunately for many underperforming students entering high school their likely completion is very low. Research indicates that if a student is not academically prepared to complete 9th grade, the likelihood of him or her dropping out is very high.
- For students exploring the possibility of going to college, the ability to access funding for higher education is an important factor in determining whether students attend.
- Completing a post-secondary degree is an increasingly important predictor of future economic and personal success. Research on college access has consistently found that students who take more advanced course work in high school are more likely to attend college, less likely to be placed in remedial courses in college, and more likely to be successful in the colleges they attend.

We identified three broad activities that TALENT 2025 should explore. The recommendations of this report are the following:

1. Work with the region's business community to improve the flow of information and dialogue between it and both the education community and job seekers.

2. Facilitate discussions with businesses and the region's community college, trade schools, and universities in providing retraining opportunities for the existing workforce.

3. Partner with the K–16 educators to assist students in obtaining a better understanding of the world of work, both with regard to technical skills requirements and soft skills workplace know-how skills, as they map out possible career options.

The report's recommendations are provided under each of these proposed activities.

A. Work with the region's business community to improve the flow of information and dialogue between it and both the education community and job seekers.

1. Identify the current skills and degree requirements of current job postings for high- and medium-skills positions.
2. Work with employers in forecasting their future skill needs.
3. Maintain active business/education advisory councils for the region's major economic base industries and services. TALENT 2025 is perfectly situated to provide the necessary "third place" for these councils to be effective.

B. Facilitate discussions with businesses and the region's community college, trade schools, and universities in the retraining of the existing workforce.

1. Assist firms in establishing and promoting lifelong learning opportunities for their workers.

2. This would also be an issue that should be taken up by the business/education advisory councils discussed above.

C. Partnering with the K-16 educators to assist students in obtaining a better understanding of the world of work.

1. Work with the region's School Districts and Intermediate School Districts (ISD) to provide greater access to more hands-on training using various technologies from information, advance manufacturing, and health. Encourage the region's companies to teach the teachers regarding the current skill demands of the workplace, both technical and soft.
2. Promote the adoption of WorkKeys® which is part of ACT's National Career Readiness Certificate (NCRC) program, as well as giving employers an assessment of the attained skills of a potential new hire.
3. Partner with school administrators to increase the resources and roles of counseling staff to assist students in choosing their careers at both the high-school and middle-school levels.
4. Partner with the region's ISD to better integrate instruction on "soft-skill" abilities such as problem solving, team building, and communication skills.
5. Encourage companies to offer internships and apprenticeships.
6. Continue to work to better refine its community indicators. Evidence suggests that the development of community indicators can assist with mapping assets and identifying gaps, setting collective goals, facilitating partnerships, and making the most of limited resources.

Analysis of the Current Talent Situation Facing Employers in the TALENT 2025 Region

Historically, the workforce in the TALENT 2025 region has been praised for its productivity. The TALENT 2025 region has a strong presence of advanced manufacturers in a wide array of industries including office furniture, aerospace, auto components, food products, and a variety of other manufacturing pursuits. Moreover, TALENT 2025 has attracted and retained world-class engineers, industrial designers, and medical researchers and practitioners. For many outside the region, the TALENT 2025 region may be seen as a Midwest success story. Nevertheless, looking forward to 2025, the region's economic and educational stakeholders face several major challenges as they work to ensure that the region's workforce will remain a driver and not a hindrance to future growth.

The Importance of Education and TALENT 2025 Economic Base Industry

A region's economic success depends upon its ability to attract new income into its borders through the sale of its goods and services.[1] In 2013, we estimate that 46 percent of total employment in the TALENT 2025 region is directly dependent upon the sale of its produced goods or services to out-of-region customers, customers who could buy these goods or services elsewhere. Of these workers, 23.8 percent are in high-skilled occupations where a majority of the job holders have a Bachelor's degree or higher and 14.9 percent are in middle-skilled occupations. It may be surprising that we estimate that currently 61.3 percent of the region's economic base workers are in low-skilled occupations where the majority of the workers hold only a high school diploma. [2] This is partially because the region houses a strong tourism industry, and has become a strong retail hub. However, it should be no surprise that skill demands of the region's economic base are expected to change substantially by 2025.

As shown in Table 1, the number of persons in high-education attainment occupations in the region's economic base will increase by 15.1 percent from 2013 to 2025. The number of workers with middle-education attainment occupations in the region's economic base will grow by a similar 14.6 percent. Low-skilled occupations will still account for more than 60 percent of all economic base jobs; however, they are only expected to grow by a small 1.3 percent. In short, while the region's economic base will remain concentrated in assembly occupations that require minimum skills for the next decade, it will also require higher-skilled workers for product development, advanced process engineering, and professional services.

[1] This includes tourism where you "sell" your amenities to out-of-region visitors. In addition, it includes efforts to capture existing expenditures that are leaving the region for goods and services that could be produced in the region.

[2] A detailed list of occupations and their education requirements are shown in Appendix A.

Table 1: TALENT 2025 Export Employment

Occupation	Export dependent employment	Percent of occupation	Percent by education requirement			Change 2013–25	
			BA or Higher	Associate's degree	High School	Absolute	Percent
High education attainment	81,693	52.7%	71.3%	7.1%	7.3%	12,297	15.1%
Middle education attainment	51,100	48.5%	16.4%	8.3%	37.4%	7,439	14.6%
Low education attainment	210,302	51.9%	9.5%	7.1%	42.8%	2,719	1.3%

Educational Attainment Levels of Workers

As every investment advisor will warn, past performance does not guarantee future results. It is true that the TALENT 2025 region workforce likely had the right skills for the 1990s and for the 2000s. However, as we look toward the future, the educational attainment levels of the region's current workers do not separate it from the crowded field of competitors.

As shown in the figures below, the educational attainment level of the region's workforce is "average" in an environment where excellence is required. Overall, 33.4 percent of the region's workforce holds a post-secondary degree—8.0 percent an Associate's degree, 16.5 percent a Bachelor's degree, and 8.9 percent have graduate or professional degrees. The region's statistics do not hold up well when compared to the nation. Nationwide, 36.3 percent of the workforce has obtained a post-secondary degree, with 7.8 percent holding an Associate's degree, 17.9 percent a Bachelor's degree, and 10.6 percent with a graduate or professional degree.

The education profile of the region's younger workers is even more disturbing, both when compared to their older coworkers in the region, and to their counterparts in similar regions. As shown in Figure 1, 37 percent of the individuals between the ages of 25 and 34 years of age held a post-secondary degree, compared to 38 percent of persons between the ages of 35 and 44 years of age in 2011. In the same figure, the region's educational attainment profile is contrasted to those in similar competing regions.[3] In short, the TALENT 2025 region does not stand out from the crowd. According to these statistics it looks "average," which is clearly not good enough.

[3] The importance of examining similar regions is that they face the same structure challenges as TALENT 2025. In particular, smaller metropolitan regions cannot provide the same number of career advancement opportunities for professional workers. Moreover they may be unable to offer the quality of life favored by younger professionals.

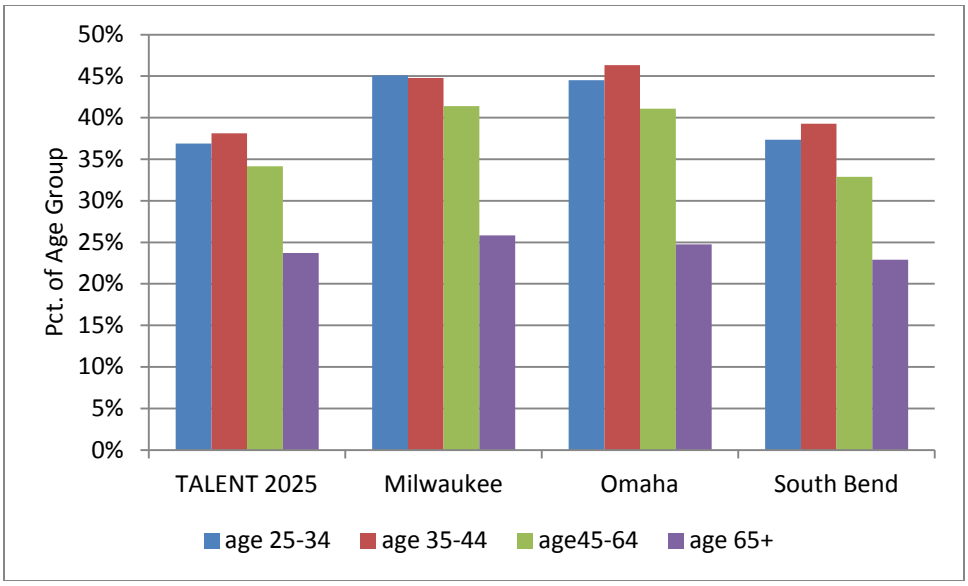

Figure 1: Associate's Degree or Higher by Age Groups

Historically, this has not been the case. In 2000, 33 percent of 25- to 34-year-olds attained an Associate's degree or higher, while only 31 percent of 35- to 44-year-olds had completed, at least, an Associate's degree. Still it is important to note that a greater share of today's young adults have attained an Associate's degree or higher, 37 percent versus 33 percent.

One possible reason for the region's younger workers not pursuing post-secondary degrees is that they are not correlated with earnings or employment status; however, this is clearly not the case, as shown in Figures 2 and 3. The earnings profile of workers by education attainment remains strong. The financial incentives to complete high school and college are quite strong. Today's average earnings of persons holding a Bachelor's degree are four times greater than for persons who only hold a high school diploma.

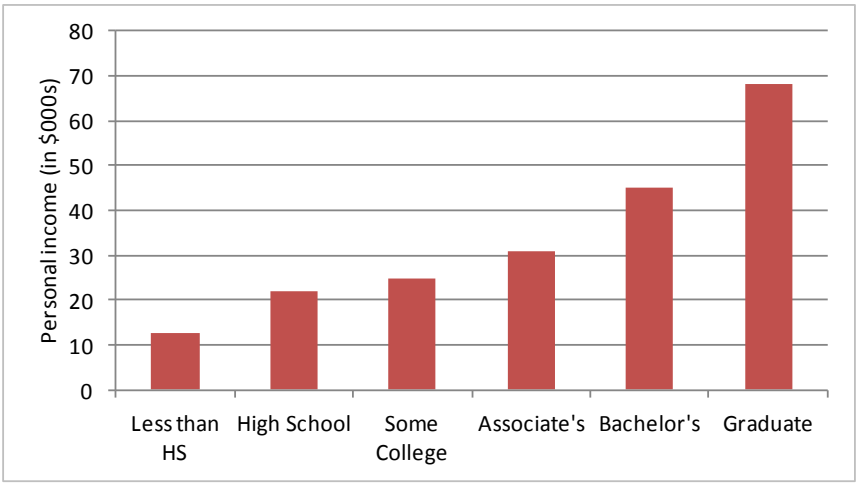

Figure 2: Personal Income by Educational Attainment Population, 16 and Over

The likelihood of being unemployed is also substantially reduced with education attainment as shown in Figure 3. The unemployment rate for the region's Bachelor's degree holders is one half of that of high school graduates and one fifth of that of high school dropouts.

In both figures, one of the more disturbing findings is that attending college, but not completing, offers only a modest boost in earnings and a slight decline in the probability of being unemployed. One of the major issues discussed in the later section is the challenge of getting college students to complete their course work and earn their degree.

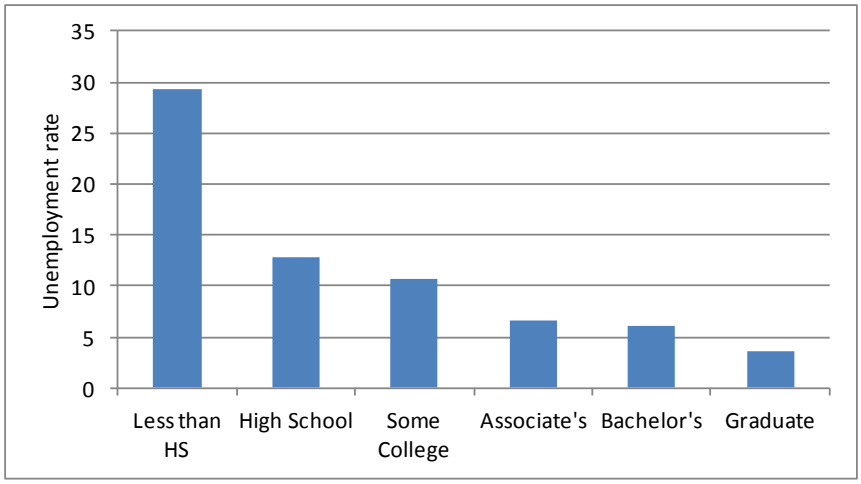

Figure 3: Unemployment Rate by Educational Attainment Population, 16 and Over

Another possible reason for the region's average educational attainment levels is that the talent needs of the region's employers differ from those of other regions and, therefore, the region's employers are not looking for a well-educated workforce. Fortunately, this is not the case. The region's employers are seeking talent as illustrated in Figure 4. This figure shows the degree requirements for regional employers who post their education requirements in the job openings on their websites and on electronic job boards.[4] As shown, 50 percent of the postings have a minimum education requirement of a Bachelor's degree. In fact, the percentage breakdown of the minimum education requirements of current job postings suggests that employers are looking for a more educated workforce than is currently available. Overall, while 50 percent of the current job postings require a Bachelor's degree only 16 percent of the region's workforce holds a Bachelor's degree.

[4] One of the more surprising findings in our analysis is that 49.1 percent of the electronic job postings monitored in the region do not provide the education requirements for the position; this is a finding that we return to in our recommendation section.

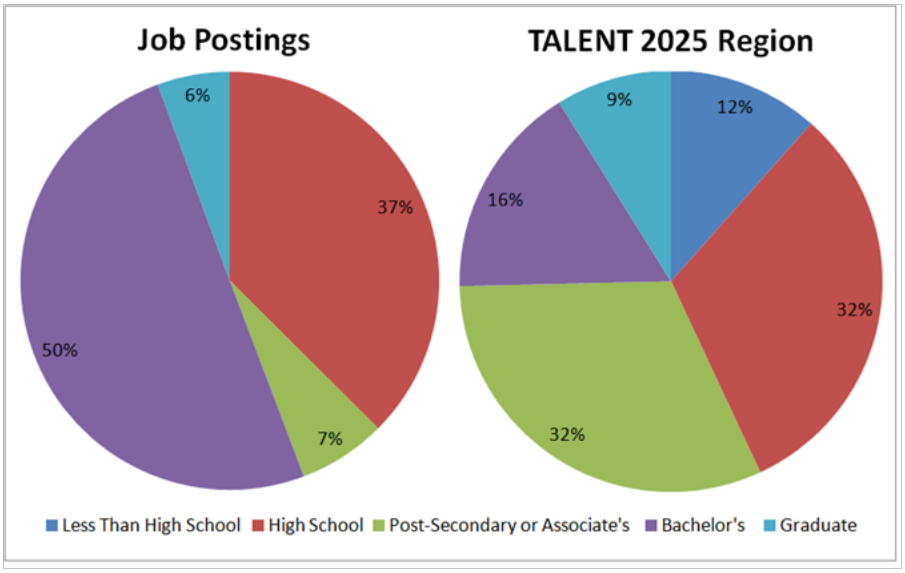

Figure 4: Comparison of Educational Attainment and Available Job Postings, 2011

One of the more difficult challenges faced when determining the talent needs of the region is that the education and skill levels of existing occupations are constantly changing. It is not only an issue that the type of occupations in demand are shifting—fewer assemblers and more engineering technicians—but the skill levels required for key occupations are advancing as well. Occupations that previously required only modest on-the-job training are now requiring more formal education. Today's machinist or CNC operator requires much more training than 10 years ago. The skill levels of the region's machinists and CNC operators grew from 2000 to 2011, as shown in Figures 5 and 6. Fewer did not complete high school and more have some level of post-secondary education.

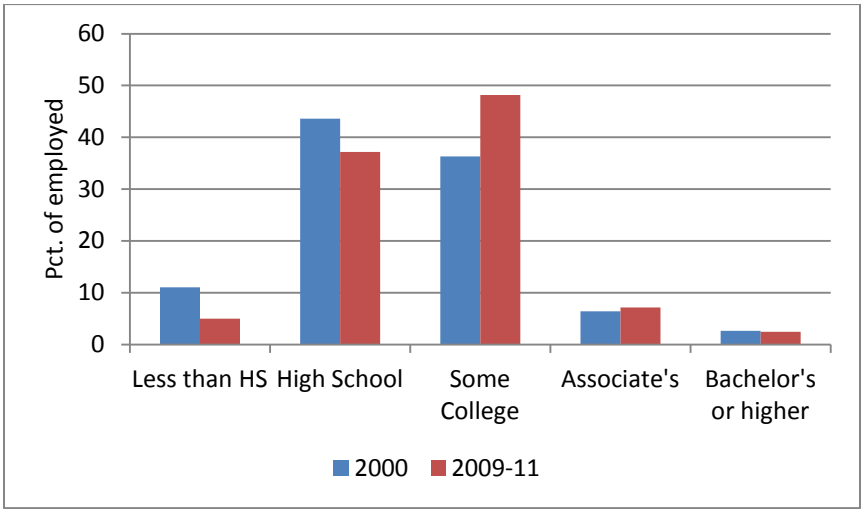

Figure 5: Educational Attainment of Employed Machinists

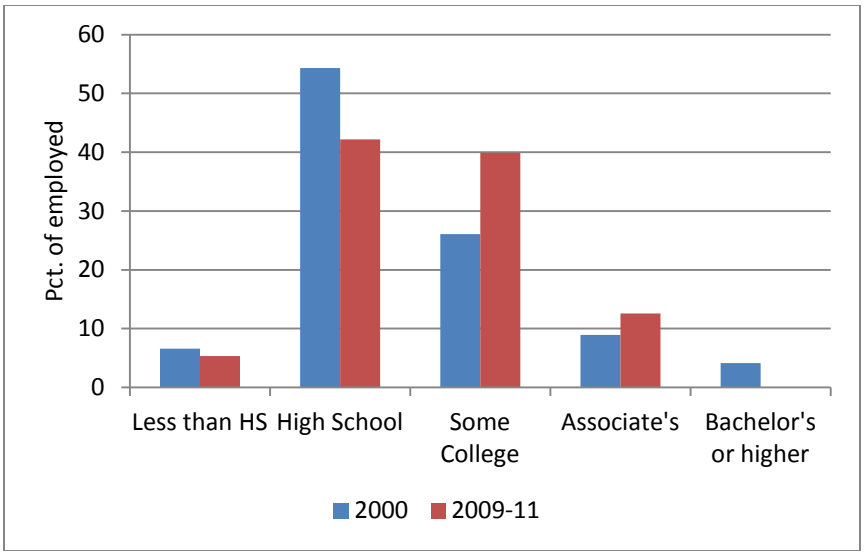

Figure 6: Educational Attainment of Employed CNC Operators and Programmers

Finally, statistics can tell only part of the story regarding the quality of today's workforce. In the next section, we hear from regional employers requiring their experience in finding the right workers.

Findings from Qualitative Research

This section of the report presents the findings and outcomes from the qualitative research methods used to collect information from TALENT 2025 company representatives based on their knowledge, experiences, and perceptions of the TALENT 2025 region's current and future workforce challenges. Three methods were pursued to identify the occupational demand of TALENT 2025-member businesses, the skill sets and training required of successful candidates for these occupations, and the skills and training needs of these businesses. An online survey was first conducted of TALENT 2025 companies to get a sense of the challenges they face in attracting and retaining talent and to identify their current and future talent needs. The Upjohn Team facilitated a focus group of Grand Rapids human resources professionals representing TALENT 2025 companies to obtain their thoughts and ideas on current and future workforce needs, on how the region's educational community could help to meet the workforce needs of these companies, and on concerns and obstacles facing the region's future workforce. TALENT 2025 company leaders and human resources professionals were also interviewed by phone to discern current and future talent needs.

Survey Findings

TALENT 2025 businesses were surveyed to identify challenges to filling job openings and to finding workers with the right knowledge and skills for these available jobs. Companies were also asked to identify the type(s) of organizations or institutions they partner with to meet their workforce needs and ways in which regional partners could help them find needed talent. Concluding questions focused on identifying the key occupations critical to their business success and identifying new or emerging occupations needed within the next five years. Surveys

were distributed to 61 companies. A total of 19 (31%) companies completed and returned the surveys.

The companies were asked how they would rate on a scale of 1 to5 (1 being Not Challenging and 5 being Very Challenging) the following list as challenging to their workforce development efforts:

- General perception of West Michigan
- Diversity issues in the workplace
- Compensation levels
- Availability of talent with appropriate skills/training
- Cost of training/education for new hires
- Cost of training/education to advance existing workers
- Availability of training/education for advancing existing workers
- Relocation of workers
- Dual career issues/finding suitable employment for trailing partner
- Public transportation/commute
- Perception of company as a viable career option

Identified as the top three most challenging issues to companies were **managing diversity issues in the workplace**, being able to **find workers with the appropriate skills and training** for the job, and being able to **attract workers from other areas** to relocate to the region or state. Figure 7 depicts the rankings of these talent issues.

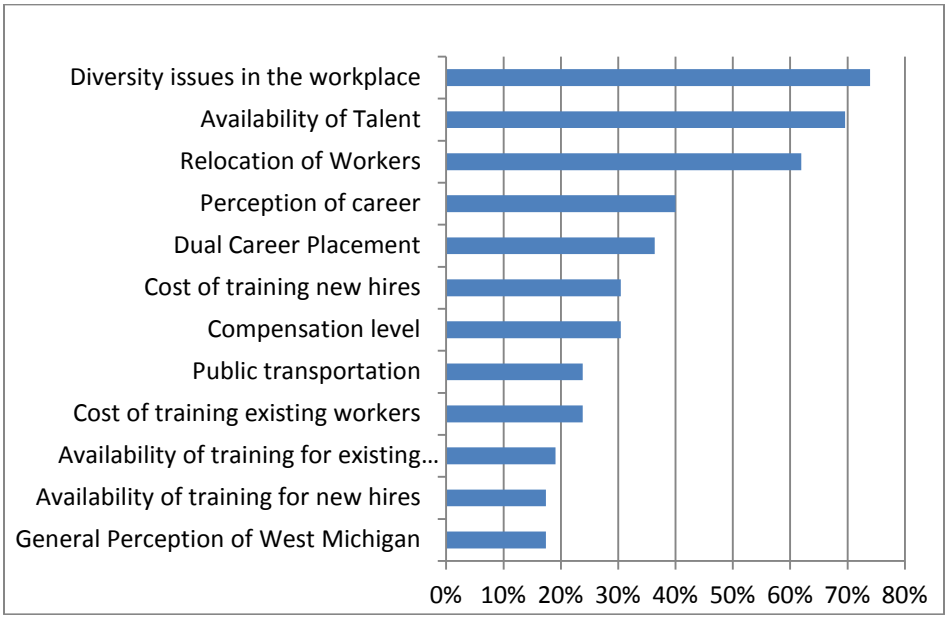

Figure 7: Talent Issues Identified as Challenging or Very Challenging

Companies were asked how they would rate on a scale of 1 to 5 (1 being Not Challenging and 5 being Very Challenging) the following list as challenging to their efforts of finding workers with the appropriate knowledge and skills for the job:

- Education (high school, two-year Associate's degree, four-year Bachelor's degree, graduate degree)
- Certifications
- Amount of experience within the field
- Ready and able to learn continuously
- Communication skills
- Analytical and problem-solving skills
- Willing to work flexible hours (evenings/nights, weekends, holidays)
- Technical skills
- Leadership skills
- Background tests, including drug screening
- Interpersonal skills
- Life skills, including personal budgeting and time management
- Child care accessibility

The traits that companies identified as the most challenging to find among potential new hires were leadership skills and technical skills. Finding workers willing to work flexible hours and finding workers with graduate degrees were also named as challenging to hiring efforts (Figure 8).

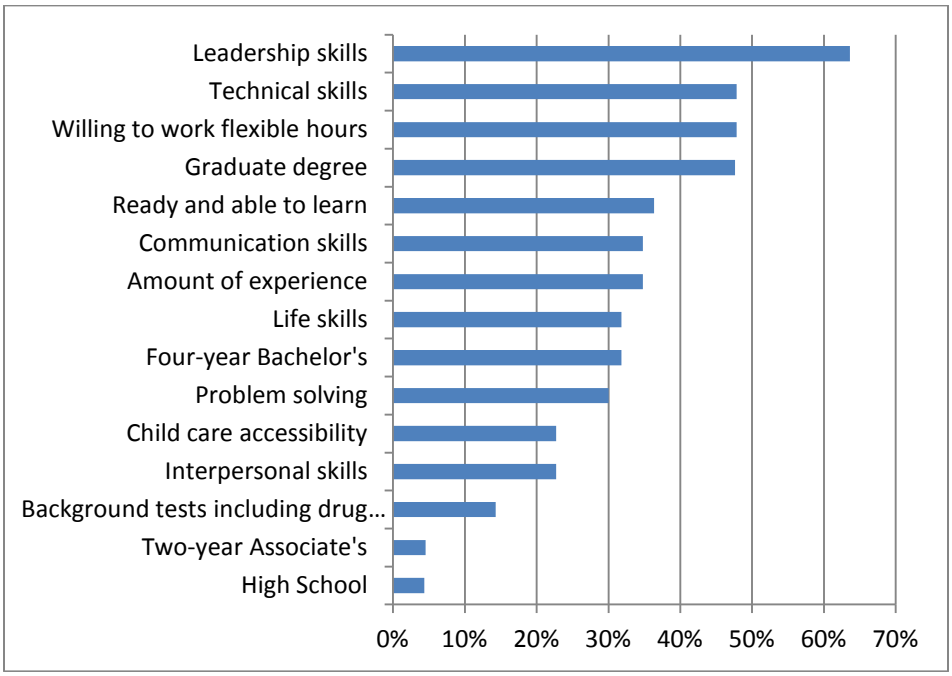

Figure 8: Challenges to Finding Workers with the Right Skills or Education

TALENT 2025 companies were asked to identify the single most important thing that regional partners (e.g., government, education, economic development) could do to help them find needed talent. The responses ranged from collectively supporting business growth to collaborating on ways to better prepare students at all levels for the workforce. The responses included:

- Come together and find a collective forum or platform to support business growth; current efforts are sporadic and disjointed
- Lower the cost of education; many of our employees are barred from advancement because they lack an education they cannot afford
- Keep bringing out great talent and educating our business leaders that talent needs to be nurtured
- Offer skilled labor trades in high school and community colleges
- Promote the region/state as a great place to live and work; share the great accolades and events associated with the region/state
- Allow businesses to influence college curricula geared more toward the practical skills/experience and competencies needed (in the workplace)
- Focus on the basics in high school; direct students into college degree programs that will actually provide them with a career when they are finished; try to find a way to come up with a financial solution to the cost of a college education
- Provide training grants or other resources for an employer
- Partner to understand driving business needs and align educational development
- Talk to one another, collaborate with each other; seems that there are many initiatives surrounding concerns of talent shortage—early childhood development, middle school training education, skilled trade exposure, problem-solving and analytical skills.

Many employers partner or collaborate with various agencies, institutions, and organizations to meet their workforce needs. Companies were asked to rate on a scale of 1 to 5 (1 being Not Satisfied and 5 being Extremely Satisfied) their satisfaction with the types of entities (below) assisting them with their workforce efforts:

- Local workforce investment boards
- Michigan Works! One-stop career centers
- Local economic development agencies
- Chambers of commerce
- Community colleges
- Universities
- Adult education centers
- Private training institutions
- Staffing agencies
- Industry-based organizations

Universities and community colleges were noted as the top entities most helpful to companies in meeting workforce needs. Private training institutions were also cited as beneficial in helping to fulfill workforce needs (Figure 9).

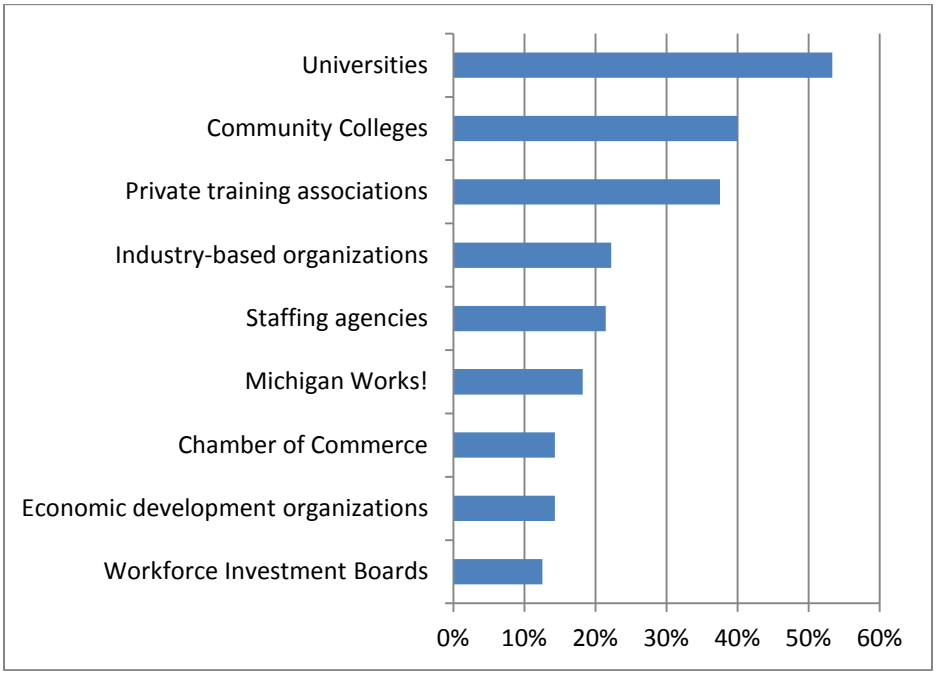

Figure 9: What Organizations are most Helpful to Businesses?

Survey respondents were asked to list up to five key occupations that are currently crucial to their business success in West Michigan and the number of employees currently employed in each occupation. A total of 16 of the 19 respondents completed this question. In fact, in the one-on-one interviews, it became clear that employers themselves have a difficult time in forecasting future skill needs. While part of this inability may reflect the dynamic nature of their industry, it is also possible that employers have not applied the resources to properly plan for their skill needs. The majority of the occupations cited as currently crucial to business success in West Michigan are those types of occupations requiring **technical skills**, with nearly 3,194[5] persons employed in those positions at the companies responding to the survey. Occupations in the medical field (1,400) and those in leadership positions (3,058) were also noted as critical. Table 2 below depicts the results.

Table 2: Occupations Viewed as Critical to Business Success

Occupation	Employees	Occupation	Employees
Company 1: Journeyman Patternmakers	103	Powder Coaters	20
Company 2: Innovation & Design	40	Press Brake Operators	12
Engineering (various disciplines)	200	General Labor	50
IT (Abap & .net)	30	*Company 10:* Postdoctoral Fellows	15

[5] Includes both actual and estimated numbers reported from respondents in Table 1.

Leadership (various levels & bench strength)	150	Research Technicians	25
Skilled Trades & Interns	30	Bioinformatics	2
Company 3: Call Center Representatives	70	Research Faculty	23
Engineers	75	Business System Analyst	3
Line Workers	85	*Company 11:* CNC Operators	15
Company 4: Property Managers	10	*Company 12:* Product Developers-Footwear	30
Maintenance Supervisors	10	Designers	15
Leasing Professionals	12	IT-SAP	80
Maintenance Technicians	13	Finance-Accounting	50
Company 5: Engineering	50	*Company 13:* Millwrights	25
Finance	45	Welders	15
Manufacturing	150	Leadership	38
Quality	17	Truck Drivers	72
Customer Service	18	*Company 14:* Registered Nurses	800
Company 6: Welding Engineers	12	Medical Assistants	300
Weld Techs	15	Physicians-Primary Care	200
Process Engineers	6	Advance Practice-PA	50
Engineers	45	Advance Practice-NP	50
Skilled Labor	50	*Company 15:* Manufacturing Operatives	~2000
Company 7: Store Directors	120	Leadership	~ 500
Team/Line Leaders	2100	Engineering/Technical	~200
Merch Buyers/Planners	200	IT	~150
DF/Manufacturing Supervisors/Mgrs/Directors	150	Sales	~500
Company 8: Toolmakers	30	*Company 16:* Nurses	Not Listed
Machinists	9	Physicians	Not Listed
Technical Machine Operators	18	Physical Therapists	Not Listed
Company 9: Welders	20	Speech Therapists	Not Listed
Machinists	8	*Company 17:* Leadership	Not Listed

TALENT 2025 companies were also asked to list the new or emerging occupations that they would need to hire within the next five years and the anticipated number of employees that would be needed for each position (see Table 3). Ten of the 16 companies who answered the prior question responded. The various types of occupations requiring technical skills were cited

as continuing to be in demand, with the responding companies projecting a need for nearly 287[6] positions. The responding companies also indicated a growing need for marketing professionals and data analysts, anticipating that nearly 17 positions would be needed.

Table 3: New or Emerging Occupations Needed

Occupation	Employees	Occupation	Employees
Company 1: Journeyman Patternmaker	20	Continuous Improvement Engineers	4
Company 2: Innovation & Design	20	*Company 8:* Toolmakers	20
Mobility Technology	Unsure	Continuous Improvement Engineers	4
Global Experience	Unsure	*Company 10:* Research Faculty	5
Company 4: Marketing	1	Postdoctoral Fellows	20
Company 5: Engineering	15	Bioinformatics	10
Digital Marketing	5	*Company 13:* Skilled Trades (electricians, millwrights, welders)	85
Talent Management	3	Truck Drivers	100
Company 6: Weld Technicians	24	Leadership	50
Welding Engineers	15	Sales & Marketing/Research	3
Electrical Engineers	12	*Company 14:* Data Analysts	50
Process Engineers	15	BSN Nurses	300
Manufacturing Engineers	6	MA – Associate's Degree	200
Company 7: Marketing & Statistical Analysts	8	*Company 15:* E-commerce	~20
Warehouse Hi-tech Engineers	25	Sales	~100
IT Emerging Technology Software Developers	10	Engineering/Technical	~50
Private Label/CPG-related Occupations	Unknown	Skilled Trades	~25

Focus Group Observations

The Upjohn Team facilitated a focus group of human resources professionals representing six TALENT 2025 member companies. Participants were asked a series of questions to glean their experiences and perceptions on the current and anticipated skills, training, and educational needs of their companies. The focus group participants were also asked to identify ways in which the education community could assist employers in meeting their talent needs.

[6] Includes both actual and estimated numbers reported from respondents in Table 2.

Current talent needs. The human resources professionals were asked to identify the skills and abilities (technical or otherwise) most important to their companies today for entry and mid-career employees, and to rank these in order of importance. **Technical skills** were overwhelmingly cited as the most important types of skills needed by their companies today. Specific skills mentioned were wet lab skills, research testing and experimentation, and engineering skills. When seeking skilled job candidates, the participants considered a bachelor's degree as the "entry-level" degree (rather than a high school diploma) and preferred that job candidates have some type of hands-on experience to accompany the bachelor's degree, such as through internships or co-op experiences.

The ability and willingness to **adapt to change and be flexible in the workplace** was cited as the second most important type of skill sought by their companies of today's job candidates. The participants seek employees with the ability to change as the work environment changes, and the willingness to alter expectations and to accept changes in work culture. Also stated was the ability of younger employees willing to learn from older employees, and older employees willing to learn from younger individuals.

The third most important type of ability mentioned was an **attitude of continuous learning**, and ongoing growth and development. Specifically stated was the ability of employees willing to "let go" of past paradigms and be willing to embrace new ways of performing job tasks. The participants also stated that the ability to work with people of different cultures was becoming a necessary trait.

Ranked fourth was **soft skills**, such as project management, leadership, collaboration, and basic communications skills. Also mentioned was the ability to identify, work through, and resolve problems. The final characteristic mentioned was the willingness of an employee to mature with the company – an employee being willing to learn and grow with the company. One issue cited was that employees seek "the next best thing" and leave the company to work elsewhere, often within the same type of industry.

Future talent needs. The focus group participants were asked to identify the workforce skills and abilities (technical or otherwise) that would be important to their companies for entry and mid-career employees over the next 5 to 8 years. All participants agreed that it was most important for these employees **to further develop the current talent skills and abilities** previously noted. The human resources professionals indicated that with an ever-changing work environment, all of these skills would be sorely needed in the future.

The second most important observation was that employers needed to find a way to **help employees develop more quickly on the job due** to the increasing pace and complexity of the workplace. Due to changing economic conditions and market demand, employers are uncertain of their workforce needs in the long run. As a result, participants noted that the employee who is adaptable and flexible to a changing work environment would be most needed in the workforce. The participants see a need for employees with **proficiency in multiple skills** sets (e.g., analytical, leadership, technical), particularly in entry-level positions – "a higher skill set at a lower level." Employees with the ability to perform many tasks well and those with leadership qualities were viewed as essential in the long run.

Another observation from these human resources professionals was that companies and employees would need to be willing to **change with global competition**, being able to adapt as companies alter policies, practices, and products based on the economic impacts of international competition. The participants additionally indicated that companies would expect long-term results from their employees, with regard to performance.

Education concerns. TALENT 2025 recognizes that the quality of the region's talent pool will increasingly determine its economic prosperity. As such, its companies are concerned with the products of the region's education system. Focus group participants were asked to identify three issues or concerns that the region's education community (K-12 and two- and four-year institutions) could address that would help them to meet their talent needs.

With regard to K-12, the participants cited a need for **access to more hands-on types of training** (experiences on machines, projects/internships/co-ops that afford hands-on skills training), particularly at the junior- and senior-high school levels. These company representatives also indicated that their companies are teaching newer and more current skill sets than what's being taught in the classroom. The companies offered to partner with schools to train teachers on how to "teach for the industry."

The participants suggested that school counselors provide **more assistance and guidance to students on career-path options**. They stated that schools guide students to two- and four-year education options rather than to careers in skilled trades. The companies would like to work with schools on ways to inform students on the benefits of skilled trades as careers.

Another issue that the participants indicated needed to be addressed by educators was the **integration of problem-solving skills at an earlier age**. These human resources professionals said, in their experience, that employees either aren't able to or have difficulty working through problems. These employees tend to seek "temporary fixes" rather than resolutions to problems. At the post-secondary level, the focus group participants find that new college-graduated employees **lack communications skills**, whether making presentations, writing reports or correspondence, or in general conversation. They suggest that more opportunities for making presentations and business writing and communications classes be woven into undergraduate and graduate curricula.

The group recognized that budget cuts and limited resources are issues for educators, and that these issues impact the human capital for its current and future workforce. The participants emphasized that companies are increasingly investing in today's education system to cultivate needed talent, and seek ways for teachers, professors, businesses, and students to work together. They cited a **greater need for businesses and colleges to collaborate and partner** on projects, case studies, and student career guidance. While many colleges and universities do partner in a variety of ways, the group emphasized the need for continuing and expanding upon partnership opportunities. Companies can provide projects for students as well as case study research opportunities, and encourage teachers and professors to contact them. The group additionally saw a need for career counselors to assist, nurture, and guide college students along career paths and to help develop "well-rounded" resumes.

Tomorrow's workforce. Focus group participants shared their major concerns regarding tomorrow's workforce. One of the major concerns mentioned was the **inability to find, train, and retain workers with technical skills** from within the state of Michigan. The group cited a lack of talent with job-ready technical skills from within the state, and the difficulty in recruiting technical talent to physically relocate to Michigan. Participants also mentioned strong competition within industry sectors to retain and attract employees, and viewed this as increasing in the future.

The group posited that companies would need to **accelerate entry-level worker training**–whether on the job or getting workers to technical institutes, colleges, or universities–to help them gain job knowledge at a more rapid pace. The participants stated that demand for technically-skilled workers will increase (in part fueled by advancing and changing technologies), thus employers would need to "work harder" to train and develop the skills of entry employees so that they may advance to mid- and senior-level positions.

The participants noted that changing future workforce presents interesting challenges, as well as opportunities, for companies. The participants envisioned a need for companies to **be creative in engaging workers** so that they remain interested in the work for the long term (e.g., flexible work environments or different marketing tactics). They also expressed concern with retiring baby boomers transferring knowledge to young workers and young workers adapting to team environments.

Internship opportunities. All companies represented offered internships and all hired new employees from these internships. The participants viewed internships as opportunities to "test drive" potential employees and bring new talent to the company. The hiring of employees from internships ranged from 20% to 90%, dependent upon the company.

TALENT 2025 Company Interviews

Telephone interviews were conducted with TALENT 2025 companies to get their thoughts and ideas on current and future workforce needs, on how the region's education community could help to meet their workforce needs, and on concerns and obstacles facing the region's future workforce. Of a possible 42 companies, interviews were conducted with leadership (president/CEO, vice president, superintendent, CAO) and human resources professionals representing 29 firms (69%). The industry sectors represented by the companies interviewed were Architectural Services, Attorneys, Grocery Retail, Industrial Building Construction, Manufacturing, Medical, Nursing Care Facilities, Recyclable Materials, Utility, and Vocational Rehabilitation Services. The companies interviewed were located in the Grand Rapids, Holland, and Muskegon areas.

Employee skills most important to companies today. Those interviewed were first asked to identify the workforce skills and abilities (technical or otherwise) that were most important to their company today for entry and mid-career employees, and then asked to rank their responses as first, second, and third in importance. **Technical skills** were ranked by companies as being the most important types of skills essential for entry and mid-career employees. The companies

included skills such as engineering (mechanical, electrical, manufacturing, quality), the ability to read blueprints, welding, and machining (manual machining, grinding, lathes) as among the technical skills deemed as important skills. A complete list of skills and rankings is found in Table 4.

Ranked second in importance was **soft skills**. The companies named such traits as team work/collaboration, problem solving, reliability, showing up for work on time, and leadership capability as soft skills. The employers cited traits and abilities relative to **company culture** as the third most important skills/abilities for entry and mid-career employees. Included in this category are traits such as being a good fit for the company, a good personality, and respecting company values; having a continuous learning attitude; being resilient, flexible, and adaptable to changing company environments; and understanding employer expectations.

Table 4: Skills and Abilities Ranked Overall in Order of Importance

Skills and Abilities as Ranked		
Technical Skills • Engineering (mechanical, electrical, mfg, quality) • Ability to read blueprints • Welding • Machining (manual machining, grinding, lathes) • Materials science • Clinical medical skills (RN) • Precision measurement	• Machine guarding • Lockout/tagout • Architecture • Interior design • Metallurgy • CNC • Die maintenance & troubleshooting • Machine design • PLC programming • Industrial radiography	• Tooling design • Auto CAD • Millwright • CMM • Pressing • Assembly • Knowledge of standard mechanical hand tools • Stamping • Meter reading
Soft Skills • Team work/collaboration • Problem solving • Reliability/showing up on time for work • Leadership • Professionalism • Interpersonal relationship building (younger vs. older worker) • Creative thinking • People skills	• Dependable/Attendance • Observation • Work ethic (getting the job done) • Decision making • Results-oriented thinking • Curiosity (ask questions) • Social skills (ability to work with diverse cultures) • Listening skills (ability to provide feedback)	• Accountability • Open to new ideas • Knowledge of supply chain logistics/management • Knowledge of lean mfg • Knowledge of synchronous mfg • Knowledge of Kaizen principles • Knowledge of strategic HR management
Company Culture • A good fit for the company / personality/values • Continuous learning attitude • Capacity for resilience (flexibility, adaptability)	• Understanding employer expectations • Ability to work in different company environments (global or otherwise)	• Respecting safety & OSHA standards • Quality product focus / continuous improvement
Communications Skills • Reading • Customer service skills	• Writing • Language	• Overall ability to communicate • Verbal communications

Math Skills • Basic math • Statistical analysis (data, probability) • Algebra	• Trigonometry • Geometry • Ability to read a tape measure	• Metrics • Finance
Technology • Computer skills (Microsoft Office suite of tools) • E-learning/interactive tools	• Writing code (ABAP, .net) • ERP systems software (monitors production, inventory, accounting, HR)	• SmartPacs (software used to operate heavy equipment to control a production line) • Knowledge of digital records systems
Education • Law degree (JD) • RN degree	• Silver WorkKeys® certificate • Bachelor's degree in engineering	• Six Sigma certification
Prior Experience • Manufacturing experience	• Internship or work experience	
Marketing Skills • Digital marketing (web, virtual, gorilla)	• Social media	

Additional skills and abilities noted as important to companies for entry and mid-career employees are communications, math skills, technology, education, prior experience, and marketing. The companies further commented that it was important for the education system to guide students to a career path to skilled trades, as well as to college. Those interviewed also noted that students have a poor perception of manufacturing and "working with their hands," and that the education system could be helpful in changing and rebuilding the image of manufacturing in the state of Michigan and nationally. The top three skills and abilities deemed most important by type of company are shown in Table 5.

Table 5: Skills and Abilities Overall by Type of Company

Type of Company	Skills and Abilities
Architectural Servs	Technical/Soft skills/Communications
Attorneys	Communications/Soft skills/Education
Grocery Retail	Soft skills/Company culture/Technology
Ind Bldg Const	Company culture/Education/Prior experience
Manufacturing	Technical/Soft skills/Communications
Medical	Soft skills/Communications/Technical
Nursing Care Fac	Math/Technology/Soft skills
Recyclable Materials	Technical/Company culture/Math
Utility	Technical/Communications
Voca Rehab Servs	Company culture/Communications

Employee skills most important to companies in the future. The employers were next asked to identify the workforce skills and abilities (technical or otherwise) that would be most important to their companies in the next 5 to 8 years for entry and mid-career employees, and to rank their responses as first, second, and third in importance. As with the first question, **technical skills** were ranked as the most important skills essential to their future workforce. Technical skills stated by employers included engineering (electrical, mechanical), reading blueprints, auto CAD, CMM, and GD&T, and welding. Table 6 below provides a complete list of all skills identified by those interviewed.

The companies ranked **soft skills** as second in importance. These employers included problem solving, reliability (showing up on time for work), creative thinking, and leadership among the top skills needed for future workers.

Ranked third in importance was **company culture**. Employers included traits such as capacity for resilience (flexibility, adaptability), the ability to work in different company environments (global or otherwise), possessing a continuous learning attitude, and being a good fit for the company, a good personality, and respecting company values as being among these skills.

Table 6: Future Skills and Abilities Ranked Overall in Order of Importance

Skills and Abilities as Ranked		
Technical Skills • Engineering (electrical, mechanical) • Ability to read blueprints • Auto CAD, CMM, GD&T • Welding • Robotic equipment programming, troubleshooting • Machine guarding • Lockout/tagout	• Metallurgy • CNC • Die maintenance & troubleshooting • Mechanical aptitude • Dimensional inspection equipment • Utility line work • Mechatronics • Engineering design	• Industrial design Precision measurement • Machining (manual machining, grinding, lathes) • Model design • Meter reading • Mechanical hand tools • Stamping processes • Assembly
Soft Skills • Problem solving • Reliability/showing up on time for work • Creative thinking • Leadership • Professionalism	• Attendance • Team work/collaboration • Flexibility in decision making • Life skills • Results-oriented attitude • International experience • Accountability	• Work ethic (getting the job done) • Interpersonal relationship building • Knowledge of lean mfg • Open to new ideas
Company Culture • Capacity for resilience (flexibility, adaptability) • Ability to work in different company environments (global or otherwise) • Continuous learning attitude	• A good fit for the company / personality / values • Understanding of risk prevention • Understanding of importance of training	• Quality product focus / continuous improvement • Loyalty to the company; a desire to make this a career

Communications Skills • Reading • Writing	• General communications • Customer service skills	• Language
Math Skills • Basic math	• Data analysis (translation of data)	
Education • Law degree (JD) • Associate's degree in machine operations • Knowledge of business & marketing	• MBA • Accounting • Finance	• Bachelor's degree in engineering • Wellness training • Six Sigma certification
Technology • Basic computer skills (Microsoft Office suite of tools)	• ERP Systems software (monitors production, inventory, accounting, HR)	• SmartPacs (software used to operate heavy equipment to control a production line)
Prior Experience • Machining	• Attorneys with law practice experience	• Internships
Marketing Skills • Digital marketing (web, virtual, gorilla)		

Employers also identified skills such as communications skills, math skills, education, technology, prior experience, and marketing skills as essential to future workforce hires. Additional comments made by employers were that the use of computers is becoming more critical to their future workforce needs, as well as lean manufacturing and continuous improvement processes. The companies noted that they will continually need skilled tradesmen because the complexity of their products may continue to increase. The skills and abilities ranked as most important by type of company are shown in Table 7.

Table 7: Future Skills and Abilities Overall by Type of Company

Type of Company	Skills and Abilities
Architectural Servs	Company culture/Prior experience
Attorneys	Soft skills/Education/Technology
Grocery Retail	Soft skills/Company culture/Education
Ind Bldg Const	Company culture/Education/Technical skills
Manufacturing	Technical skills/Soft skills/Math
Medical	Communications/Soft skills/Education
Nursing Care Fac	Company culture/Prior experience
Recyclable Materials	Soft skills/Education/Technical skills
Utility	Technical skills/Communications
Voca Rehab Servs	Company culture/Communications

How can the education system help to meet workforce needs? TALENT 2025 recognizes that the quality of a region's talent pool will increasingly determine its economic prosperity, thus a region's education system plays a significant role in contributing to the quality of its

workforce. Employers were asked to identify three issues or concerns that the region's education community (including K-12, and two- and four-year colleges and universities) could address that would help companies to meet their talent needs. The companies were also asked to rank their responses as first, second, and third in importance.

Of primary importance to employers is the need for **promoting high school career paths that lead to skilled trade occupations**, not only to two- and four-year college degrees. The companies indicated that trades, particularly manufacturing, should be promoted as viable career options after high school graduation. Most companies offer employment incentives such as paid internships and apprenticeships, and paid tuition and/or reimbursement toward two- and four-year degrees that would allow employees to further their education at little or no cost to them. One employer suggested that information catalogs be published and distributed in early years to high school students containing the types of education incentives offered by companies.

Employers emphasized a strong need for **integrating soft skills training into high school and college course work,** through course work that includes accountability, responsibility, problem solving, leadership, communications, writing, language, creative thinking, working in teams, making presentations, how to interview, how to dress appropriately for work, managing conflict, corporate/business etiquette, and paying attention to details. Respondents noted that while technical skills are critical, soft skills are also essential to the work environment and contribute to occupational advancement.

The employers interviewed stressed a need to **engage businesses** in a variety of ways to help guide high school and college career paths and to help weave applied training and tactics into curricula. Companies suggested inviting businesses into schools for career talks, helping to develop "hands-on" projects and research for students, reaching out to companies for facilities tours and demonstrations, and working with businesses to help students better understand the demands of a work environment. Employers also suggested that educators encourage students to take advantage of and help to create internships and work-study programs, and consider integrating internships and work study as requirements for graduation. Additional suggestions are shown in Table 8.

Table 8: How Educators can Help Meet Employer Talent Needs

Responses from Employers
Students need more training in math, statistics and analysis, science, technology, engineering, robotics, automation, root cause analysis, troubleshooting, & mechanical plant equipment maintenance (high school and college levels).
Software, technology, and technical equipment in high schools & colleges should mirror what is being used in industry today (keep it current).
More courses in computer-based applications (Auto CAD, CNC) should be offered and should be aligned specific to industry needs (high school and college levels).
As much as possible, broaden student exposure to global issues when teaching at the high school and college levels.
Continue and/or add WorkKeys® certification in high school.

Major concerns regarding tomorrow's workforce. Employers were asked to share their major concerns regarding tomorrow's workforce. The most pressing concern of all companies interviewed is the **availability of workers**—particularly skilled workers—as they look to sustain and/or grow their companies. The employers stated that a number of factors contribute to this concern. The companies indicated that the number of experienced skilled trade workers is declining (e.g., machining, pattern makers, tool & die) and apprenticeships can only "grow" so many workers. Those interviewed shared their concerns with misperceptions of the manufacturing industry–manufacturing as a "less desirable" industry, that one can't build a stable, long-term career in manufacturing due to off-shoring of manufacturing jobs, and of the negative media regarding manufacturing as a career choice. Employers emphasized that the image of manufacturing in Michigan and the United States should be positively promoted, that the media should send a message that manufacturing is not dying and thrives in the United States, and that educators should help students to recognize that there is a future for manufacturing in Michigan and domestically. The companies noted that students don't understand the career potential in skilled trade occupations and that promoting career path options for skilled trades (not only college-educated occupations) in high school could help.

The companies indicated that **soft skills will be critical for tomorrow's workforce**. Workers with critical-thinking and problem-solving skills, a continuous learning attitude, the ability to communicate and work in teams, and leadership capabilities were cited as important to employers in the near future.

Employers also voiced that they find today's workforce "impatient," not focused on product delivery, and unconcerned with long-term tenure with a company. The companies are concerned that workers don't desire to have long-term careers with employers and are always "looking for the next best thing."

Internship opportunities. The employers were asked whether they sponsored internships and if they hired potential employees from these internships. All but one of the companies interviewed offered and hired employees from internships; that company doesn't have a structured internship program, but is currently developing one. The company does, however, have a tuition-paid apprenticeship program for its employees where the employee works part time and attends the community college part time to earn an associate's degree. Many of the employers stated that they use internships as opportunities to "test drive" potential employees and hire interns to fill open job positions. The percentage of interns hired as employees by the companies interviewed is shown below in Figure 10.

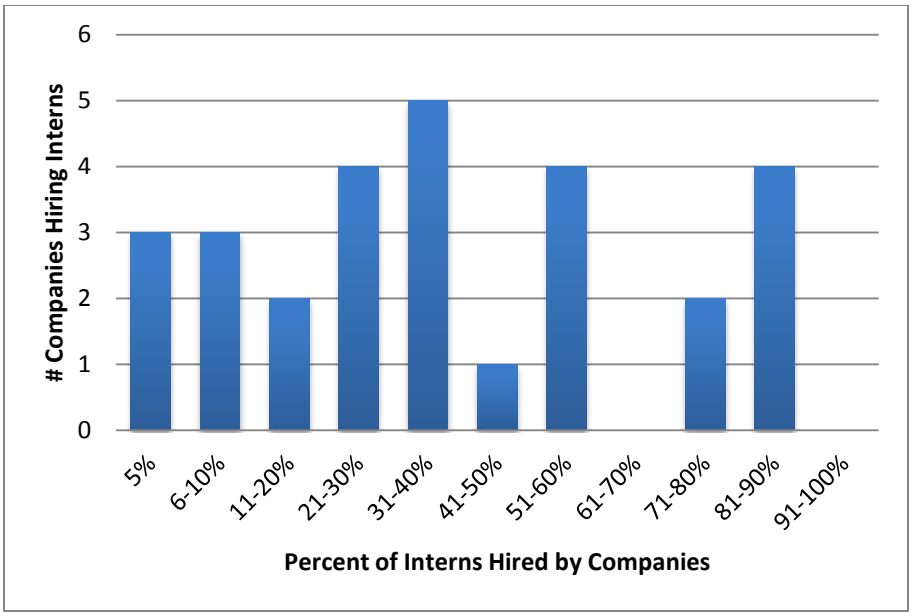

Figure 10: Employees Hired from Internships

Conclusions

Observations from the survey, focus group, and interview responses indicate that employers are concerned overall with being able to find workers to fill skilled positions, both today and in the near future. The key occupations critical to business success in West Michigan primarily require some type of technical expertise. New and emerging occupations for which these employers expect to hire will also likely require various levels of technical knowledge. As such, technical skills are viewed as being the most important skills necessary for the region's current and future workforce.

Employers look to educators to help them resolve talent issues and to help meet future workforce needs. Companies want to become more engaged at the K-12 and post-secondary levels in nurturing their prospective workforce. Promoting skilled trade occupations as viable careers, as well as the course work needed for such trades, is viewed as important to helping inform students considering career-path options. The companies want to become more engaged with educators to promote skilled-trade careers and to educate and train students for skilled occupations.

Companies are investing more time and dollars into sculpting future employees. They recruit potential new hires through internship and work-study programs and build the skill levels of employees with apprenticeship training programs, with the hope of preparing workers for long-term careers with their companies so workers can thrive and continue to call Michigan home.

Forecast of Future Employment Growth and Labor Supply

The future employment situation for the TALENT 2025 region will be determined by both demand and supply factors. On the demand side, the labor demand will depend upon the ability of the region's base industries—those that sell their products to customers outside the region—to expand. In turn, this will depend on the national and international outlook for their specific industries. For example, most analysts are predicting that auto sales are expected to remain strong until at least 2016 and then hopefully level off at a stable rate. The base industries' demand for workers will also depend upon their ability to generate new products and services that meet market demand. If the region's base industries are successful in the launch of new high-demand products and services and are able to keep their production costs low by adopting advanced lean production processes, then their demand for labor would increase as they gain market share at the expense of their rivals.

The success of the region's base industries will, in turn, determine the labor demand for the region's non-base employers—consumer services, medical, and retailers. Every job created by the region's base industries can be expected to generate between 0.4 and 1.4 additional jobs in the non-base sector.

Supply side factors can clearly impact future job growth in the region as well. In short, if employers cannot find the talent they need, then they will have to look elsewhere to produce their products or services or they will be forced into a bidding war for the limited number of skilled workers in the region which would negatively impact their competitiveness.

With regard to supply, there are three major avenues that the region can take to increase its supply of talent:

- Retrain and retain its current workforce,
- Grow its own workforce by working to improve the region's K-16 education system, or
- Attract talent into the region

Each will be examined in the following section; however, we first present our demand side employment forecast for TALENT 2025.

Demand Forecast

The TALENT 2025 Region has bounced back from the 2007–09 recession. From the second quarter of 2009 to the third quarter of 2012, employment in the TALENT 2025 region increased by 47,720 jobs, an 8.2 percent increase.[7] Nationwide, employment increased by only 1.6 percent during the same time period.

In preparing our demand forecast for TALENT 2025, we assume a slight business slowdown in 2018 and an overall employment growth rate of 0.7 percent annually, from 2013 to 2025. The

[7] During the recession, the TALENT 2025 region employers lost 56,250 jobs.

region would fully recover for the 2007–09 recession in 2016. In 2025, employment in the TALENT 2025 region nearly reaches 900,000 workers (Figure 11).

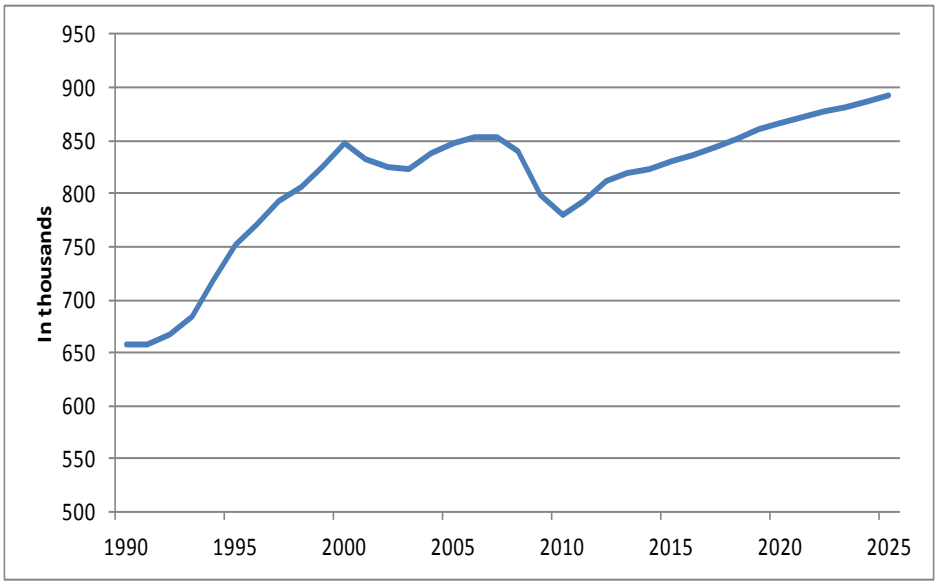

Figure 11: Employment History and Forecast for TALENT 2025, 1990 to 2025

The employment forecast for specific industrial sectors are shown below (Figure 12). The number of workers in manufacturing is expected to decline to just under 100,000 workers in 2018, and then stabilize through the rest of the forecast period. The predicted loss in employment is because of expected productivity gains in the sectors and not due to a loss of competitiveness. In short, global pressures and advancements in technology will push the region's manufacturers to produce more with fewer workers.

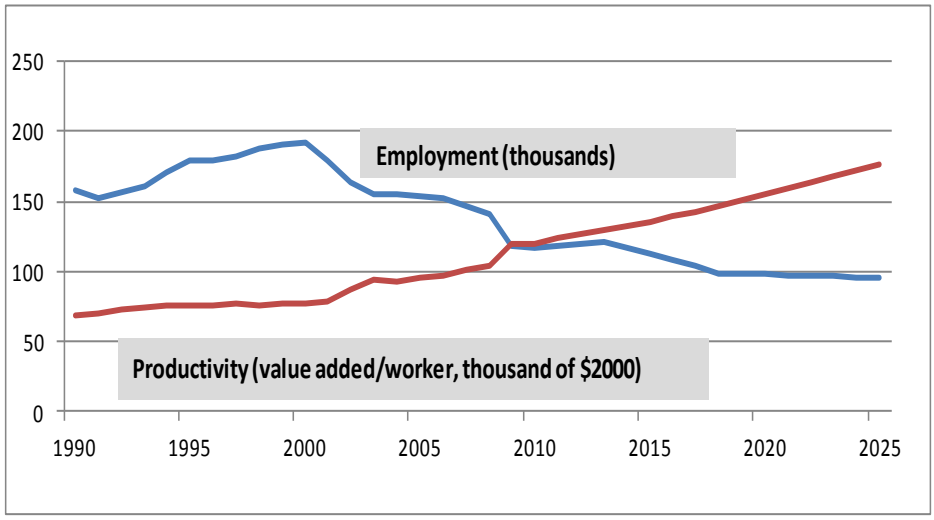

Figure 12: Manufacturing Employment and Productivity Forecast for TALENT 2025

The number of workers in manufacturing is expected to decline to just under 100,000 workers in 2018 and then stabilize through the rest of the forecast period (Figure 13). The predicted loss in employment is because of expected productivity gains in the sectors and not due to a loss of competitiveness. In short, global pressures and advancements in technology will push the region's manufacturers to produce more with fewer workers. At the same time, however, manufacturers will demand and provide long-term employment opportunities for high-skilled workers. This is a crucial point that must be stressed over and over again: The loss of low-skilled workers cannot be taken as evidence of a lack of demand for high-skilled positions.

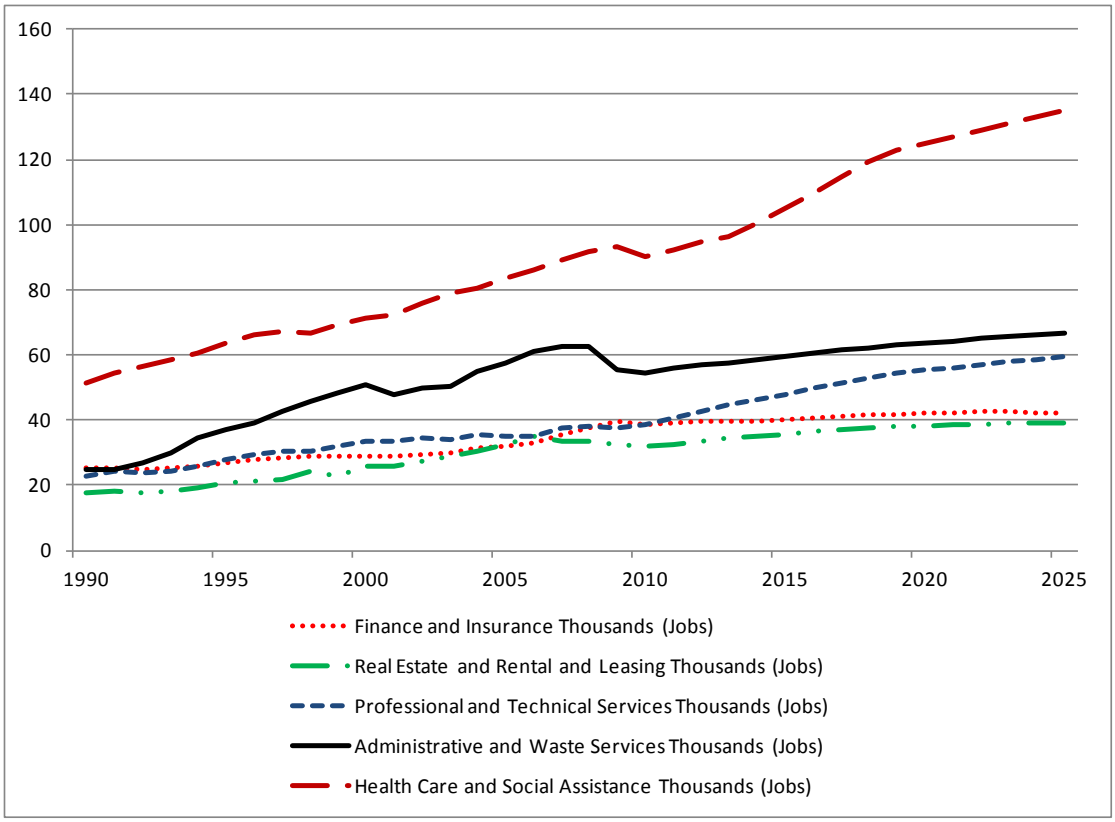

Figure 13: Employment Forecast for Specific Services Industries in TALENT 2025

A detailed occupational forecast for the TALENT 2025 region is provided in the Appendix, Table A-2.

The REMI Model

The W.E. Upjohn Institute maintains an economic computer model specifically designed to estimate the economic impact of changes in the 13 counties in the TALENT 2025 region. The model was constructed by Regional Economic Models Incorporated (REMI) and contains three separate components that together capture the resulting total impact to the local economy due to a change in employment. These components are:

- An input-output model that estimates the impact on the local economy of changes in inter-industry purchases. This component of the model captures the impact of an increase in orders to local suppliers of goods and services, as well as the impact of households increasing their purchases of consumer goods and services.
- A relative wage component that estimates the impact of the expected changes in the area's cost structure due to changes in economic activity. For instance when a major employer moves into the area, it can cause wages to increase across almost all industries due to the increased demand for workers and other local resources. This boost in wages, while generating additional consumption expenditures, increases the cost of doing business in the area, making the area slightly less attractive to other industries.
- A forecasting and demographic component that forecasts the resulting changes in future employment and population levels due to a change in economic activity.

TALENT 2025 has established the goal of having 64 percent of the population over 25 years of age attain at least some college or higher by 2025 (Figure 14). The "some college" criteria is used because it includes non-degree certificate programs. The most recent data from 2011 show the attainment rate of 56.9 percent in the TALENT 2025 service area. The good news is that using the five years to project a linear trend, the region is on target for meeting its goal. The dashed blue line shows the projected trend line based on the past five years of education attainment of at least some college. Moreover, if the region's colleges were successful in increasing the completion rates of their students, the region would exceed its goals substantially.

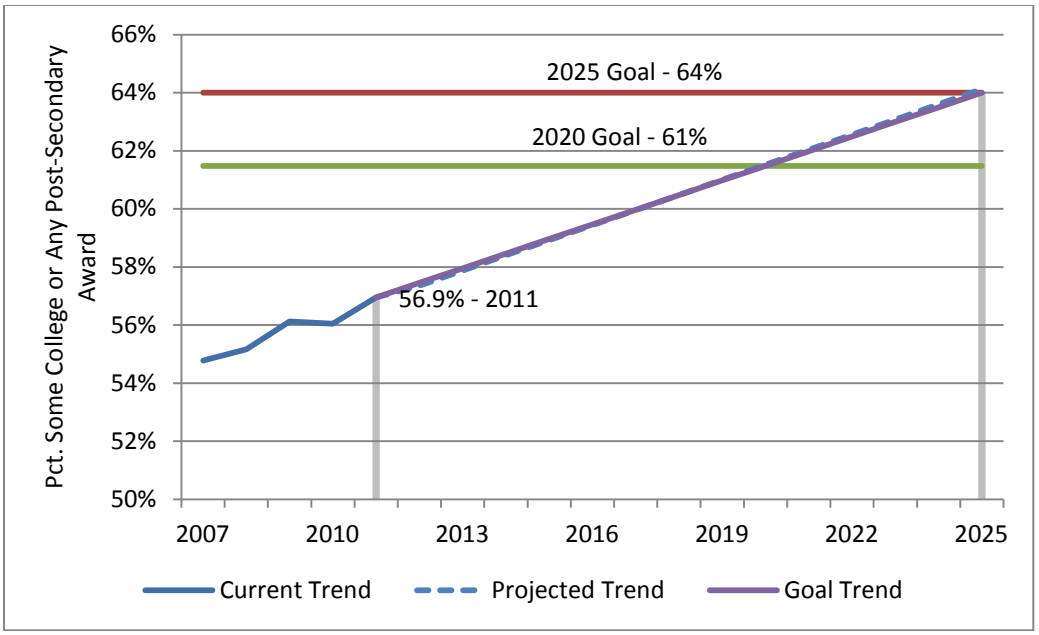

Figure 14: Educational Attainment Goals and Projection

Supply Side Factors

We are getting older. We fear that the consequences of this well-known fact are still not fully understood. However, for the TALENT 2025 region it will mean that there will likely be a squeeze on the available workforce in the next 10 years. While it is premature to say that there will be a labor shortage due to demographic forces during this time period, it is clear that the employment-to-population ratio will be climbing during the forecast period (Figure 15).

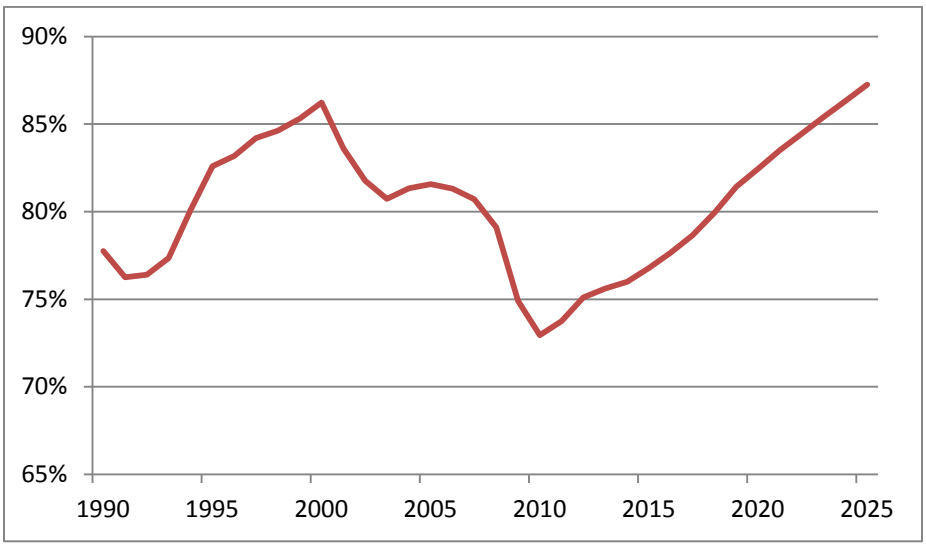

Figure 15: Future Employment to Population Ratio in TALENT 2025 Region

Hitting a low in 2011 due to the recession, the ratio of employment to working-age adults climbs from 73 percent to 87 percent in the TALENT 2025 region. If this forecast holds true, the ratio will top the high mark reached in 2001. The clear ramifications of this forecast are that to avoid a possible labor shortage in the future, it will be very important to:

- Retain and retrain the region's existing workforce
- Attract skilled workers into the region
- Make sure that young adults completing high school are career ready

Future Supply Flows

The year 2025 is only 12 years away so it should not be surprising that a large share of the workforce at that time is already in the region's workforce today. As shown in Figure 16, we are forecasting that nearly 400,000 of the nearly 900,000 workers in 2025, 44 percent are currently in the region's workforce today. Now, it is important to note that the decline in the region's existing workforce during this time period will be due to a variety of factors, the major ones being:

- Retirements
- Individuals moving out the region for employment or family reasons
- Young adults going to college outside the region

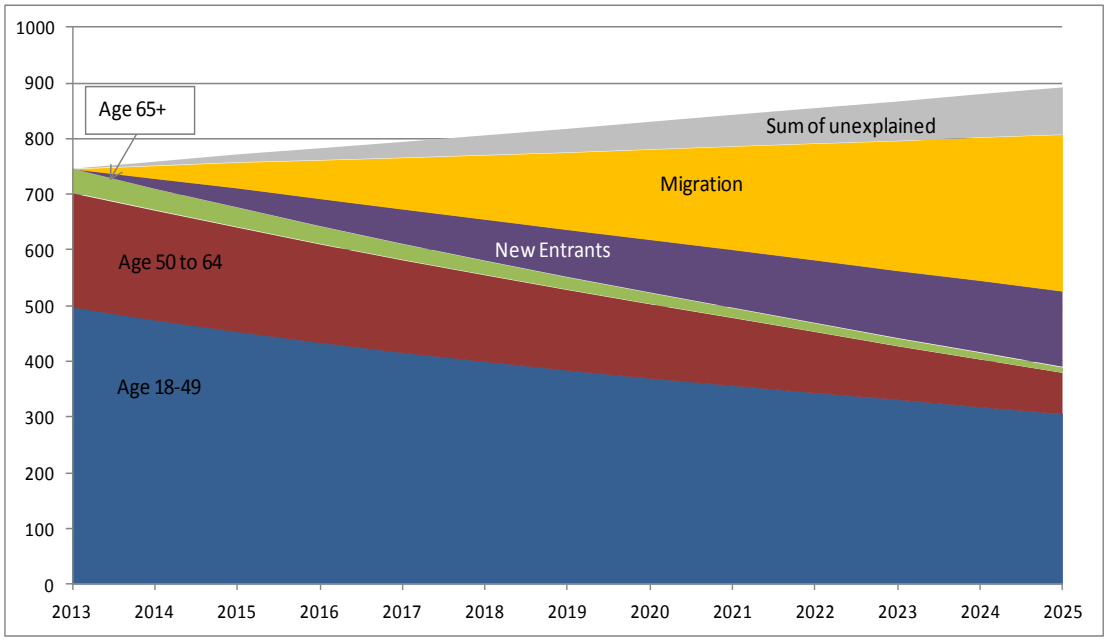

Figure 16: Labor Force Flow, 2013 to 2025

The next largest share of the TALENT 2025 workforce will be persons who will have moved into the area from 2014 to 2025. We are forecasting that in-migrants will account for 280,000 employees, 31 percent of the region's 2025 workforce. These individuals will include young adults moving back to the region after attending college outside the region as well as other

former residents moving back after working outside the region. However, a majority of the group will be individuals who are moving into the region for the first time.

The final source of the 2025 regional workforce will be new entrants coming from the area's K–12 system and either entering the workforce right after high school or after attending a region's college and university. We are forecasting that this group will account for 15 percent—135,000 workers—of the 2025 workforce.

We now examine each of these future supply sources and identify key policy implications.

The Existing Workforce

With the passage of time, the region will lose years of experience and know-how as some of the region's best workers retire or take employment positions outside the region. For some of the region's smaller firms with an aging workforce, the next 10 years will be extremely challenging. Much of this loss will be unavoidable; however, if the region is able to address the following issue, the potential loss of talent can be minimized (Figure 17).

Efforts should be explored to increase the accessibility of retraining opportunities to existing workers who may need new skills to stay productive and for older workers who find themselves unemployed. The region's community colleges and Michigan Works! have the educational and job search resources that can help keep workers in the workforce and increase their productivity as well. Many incumbent workers who find themselves unemployed will likely find the new electronic job market difficult to negotiate. The second challenge is that many older workers have not been in a learning environment for years and they may feel isolated and alone in a classroom setting. For those who find that their job skills have become obsolete, they may be required to consider changing careers.

Clearly, expert career counseling is a must; however, it may not be sufficient. Five years ago, two-year registered nursing programs were in high demand as the region's medical facilities faced severe shortages. Many workers who were underemployed or unemployed entered and successfully completed two-year programs. Unfortunately, now there appears to be an oversupply of RNs with only two years of training as changing regulations, and a soft labor market is pushing medical centers to seek only four-year-degreed RNs.

Finally, for older workers being unemployed can be a severe crisis as evidence clearly shows that the probability of finding another job can be very small. The loss of experience and ability that occurs when an older unemployed worker gives up and drops out of the labor market can be large. It is a national problem, which means that regions that find the solution will have a competitive advantage.

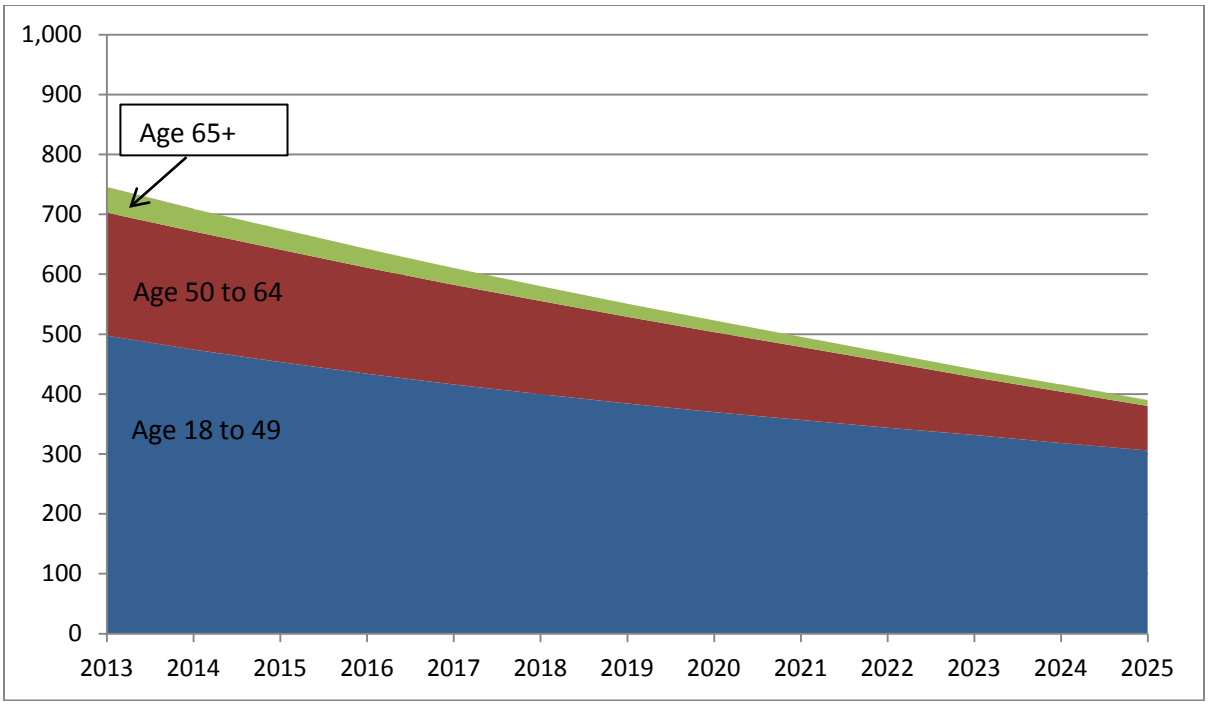

Figure 17: The Decline in the Existing Workforce—A Loss of Experience and Knowhow

Attracting New Workers into the TALENT 2025 Region

The generation of new jobs is the best way to attract new workers into the region; however, job attraction is clearly outside the focus of TALENT 2025. Moreover, the with Right Place, Lakeshore Advantage, and Muskegon Area First, the TALENT 2025 region already has an internationally recognized economic development team in place.

"Place making" has become a major component in many regional economic development efforts. But, again, the necessary actions required to create an attractive environment for young professionals is outside the expertise of TALENT 2025. Furthermore, programs already exist that highlight the attractive environment that West Michigan provides for young professionals. For instance, Hello West Michigan assists young professionals and their spouses, significant others, and/or family members in their move into West Michigan by offering networking opportunities, providing job search assistance, and highlighting recreational and cultural events. In addition, Downtown Development authorities, real estate developers, and neighborhood associations are clearly better prepared to address quality of life opportunities in the region. However, the attraction of talent into the region is also about developing strong employment networks, the development of internships/apprenticeships opportunities, and the design of creative workplaces.

Information flows can always be improved. The region's professional and high-skilled workers can be the region's best sales force. Through personal contacts and professional associations, they can be effective conduits for sharing regional employment opportunities to individuals living out of the area (Figure 18).

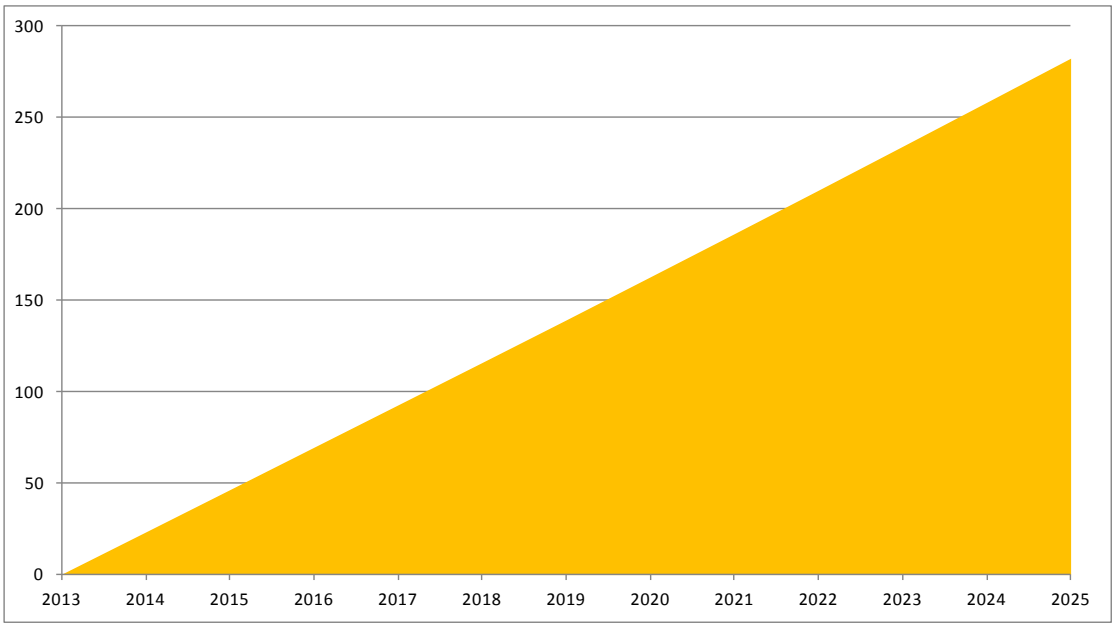

Figure 18: Migration into the Area

Internship and apprenticeship programs from area companies offer excellent opportunities for young workers to explore work environments. While such programs are an effective way to attain recent graduates from the region's universities and colleges, many of whom came from outside the region to attend college. They can also be an effective way to attract young workers from outside the region. Selective posting of internship opportunities at the major universities in the Great Lakes states could enhance the visibility of the TALENT 2025 region to a larger regional talent pool.

Finally, with the creation of GRid70, a partially shared workplace for some of the region's most innovative companies, the TALENT 2025 region is already at the forefront of efforts to design creative workplaces. Given the strong design presence in the region, as indicated by the activities hosted by Design West Michigan, TALENT 2025 has the resources to create more well-designed work environments.

New Entrants from the Region's K–12 System

The final path to talent development for the TALENT 2025 region is to grow its own talent. This is a road well traveled throughout the nation; however, most efforts have not effectively called upon the business leadership to work in cooperation with the education community to address the issue, as has been done with TALENT 2025 (Figure 19).

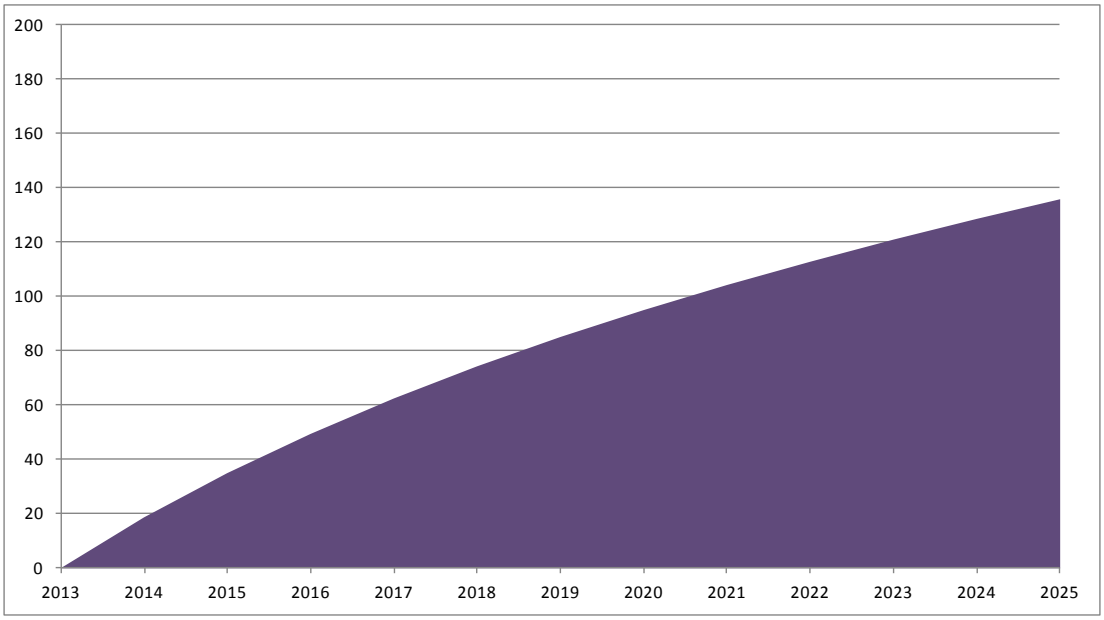

Figure 19: New Entrants to the Labor Force from the K-12 System

The Plight of the Associate's Degree Registered Nurse

Job postings for registered nurses indicate that the Associate's degree is no longer in demand for the position. Out of 1,450 positions for registered nurses (RN) posted in the TALENT 2025 area, only 57 listed an Associate's degree as the minimum educational requirement, compared to 552 for a Bachelor's degree. Figure 20 shows the complete distribution of educational requirements; however, the situation could be even worse than that. The data come from Burning Glass Labor Insight, whose software lists the minimum requirement but not the preferred minimum educational requirement. Notice also that 86 jobs listed a high school degree as the minimum requirement. Upon viewing the job postings, these 86 positions do require a certification in nursing as well as a high school degree, but the software determines that high school is the minimum. The 57 positions with a minimum Associate of Arts degree could still list a Bachelor of Arts (BA) degree as preferred.

Nearly 50 percent of the postings do not list an educational requirement at all. Considering that nursing is a licensed profession, one cannot be hired as an RN without a degree. And while an Associate's degree may get a person considered for the job, they could still lose the position to someone with a BA in nursing.

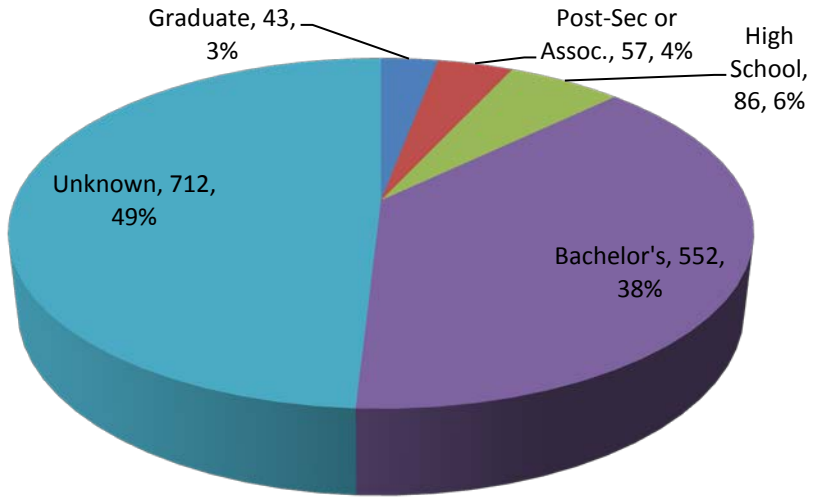

Figure 20: Educational Requirements of Registered Nurse Job Postings

Flow Analysis of the Current K-16 System

Based on very limited national and local data, we developed the following "back of the envelope estimation on the outcome of the current K–12 education system in the TALENT 2025 region (Figure 21). While this flow model offers only a rough approximation of current outcomes, it does identify several key break points that could have serious consequences to students' ability to complete. First, students' performance in pre-k through third grade has a dramatic impact of their future success. Third-grade performance can be considered a necessary condition for future success; at this time approximately 40 percent of the region's third graders pass this milestone. For the majority who do not, many end their academic career with only a high school diploma (45.8 percent). Another 30 percent unfortunately drop out. For the upper 40 percent of third-grade performers, 95 percent complete high school and 85 percent go on to college when they hit the second major break point. Only 55 percent of the students attending college complete the degree.[8]

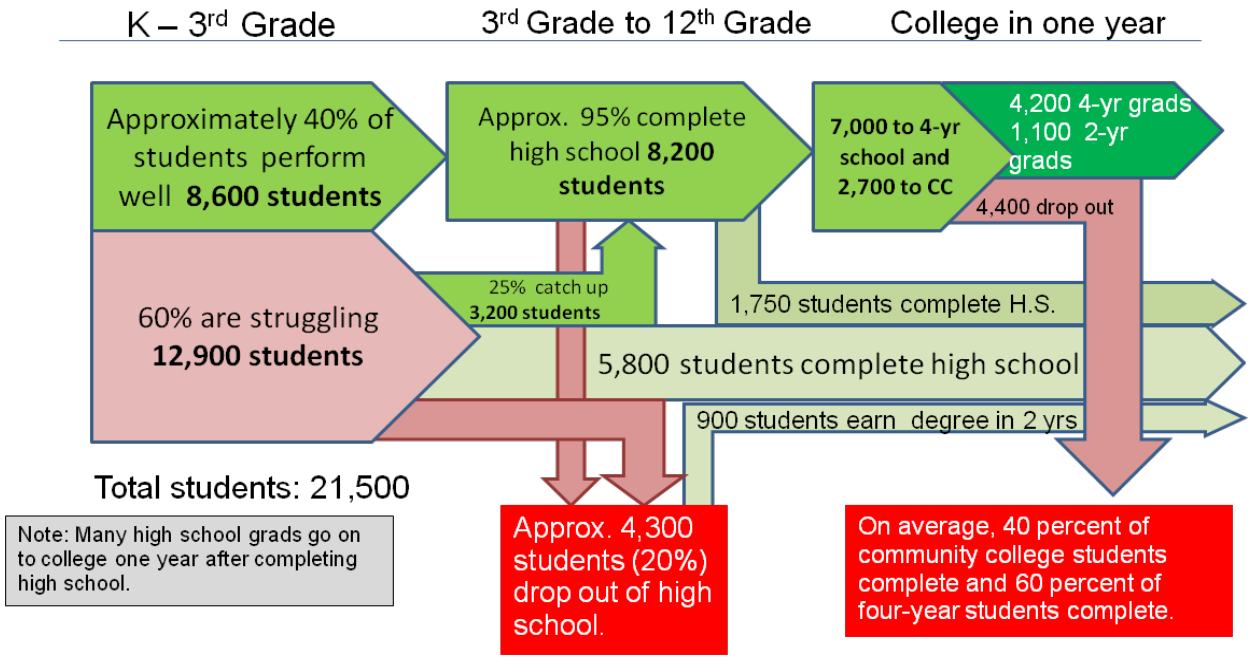

Figure 21: K–12 Student Performance Flow Chart

Reviewing the flow of children and students through the pre-k through 16 education continuum provides an analysis of performance across the transition points of this birth-to-career continuum. Our review identifies critical transition points and the most common denominators among those who are successful in completing these transitions. More specifically, our research identifies several indicators believed to be predictive of future academic success. Predictive indicators can be useful tools for assessing whether students are on target for K–12 achievement,

[8] It should be note that college completion estimates, as they as currently measured, are flawed because they do not properly account for students transferring from one school to another. We made adjustments to the completion rate estimates based on conversations with representatives of the region's colleges.

high school graduation, and college readiness. They offer opportunities for data-driven goal setting, integrated planning, and implementation of interventions and accelerations. The premise is that with early warning indicators in place, schools and the community can more readily monitor progress and implement interventions for remediation and acceleration when necessary.

Some of the research highlighting the value of predictive indicators at key transition points is summarized below. Also summarized is the approach taken in Montgomery County, which is considered by many experts in the field an example of best practices in building an asset-based approach to preventing skills gaps (starting at pre-k), identifying gaps, and building toward success.

Selected Research Findings

- Growing up poor leaves children at a disadvantage starting school. Poverty alone puts children at risk for poorer health, behavior, and skills at the start of kindergarten than their counterparts growing up in better economic conditions.
- Early childhood interventions, especially high-quality preschool, yield benefits in academic achievement, behavior, educational progression and attainment, delinquency and crime, and labor market success, among other domains. Well-designed early childhood interventions generate a return to society ranging from $1.80 to $17.07 for each dollar spent on the program.
- Third-grade reading proficiency has an important predictive value for future academic success, including high school graduation. Students not reading at grade level by third grade are four times more likely to leave high school without a diploma than children who are proficient readers. Poverty compounds the problem: Poor students are three times more likely to drop out or fail to graduate on time. Poverty hurts even the best readers, with low proficiency third graders graduating at about the same rate as subpar readers who have never experienced poverty. Kids who struggle with reading and live in poverty are the hardest hit—they are six times at greater risk than their proficient counterparts. For black and Latino students, the combined effects of poverty and poor third-grade reading skills make the rate eight times greater.
- Sixth-grade reading and math proficiency are key indicators of future academic success, including high school graduation. Non-academic issues, such as behavior or attendance, problems are also important. According to one study, sixth graders who failed math or reading/English or attended school less than 80 percent of the time or received an unsatisfactory behavior grade in a core course had only a 10 to 20 percent chance of graduating on time.
- The likelihood of dropping out in high school can be predicted with great accuracy based on a student's performance in 9th grade. Absenteeism, earning too few credits, and not being promoted to 10th grade all increase the likelihood of dropping out of high school.
- Students who take more advanced course work in high school are more likely to attend college, less likely to be placed in remedial courses in college, and more likely to be successful in the colleges they attend.
- Post-secondary education has long-term financial and health benefits for individuals:
    - Lifetime earnings of individuals holding a Bachelor's degree is projected at $2.3 million, relative to earnings of $1.3 million for those with high-school diplomas.

  - Workers with Bachelor's degrees experience substantially lower levels of unemployment even during economic downturns.
  - The longstanding link between a college education and longevity has grown only stronger over time.
- Lifelong learning is more essential than ever, as the economy is evolving quickly and a community's workforce must be able to retool to match business needs. However, traditional approaches to higher education are often inadequate in effectively connecting low-income students to learning.

Early Childhood

Research increasingly shows that the first few years of a child's life are a particularly important period in development, laying the foundation for cognitive functioning; behavioral, social, and self-regulatory abilities; and physical health. Yet many children face various stressors during these years that can impair their healthy development. Quality early childhood education programs are designed to mitigate the factors that place children at risk of poor outcomes. Such programs provide supports for parents, children, and/or the family as a whole. These supports take the form of learning activities or other structured experiences that affect a child directly or that have indirect effects through training parents or enhancing the caregiving environment. As part of a recent study, RAND researchers synthesized what is known from the scientifically sound research literature about the short- and long-term benefits of early intervention programs, the features that are associated with more effective programs, and the economic gains that accrue from investing additional resources in early childhood. Among the study's findings:

- Early childhood education programs yield benefits in academic achievement, behavior, educational progression and attainment, delinquency and crime, and labor market success, among other domains.
- Interventions with better-trained caregivers and smaller child-to-staff ratios appear to offer more favorable results.
- Well-designed early childhood interventions generate a return to society ranging from $1.80 to $17.07 for each dollar spent on the program.

A study by High/Scope Educational Research Foundation of Ypsilanti, Michigan, showed the significant value of early learning. From 1962–67, 123 African Americans, all ages 3 to 4 and born in poverty—and therefore at a high risk of later failing in school—were randomly divided into two groups. One group was exposed to a high-quality preschool program while the control group was not exposed to any preschool programs. The program that the experimental group was exposed to was based on High/Scope's active learning approach. In the study's most recent phase, 95 percent of the participants were interviewed at age 27. Additional data were gathered from the subjects' school, social service, and arrest records. The most significant findings of this study were that:

- Almost one third as many of those attending the preschool program, opposed to those with no preschool exposure (71 percent vs. 54 percent), graduated from regular or adult high school, or received their General Education Development Certificate.

- At age 27, four times as many of those exposed to the preschool program, opposed to those with no preschool exposure (29 percent vs. 7 percent) earned $2,000 or more per month. The treatment group also scored higher on home and car ownership.
- At age 27, only one fifth as many of those with preschool exposure, opposed to those with no preschool exposure (7 percent vs. 35 percent), had been arrested five or more times, and significantly fewer arrests for drug dealing were made under the preschool program group members (7 percent vs. 25 percent).
- The rate of out-of-wedlock births was lower among the group that had received preschool exposure (57 percent vs. 83 percent).

In a 2012 study published by the Brookings Institution, the authors emphasize that growing up poor is a key stressor that often leaves children at a disadvantage when starting school. The study documents that poverty alone puts children at risk for poorer health, behavior, and skills at the start of kindergarten than their counterparts growing up in better economic conditions. Fewer than half (48 percent) of poor children are school-ready at age five when measured in terms of early math and reading skills, learning-related and problem behaviors, and overall physical health. Conversely, 75 percent of children born to parents of moderate to high incomes start kindergarten ready to learn, leaving a 27 percentage point gap in school readiness between the two income groups. School readiness effects extend beyond the first few months of kindergarten. Children ready for school at age five are generally more successful in grade school, are less likely to drop out of high school, and earn more as adults, even after adjusting for differences in family background (Duncan et al. 2007; Duncan et al. 2010). Entering school prepared to learn can improve the likelihood of reaching middle-class status by age 40 by about 8 percentage points, according to a recent analysis that links data sets to track success from birth to 40 (Winship, Sawhill, and Gold 2011).

The Brookings study looked beyond poverty to show that income status alone does not put children at risk. Other contributing factors are that the parents of poor children have lower levels of education, higher rates of smoking, higher rates of depression, and fewer parenting skills and supports than children from moderate and high-income families. Comparing the simulated effects of three intervention strategies—preschool programs, smoking cessation programs, and nurse home visiting programs—the study suggests that preschool expansion has the most promise for increasing the school readiness of poor children.

Montgomery County Public Schools (MCPS) identified the importance of investing in early childhood education and determined that more instructional time spent in pre-k is cost effective because it builds strong foundations for later school success. Successful programs, according to MCPS, must include early childhood-certified teachers, consistent assessment and a strong, fully-aligned curriculum. They also believe that it's essential to keep preschool fun so children and families stay engaged. MCPS research has found that by spending an extra $2,000 on each student, the following results were achieved: The percentage of children reading at a Level 3 in kindergarten rose from 39 percent in 2001 to 93 percent in 2007–08; in fact, 65 percent of kindergarten students were reading at a Level 6—an indication of advanced reading levels—by the end of 2008.

Elementary School

Third-grade reading and math proficiency is increasingly cited as a critical predictive indicator for students. A 2011 study by the Annie E. Casey Foundation has identified that poverty and third-grade reading proficiency has a significant impact on high school graduation rates. Students not reading at grade level by third grade are four times more likely to leave high school without a diploma than children who are proficient readers. The report, "Double Jeopardy: How Third-Grade Reading Skills and Poverty Influence High School Graduation," studied nearly 4,000 students nationwide. Overall, poverty compounds the problem: Poor students are three times more likely to drop out or fail to graduate on time. The study also confirmed that poverty hurts even the best readers, with poor proficiency third graders graduating at about the same rate as subpar readers who have never experienced poverty. Kids who are poor readers and live in poverty are the hardest hit—they are six times at greater risk than their proficient counterparts. For black and Latino students, the combined effects of poverty and poor third-grade reading skills make the rate eight times greater.

A 2010 study from the University of Chicago supports the theory about the importance of third-grade reading levels as predictors of high school performance and college enrollment. This longitudinal analysis of Chicago students emphasizes that it was only third graders *above grade level* who enrolled in college at a significantly higher rate than below or at grade-level students. This pattern proved true even after controlling for background characteristics such as poverty level, prior achievement, and school effects. Although the study illuminates the relationship between early performance and later outcomes, the researchers emphasize that it is not reading and math proficiency alone that serve as predictors. Rather, they emphasize it is more likely that individual, family, and community factors contribute to low-academic performance and future student educational outcomes.

In Montgomery County, researchers and school personnel have used the results of the Maryland School Assessment (MSA) to track how performance on these tests in the early grades correlates to future performance, high school graduation, and college readiness. The reading and mathematics tests are administered annually to students in grades 3 through 8 and results are scored as "basic," "proficient," or "advanced." The school district found that students who score in the "advanced" range demonstrate more complex reading, thinking, writing, and creative problem-solving skills. Students who score in this advanced range for reading in these early years are also more likely to accelerate in higher level math (Algebra I and II) in later years. They are more likely to maintain this level through 9th grade (and are therefore prepared for high school), stay on the college-ready pathway when they go to high school, and are more likely to be college ready. Equally important to these findings are the interventions designed to meet the needs of students not performing in the advanced range.

Middle School

Middle school is a time of critical preparation for high school and beyond, providing the cognitive, content, and social skills necessary for future success. Research cited in the Program on Education Policy and Governance Working Papers Series at Harvard University found that students moving from the 5th grade to middle school show a decrease in math and language arts

achievement. The study, based on Florida schools, suggested that this decline can plague student academic achievement outcomes as far out as 10th grade, even thwarting prospects of graduating from high school and continuing on to college. The study found that students who make a school transition in 6th grade are absent more often than those that remain in one school through 8th grade, and they were more likely to drop out by 10th grade. Limited research has focused on this middle-school age group, but a 2010 study, "Gaining Ground in the Middle Grades" from the research group Edsource, supported the concept that schools that designed specific programming to assist middle-school students with the transition from elementary to middle school fared much better. Higher achievement outcomes were found in schools that were more intensive and intentional about looking at a wider array of student data and were prepared with interventions.

Sixth-grade reading and math proficiency is a key indicator of future academic success. A study conducted by Balfanz and Herzog (2006) in Philadelphia found that more than half of sixth graders who attended school less than 80 percent of the time, received a poor final grade from their teachers in behavior and were failing either math or English, eventually left school. The research showed that middle-school students who later dropped out sometimes exhibited problems with academic performance or engagement ***but not both at the same time***, suggesting that an off-track academic path and an off-track nonacademic path to dropout seem to converge closer to high school. Attending to behavior challenges, engagement, and attendance with middle-grade students who are not failing course work may be one key to reaching a group of students who may otherwise drop out later.

A subsequent Balfanz (2009) study reviewed 30 middle schools implementing reforms to look at the role of middle grades in determining the likelihood that a student will graduate from high school. This research found that sixth graders who failed math or reading/English, or attended school less than 80 percent of the time, or received an unsatisfactory behavior grade in a core course had only a 10 to 20 percent chance of graduating on time. Fewer than 25 percent of students with at least one off-track indicator graduated within one extra year of on-time graduation. In other words, once a sixth grader demonstrates that he or she lacks the knowledge to pass an English or math test or the ability to complete assignments, absent successful intervention, this pattern is unlikely to change for the better, particularly in high-poverty schools.

Career awareness programs at the middle- and high-school levels have been found to help improve academic performance if they: 1) offer students access to challenging, high-quality curriculum and instruction; and 2) have adopted new organizational arrangements that support improved learning opportunities. Such programs link school work to future opportunities and actively address the needs of the whole student, creating networks of support that allow students to succeed. Finally, they use many resources to energize and sustain their work, chief among them the enhanced professional skills of their faculty. David Conley, CEO of the Educational Policy Improvement Center at the University of Oregon, has conducted and published extensive research supporting this premise. In addition to the content knowledge and cognitive strategies measured by standardized tests, grades, and classroom measurements, students must also master academic behaviors and contextual skills and awareness. Conley's research supports career awareness being delivered throughout the K–12 years to offer students a context for their classroom studies and assist them in developing self-awareness and the soft skills necessary in both the academic and work world.

Montgomery County maintains its level of high expectations through middle school. A third widely accepted goal is for students in the district is to take Algebra I, traditionally a high school course, in middle school. The target outcome is for students to earn a C or higher in this middle-school course.

High School

Risk factors for dropping out. Findings from a 2006 study by Neild and Balfanz who followed a cohort of students in Philadelphia, identified important indicators for the future educational success of at-risk ninth graders. Students who attended less than 70 percent of the time, earned fewer than two credits, and/or were not promoted to 10th grade on time were most at risk. According to Neild and Balfanz, a ninth grader with just one of these characteristics had at least a 75 percent chance of dropping out of school. About one-half of the dropouts in the Philadelphia school system can be identified before ever entering high school, and a full 80 percent of the students who dropped out were either at-risk eighth or ninth graders. The authors found that being held back in ninth grade was the strongest factor for dropping out.

Melissa Roderick's research from the Consortium of Chicago School Research noted that students who drop out in 9th or 10th grade tend to have low grades in elementary school. These students also show a steep decline in attendance and grades during middle school. However, nearly one third of Philadelphia's dropouts exhibited no warning signs in 8th grade but had problems in 9th grade—the transition year to high school.

In a study published by the Alliance for Excellent Education (2007), lowest performing readers in the eighth grade whose test scores demonstrate achievement in the lowest quartile are 3.5 times more likely to drop out than students in the next quartile of achievement and 20 times more likely to leave school early than top-performing students.

College readiness measures. For schools using early warning systems and communities employing college readiness indicators, traditional college admissions tests are the most widely used because of the availability of ACT and SAT scores. In Michigan, a measure used frequently is the percent of students who meet the four college readiness benchmarks (English, Reading, Science, and Mathematics) as measured by the results of student performance on the ACT portion of the 11th grade Michigan Merit Exam. The ACT is an industry standard in which acceptable scores signal "college-readiness." However, based on recent research findings, recommendations have been made that a more appropriate indicator is the percent of students who meet or exceed the ACT English and Mathematics subtests as college readiness benchmark scores. (As a point of reference, the top score is 36 and readiness is defined as scores at or above 18 on the English test and 22 on the Mathematics test).

Research studies from the National Bureau of Economic Research (2011) suggest that not all ACT subtests have equal predictive power for college readiness. The research has drawn into question the ACT Reading subtest's ability to predict college success. The authors conclude, "In fact … Reading and Science [subtest scores] provide essentially no predictive power regarding

college outcomes." (The same study found the ACT English and Mathematics subtests to be "highly predictive of positive college outcomes.")

The research literature supports a significant number of useful tools for measuring college readiness, but prior to adopting a specific test caution must be used to validate such claims. For example, one area of caution is the validity studies conducted to determine the placement accuracy of students into entry level college credit course work and remedial courses. Conley (2007) emphasizes the importance of academic behaviors that influence graduation and persistence as another source of validity evidence. These researchers and others support the validity of college readiness metrics that rely on a variety of sources of evidence that demonstrate the relationship between the measure and subsequent performance.

College access services. The ability to access funding for higher education is an important factor in determining whether students attend. MCPS is a member of the National College Access Network and has adopted the CollegeTracks model to ensure that their graduates are not only prepared for college and careers but that they are also guided and supported with college admissions, financial aid, and college completion. While corporations and private foundations provide nearly 70 percent of the financial support for the operations and administration of this initiative, over 50 community volunteers have also been recruited and deployed to provide one-on-one student attention. Services are universal across all students but extra targeting is focused on low-income and first generation college-going students. Staff and volunteers assist students and families in navigating the critical milestones in the college search process. Services are school based to improve access and integration with teachers and counselors.

Post-Secondary Education

Completing a post-secondary degree is an increasingly important predictor of future economic and personal success. The benefits of a college education can be seen in areas as diverse as earnings, unemployment rates, and longevity. Repeated studies have found a linear relationship between higher education and higher earnings, with each level of post-secondary education completed accounting for an increase in lifetime earnings. A recent summary of this research by the Georgetown University Center on Education and the Workforce, The College Payoff 2011, projects lifetime earnings of individuals holding Bachelor's degrees of $2.3 million, relative to earnings of $1.3 million for those with high-school diplomas. Data from the Bureau of Labor Statistics provides evidence that workers with Bachelor's degrees experience substantially lower levels of unemployment even during economic downturns. For example, the March 2012 unemployment data showed a national unemployment rate of 8.2 percent, but a rate of only 4.2 percent for those with a four-year college degree. The unemployment rate for these more educated workers has remained at the 4.0 to 4.2 percent level throughout the recent recession. Finally, research from the University of Wisconsin Population Health Institute shows that the longstanding link between a college education and longevity has grown only stronger over time; recent data reveals the lack of a college education accounting for about 35 percent in the variation of premature death rates across counties, up from 30 percent seven years earlier.

Beyond its impact on the health and well-being of individuals, college attainment levels have implications at the community level. A large body of research, much of it carried out by Edward

Glaeser of Harvard University and his colleagues, shows a positive relationship between the percentage of workers in a community who have a post-secondary degree and rates of economic growth. For example, Glaeser and Saiz (2003) have found that, apart from climate (which along with immigration is the most important driver of metropolitan population growth in the United States), "skill composition may be the most powerful predictor of urban growth." A skilled workforce is an especially important asset for communities that have suffered from urban decline.

Other research has shown that the relationship between growth and years of schooling at the national level is complex; the positive relationships between education and growth generally hold true, but there is growing evidence that for many young people career and technical training in a field that is in demand can yield greater benefits than a four-year Bachelor's degree. Policymakers should be focusing not so much on the simple number of years of school or degrees obtained, but rather on the connection between job opportunities and skilled or trained workers in those fields.

College retention and completion. The volume of research examining factors that contribute to students' decisions to enroll in college, their persistence, and their ultimate graduation outcomes is abundant. The research literature now emphasizes the importance of taking both student and school-level characteristics into consideration as important predictors of educational outcomes. In a 2010 study completed by Godfrey and Matos-Elefonte of the College Board, their multivariable model found that multiple measures (academic and non-cognitive) should be taken into account when assessing whether students are ready for college.

Education Sector recently published "College- and Career-Ready: Using Outcomes Data to Hold High Schools Accountable for Student Success." Authored by policy analyst Chad Aldeman, the report describes the relative value of No Child Left Behind school measures (i.e., Adequate Yearly Progress) in predicting graduate success in higher education and career. Aldeman concluded that students graduating from schools that met AYP were not necessarily more likely to be successful in college as indicated by student participation in remedial course work, first term GPA, and persistence from freshman to sophomore year. He proposes a more comprehensive collection of variables including some data points of post-secondary activity to ensure some validity.

Research on college access has consistently found that students who take more advanced course work in high school are more likely to attend college, less likely to be placed in remedial courses in college, and more likely to be successful in the colleges they attend. In a 2006 study from the Consortium on Chicago School Research, researchers looked at college-going patterns and success of Chicago Public Schools graduates. While high school grades were found to be the best predictor of college graduation, high school course rigor and test scores also matter. The number of honors or Advanced Placement courses a student took was associated with an increased likelihood of graduation, as were higher 11th-grade test scores, though neither measure was as important as GPA. A high GPA alone, in the absence of evidence of skills attainment through standardized test scores or rigorous course work, was also unlikely to translate into college graduation.

Lifelong Learning

Training of employees is an investment in two distinct ways. First, a more educated employee tends to be more productive. Second, the provision of training services can help attract and retain talented employees.

New York Times columnist David Brooks wrote in 2008 that the changes and churning in our economy are not being driven by globalization as much as they are by "the skills revolution." Brooks commented that if we are to thrive in this increasingly demanding cognitive age, "people are compelled to become better at absorbing, processing and combining information." There is widespread agreement among policymakers, researchers, and economists that in order for our regions, states, and the nation to compete in the new global economy, workers need to be educated, highly skilled, and ready to learn and adapt to the changing world around us. Such a workforce enables greater innovation, higher quality, and the ability to respond quickly to a changing world. Similarly, in the Educational Testing Service's report, "America's Perfect Storm: Three Forces Changing our Nation's Future," the authors examine economic trends and conclude that, "if our society's overall levels of learning and skills are not increased and the existing gaps are not narrowed, there is little chance that economic opportunities will improve among key segments of our population" (Kirsch et al. 2007).

Businesses and workforce development systems alike have struggled to respond to these developments. In a 2008 report by the Council for Adult and Experiential Learning (CAEL) prepared for the Innovation Network for Communities (INC), the authors highlighted four focus areas that lifelong learning must address to ensure successful delivery:

- A growing understanding that a skilled workforce is critical to our nation's economic future.
- Critical shortages – and projected shortages – exist in high skill positions (e.g., nursing/healthcare, engineers, utility workers), creating incentives for employers within key industries to work together on workforce development strategies.
- Technology advancements, such as online learning and podcasts, are dramatically changing how learning can be offered and managed, while also helping to focus attention on accelerating the learning and degree-earning process. Such advancement should assist with access issues often faced by adult learners.
- A growing emphasis on what is learned rather than how long a student sits in a class. This is what is helping to support interest in prior learning assessment, Advanced Placement exams, career readiness certificates, accelerated education programs, competency-based degree programs, online learning, apprenticeship and internship programs, and other work-based learning.

The same study emphasized that innovations must also give consideration to improving individual skills and employability; removing barriers to access (e.g., personal finances, time, family responsibility, training institution scheduling, transportation, etc.); helping businesses succeed (retention, recruitment, performance, sales); helping regions succeed (reducing high-skill job vacancies, business attraction); and creating cost and delivery efficiencies.

A 2012 report from the Aspen Institute's Workforce Strategies Initiative recognized that traditional approaches to higher education are often inadequate in effectively connecting low-income students to learning. These groups of learners, who historically comprise a significant portion of the workforce, have poor completion rates in academic and training programs. The significant challenges often faced by this group make it difficult for them to complete course work—whether because of financial stress or finding the time to balance work, school, and family needs—and beg the redesign of the structure and delivery of post-secondary education. Many of these adults require assistance to navigate the foreign culture of higher education, and many lack the background needed to find and land appropriate jobs once they complete their training. The study found that industry-specific or sectoral workforce initiatives housed in nonprofit organizations have shown promise in addressing barriers faced by adult job seekers and in helping these job seekers improve their skills and navigate their regional labor market. These initiatives, however, have typically remained very small scale. In addition, they often have lacked the ability to help their trainees access the additional education and credentials that would help them advance further in their chosen fields. Around the country, community colleges are partnering with nonprofit organizations to launch a range of innovative approaches to educating adult learners, especially low-income adults who often require more intensive assistance to succeed.

The lifelong learning phase of the continuum will continue to evolve due to market changes, employer needs, and the state of the educational system. Employers have always needed appropriately trained workers to maintain and grow their businesses. The public and private sectors have responded to these evolving needs by developing various efforts to facilitate skill development. Employer-based incumbent worker training, vocational colleges, and state offices of workforce development are successful initiatives that were launched over the past century. In the past two decades, local workforce boards have brought together communities' public and private sectors to address workforce needs. These partnerships have been an important component of ensuring that a community's skilled labor aligns with the needs of local employers. Yet ensuring that human capital talent is matched to local needs remains a complicated challenge for workforce development professionals in both the private and public sectors. Innovation and responsiveness will be a necessary component of future efforts, especially in periods of high unemployment and changing market structures.

Conclusions

TALENT 2025 is engaged in a large-scale effort to align community resources to create an integrated talent development system designed to produce and attract both talent and jobs. Comparable endeavors in other communities suggest the usefulness of a community indicator mechanism, such as a scorecard, to move this process forward. The process of developing community indicators can help with mapping assets and identifying gaps, setting collective goals, facilitating partnerships, and making the most of limited resources. Most critically, it results in a set of shared measures against which a community can measure its collective progress.

Major Issues and Recommendations

A region's economic strength is only as robust as its talent base. The CEOs who are leading TALENT 2025 should be strongly commended for their willingness and drive to confront the challenges in developing the partnerships and initiatives necessary to enhance the quality of the region's workforce. The following are the major issues identified in this research effort and our recommendations for future action by TALENT 2025.

In moving forward it is important that TALENT 2025 focus on only those activities where it can make a difference. The future demand for talent in the region will depend on the ability of its major economic base employers to produce competitive and innovative products and services. Product development and effective marketing of products and services are key for the area's demand of skilled workers; however, these issues are clearly outside the reach of TALENT 2025.

Place making activities that improve the business environment and resident options for professional and high-skilled workers are also extremely important to the success of the region to attract a skilled workforce; however, again this is outside the abilities of TALENT 2025.

Clearly, the strongest role that TALENT 2025 can play is to assist the education community in developing programs and opportunities for students to become career aware and career ready. TALENT 2025 recognizes that the quality of a region's talent pool will increasingly determine its economic prosperity, thus, a region's education system plays a significant role in contributing to the quality of its workforce.

The region's education system has hundreds of moving parts similar to that of an automobile. And like a car, its performance depends upon all of these parts working smoothly: Any one of its many components such as tires, brakes, transmission, radiator, battery, fuel injector, and steering mechanisms can cause the car to malfunction. Moreover, the components cannot compensate for each other: Great brakes do not correct for a bad fuel injector. Likewise, an excellent dropout prevention program does not offset the importance of a quality prekindergarten program.

The three broad activities that TALENT 2025 can engage that could make a difference are:

1. Working with the region's business community to improve the flow of information and dialogue between it and both the education community and job seekers.

2. Facilitating discussions with businesses and the region's community college, trade schools, and universities in providing retraining opportunities for the existing workforce.

3. Partnering with the K–16 educators to assist students in obtaining a better understanding of the world of work, both with regard to technical skills requirements and soft skills workplace know-how skills, as they map out possible career options.

The report's recommendations are provided under each of these proposed activities.

A. Work with the region's business community to improve the flow of information and dialogue between it and both the education community and job seekers.

One of the more unexpected findings of this research effort was that many firms are unable or unwilling to identify their current and future skill requirements. Nearly 50 percent of all electronic job postings do not identify the educational requirements of the position. When directly asked, "What are the specific technical skills that will be required of workers in the near-term future?" many could not answer. This is not surprising given the ever-changing marketplace and the constant demand for the development of new services and goods. In fact, it may be impossible for many employers to know their skill needs just three years from now, let alone in 2025. Nevertheless, without providing a clear description of its current skills needs, firms are frustrating job seekers and educators.

Recommendations:

1. Identify the current skills and degree requirements of current job postings for high- and medium-skills positions. This information would be to the benefit of all. For the job seeker, it will give him/her a better understanding of the training required for the career. For the trainers and educators, it would provide information necessary to adjust and revise training programs. Finally, for the companies' human resource departments it would limit the need to examine unqualified applicants.
2. Work with employers in forecasting their future skill needs. This is a difficult task because of the dynamic nature of market place; new technologies and products are being developed at an increasing rate. Still, TALENT 2025 could help employers in their efforts to properly plan for their future skill needs.
3. Maintain active business/education advisory councils for the region's major economic base industries and services. TALENT 2025 is perfectly situated to provide the necessary "third place" for these councils to be effective. Moreover, TALENT 2025 could play an active role in relaying the outcomes of these meetings to state government to push for additional education funding if necessary.

B. Facilitate discussions with businesses and the region's community college, trade schools, and universities in the retraining of the existing workforce.

Again, we forecast that 44 percent of the region's workforce in 2025 is already in the workforce; however, it is very likely that many will not be working at the same occupation or even in the same industry in 2025.

Recommendations:

1. Assist firms in establishing and promoting lifelong learning opportunities for their workers. This makes business sense, as employers need to constantly train and retrain workers to maintain and grow their businesses. This could also have a substantial impact on the quality of the region's workforce, as employees move from firm to firm. Most importantly, it can create a learning culture for the region.

2. This would also be an issue that should be taken up by the business/education advisory councils discussed above.

C. Partnering with the K-16 educators to assist students in obtaining a better understanding of the world of work, both with regard to technical skills requirements and soft skills workplace know-how skills, as they map out possible career options.

1. Work with the region's School Districts and Intermediate School Districts (ISD) to provide greater access to more hands-on training using various technologies from information, advance manufacturing, and health. In addition, TALENT 2025 should promote businesses to offer projects/internships/co-ops that afford hands-on skills training, particularly at the junior- and senior-high school levels.

   These activities could require additional capital expenditure for the area's school districts to purchase or lease the necessary equipment. It may be necessary for TALENT 2025 to address the state government regarding the funding of technical training.

   Finally, it is very possible that the region's school instructors and administrators are unaware of the required skills and environment of today's workplace. TALENT 2025 can encourage the region's companies to teach the teachers regarding the current skill demands of the workplace, both technical and soft.

2. Promote the adoption of WorkKeys® which is part of ACT's National Career Readiness Certificate (NCRC) program. WorkKeys® is a portable credential that documents the achievement of a specific level of workplace employability skills. While WorkKeys® is not new, it still offers a well-regarded credential system that both provides guidance to educators on what employers are looking for in a new hire, as well as giving employers an assessment of the attained skills of a potential new hire.

3. Partner with school administrators to increase the resources and roles of counseling staff to assist students in choosing their careers at both the high-school and middle-school levels. Most school counselors are overly burdened with class scheduling responsibilities and they cannot provide the level of career counseling that would benefit students. In addition, the region's business leaders could work with school counselors in presenting to students and their parents the career options that are in high demand.

   Again, this may be a state funding issue that TALENT 2025 can bring to the attention of state government.

4. Partner with the region's ISD to better integrate instruction on "soft-skill" abilities such as problem solving, team building, and communication skills. While employers have a difficult time identifying the technical skills of tomorrow's workplace, they have a strong sense of the soft skills that will be extremely important. Companies

report that employees either aren't able to or have difficulty solving problems, for example.

Moreover, the teaching of soft skills should not be limited to K—12. Employers emphasized a strong need for integrating soft-skills training into college course work as well. In particular, course work should include accountability, problem solving, leadership, communications, writing, creative thinking, working in teams, and making presentations.

5. TALENT 2025 should encourage companies to offer internships and apprenticeships. Many companies offer employment incentives such as paid internships and apprenticeships, and paid tuition and/or reimbursement toward two- and four-year degrees that would allow employees to further their education at little or no cost to them. TALENT 2025 could produce information catalogs to be published and distributed to high school students and existing workers containing the types of educational incentives offered by companies.

6. TALENT 2025 should continue to work to better refine its community indicators. Evidence suggests that the development of community indicators can assist with mapping assets and identifying gaps, setting collective goals, facilitating partnerships, and making the most of limited resources. Most importantly, indicators generate a set of shared measures against which a community can gauge its collective progress.

   A word of caution must be shared: We do not advise that community indicators be used to evaluate particular programs. Many factors can impact these indicators and these factors can erase the impact of a solid program initiative.

It should be noted that a glaring omission to our list of recommendations is the need to provide quality pre-kindergarten to all children. The documented return on investment for this activity is high; in fact, it is likely the best educational investment to be made. However, TALENT 2025 resources and assets are not well suited to address this issue except to "join the choir" with regard to its importance.

References

Aldeman, C. 2010. "College- and Career-Ready: Using Outcomes Data to Hold High Schools Accountable for Student Success." Washington, D.C: Education Sector.

Allensworth, E., and J. Q. Easton. 2005. "The On-Track Indicator as a Predictor of High School Graduation." Chicago: Consortium on Chicago School Research.

———. 2007. "What Matters for Staying On-Track and Graduating in Chicago Public High Schools: A Close Look at Course Grades, Failures and Attendance in the Freshman Year." Chicago: Consortium on Chicago School Research.

American Youth Policy Forum. 1998. "Transitional Environment (STEP) in Some Things Do Make a Difference for Youth." http://aypf.org/publications/compendium (accessed June 3, 2013).

Balfanz, R. 2009. "Putting Middle Grades Students on the Graduation Path." Baltimore, MD: Center for Social Organization of Schools at Johns Hopkins University.

Balfanz, R., and L. Herzog. 2005. "Keeping Middle Grades Students on Track to Graduation: Initial Analysis and Implications." Presentation given at the second Regional Middle Grades Symposium, Philadelphia, PA, (March).

———. 2006. "Keeping Middle Grades Students on Track to Graduation." http://www.philaedfund.org/powerpoint/dropoutresearch_4.06.ppt (accessed June 3, 2013).

Balfanz, R., and N. Legters. 2006. "Closing 'Dropout Factories': The Graduation-Rate Crisis We Know, and What Can Be Done About It." Education Week 25(42): 42–43.

Barnett, W. S. (1996). "Lives in the Balance: Age-27 Benefit-Cost Analysis of the HighScope Perry Preschool Program" Monographs of the High/Scope Educational Research Foundation, 11. Ypsilanti, MI: High/Scope Press.

Berrueta-Clement, J., W. Barnett, L. Schweinhart, A. Epstein, and D. Weikart. 1984. "Changed Lives: The Effects of the Perry Preschool Project on Youths through Age 19." Monographs of the High/Scope Educational Research Foundation, No. 8. Ypsilanti, MI: High/Scope Press.

Bettinger, E., B. Evans, and D. Pope. 2011. "Improving College Performance and Retention the Easy Way: Unpacking the ACT Exam." NBER Working Paper 17119. Cambridge, MA: National Bureau of Economic Research.

Brooks, D. 2008. "The Cognitive Age." *New York Times*. http://www.nytimes.com/2008/05/02/opinion/02brooks.html (accessed June 3, 2013).

Carnevale, A. P., S. J. Rose, and B. Cheah. 2011. "The College Payoff: Education, Occupations, Lifetime Earnings." Washington, DC: Georgetown University Center on Education and the Workforce.

Conley, D. 2007. "Redefining College Readiness." Eugene, OR: Educational Policy Improvement Center.

Conway, M., A.Blair, and M. Helmer. 2012. "Courses to Employment: Partnering to Create Paths to Education and Careers." Washington, DC: The Aspen Institute's Workforce Strategies Initiative.

Council for Adult and Experiential Learning. 2008. "Innovation Strategies for a New System of Workforce Development and Lifelong Learning." Chicago, IL: CAEL.

Duncan, G. J., C. J. Dowsett, A. Claessens, K. Magnuson, A. C. Huston, P. Klebanov, L. S. Pagani, L. Feinstein, M. Engel, J. Brooks-Gunn, H. Sexton, and K. Duckworth. 2007. "School Readiness and Later Achievement." *Developmental Psychology* 43(6): 1428–1446.

Duncan, G. J., K. M. Ziol-Guest, and A. Kalil. 2010. "Early Childhood Poverty and Adult Attainment, Behavior, and Health." *Child Development* 81(1): 306–325.

Duncan, G. J., P. A. Morris, and C. Rodrigues. 2011. "Does Money Really Matter? Estimating Impacts of Family Income on Young Children's Achievement with Data from Random-Assignment Experiments." *Developmental Psychology* 47(5): 1263–1279.

Epstein, J. L. 1995. "School/Family/Community Partnerships: Caring for the Children We Share." Phi Delta Kappan 76(9): 701–712.

Glaeser, E. L., and A. Saiz. 2003. "The Rise of the Skilled City." Harvard Institute of Economic Research Discussion Paper No. 2025; FRB Philadelphia Working Paper No. 04-2.

Gleason, P., and M. Dynarski. 2002. "Do We Know Whom to Serve? Issues in Using Risk Factors to Identify Dropouts." *Journal of Education for Students Placed at Risk* 7(1): 25–41.

Godfrey, K. E., and H. Matos-Elefonte. 2010. "Key Indicators of College Success: Predicting College Enrollment, Persistence, and Graduation." College Board. http://research.collegeboard.org/sites/default/files/publications/2012/7/presentation-2010-8-key-indicators-college-success.pdf (accessed June 3, 2013).

Green, T. 2012. "Everything Must Change: Rethinking Workforce Development." Atlanta: Federal Reserve Board. EconSouth, 1st quarter.

Hanleybrown, F., J. Kania, and M. Kramer. 2012. "Channeling Change: Making Collective Impact Work." Palo Alto, CA: Stanford Social Innovation Review.

Hernandez, D. 2011. "Double Jeopardy: How Third-Grade Reading Skills and Poverty Influence High School Graduation." Baltimore, MD: Annie E. Casey Foundation.

Isaacs, J. 2012. "Starting School at a Disadvantage: The School Readiness of Poor Children." Washington, DC: Brookings Institution.

Jerald, C. 2006. "Identifying Potential Dropouts: Key Lessons for Building an Early Warning Data System." Washington, DC: Achieve, Inc.

———. 2007. "Keeping Kids in School: What Research Says About Preventing Dropouts." Washington, DC: Center for Public Education.

Kania, J., and M. Kramer. 2011. "Collective Impact." Palo Alto, CA: Stanford Social Innovation Review.

Kennelly, L., and M. Monrad. 2007. "Approaches to Dropout Prevention: Heeding Early Warning Signs With Appropriate Interventions." Washington, DC: National High School Center at the American Institutes for Research.

Kirsch, I., H. Braun, K. Yamamoto, and A. Sum. 2007. "America's Perfect Storm: Three Forces Changing Our Nation's Future." Policy Information Report. Princeton, NJ: Educational Testing Service, Policy Evaluation and Research Center.

Lesnick, J., R. M. George, C. Smithgall, and J. Gwynne. 2010. "Reading on Grade Level in Third Grade: How Is It Related to High School Performance and College Enrollment?" Chicago: Chapin Hall at the University of Chicago.

Loftus, S. 2002. "Every Child a Graduate: A Framework for an Excellent Education for all Middle and High School Students." Washington, D.C: The Alliance for Excellent Education.

Michalos, A.C. (2007). "Connecting Communities with Community Indicators." Paper prepared for the conference on Measuring and Fostering the Progress of Societies, Second OECD Forum on Statistics, Knowledge and Policy. Istanbul.

Matos-Elefonte, H., and K. E. Godfrey. 2010. "Key Indicators of College Success: Predicting College Enrollment, Persistence, and Graduation." Presented at AERA in Denver, CO, April 2010.

Neild, R. C., and R. Belfanz. 2006. Unfulfilled Promise: The Dimensions and Characteristics of Philadelphia's Dropout Crisis, 2000–2005. Baltimore, MD: Center for Social Organization of Schools, Johns Hopkins University.

RAND Labor and Population Research Brief. 2005. "Proven Benefits of Early Childhood Interventions." http://www.rand.org/pubs/research_briefs/2005/RAND_RB9145.pdf/ (accessed June 3, 2013).

Roderick, M. 1993. "The Path to Dropping Out: Evidence for Intervention." Westport, CT: Auburn House.

Roderick, M., J. Nagaoka, and E. Allensworth. 2006. "From High School to the Future: An Analysis of the College Attendance Patterns, College Qualifications, and College Graduation Rates of Chicago Public School Graduates." Chicago: Consortium on Chicago School Research.

Schweinhart, L. J., J. Montie, Z. Xiang, W. S. Barnett, C. R. Belfield, and M. Nores. 2005. "Lifetime effects: The High/Scope Perry Preschool Study through Age 40." Monographs of the High/Scope Educational Research Foundation, 14. Ypsilanti, MI: High/Scope Press.

Schweinhart, L. J., H. V.Barnes, and D. P. Weikart. 1993. "Significant Benefits: The High/Scope Perry Preschool Study through Age 27." Monographs of the High/Scope Educational Research Foundation, 10. Ypsilanti: High/Scope Press.

Schwerdt, G., and M. West. 2011. "The Impact of Alternative Grade Configurations on Student Outcomes through Middle and High School." IZA Discussion Paper No. 6208.

University of Wisconsin, Population Health Institute. 2012. "County Health Rankings and Roadmaps." http://www.countyhealthrankings.org/ (accessed June 3, 2013).

Von Secker, C. 2009. "Closing the Gap: Seven Keys to College Readiness for Students of All Races/Ethnicities." Rockville, MD: Montgomery County Public Schools Office of Shared Accountability Applied Research Unit.

Welch, C., and S. Dunbar. 2011. "K-12 Assessments and College Readiness: Necessary Validity Evidence for Educators, Teachers and Parents." Presented at the annual meeting of the National Council on Measurement in Education, held in New Orleans, LA.

Williams, T., M. Rosin, M. Perry, B. Webman, K. Wilson, R. Payne, and K. Woodward. 2010. "Gaining Ground in the Middle Grades: Why Some Schools Do Better." Mountain View, CA: EdSource.

Winship, S., I. Sawhill, and A. Gold. 2011. "Pathways to the Middle Class." Draft paper presented at the Social Genome Project Conference at Brookings, November 8, 2011.

Appendices

Data Tables

A-1: Employment Forecast by Industry 2013 to 2025

Industry	2013	2025	Change	
			Absolute	Percent
Agriculture and forestry support activities; other	1,170	1,100	-70	-6.0
Oil and gas extraction	2,020	2,220	200	9.9
Mining (except oil and gas)	1,230	530	-700	-56.9
Support activities for mining	540	540	0	0.0
Utilities	40	50	10	25.0
Construction	2,310	1,680	-630	-27.3
Wood product manufacturing	42,890	51,340	8,450	19.7
Nonmetallic mineral product manufacturing	2,510	2,080	-430	-17.1
Primary metal manufacturing	3,040	2,300	-740	-24.3
Fabricated metal product manufacturing	4,410	1,620	-2,790	-63.3
Machinery manufacturing	14,700	9,930	-4,770	-32.4
Computer and electronic product manufacturing	18,180	14,250	-3,930	-21.6
Electrical equipment and appliance manufacturing	11,790	8,670	-3,120	-26.5
Motor vehicles, bodies & trailers, and parts manufacturing	1,200	790	-410	-34.2
Other transportation equipment manufacturing	9,000	4,370	-4,630	-51.4
Furniture and related product manufacturing	1,780	1,600	-180	-10.1
Miscellaneous manufacturing	16,200	14,120	-2,080	-12.8
Food manufacturing	4,440	4,360	-80	-1.8
Beverage and tobacco product manufacturing	12,840	13,270	430	3.3
Textile mills	1,100	1,230	130	11.8
Textile product mills	60	30	-30	-50.0
Apparel manufacturing	250	210	-40	-16.0
Leather and allied product manufacturing	120	70	-50	-41.7
Paper manufacturing	560	500	-60	-10.7
Printing and related support activities	3,080	2,020	-1,060	-34.4
Petroleum and coal product manufacturing	2,580	1,890	-690	-26.7
Chemical manufacturing	250	210	-40	-16.0
Plastics and rubber product manufacturing	7,100	6,930	-170	-2.4
Wholesale trade	6,040	5,180	-860	-14.2
Retail trade	34,750	31,840	-2,910	-8.4
Air transportation	85,740	84,960	-780	-0.9
Rail transportation	240	250	10	4.2
Water transportation	300	300	0	0.0
Truck transportation; Couriers and messengers	70	70	0	0.0
Transit and ground passenger transportation	13,280	14,200	920	6.9
Pipeline transportation	1,540	1,860	320	20.8
Scenic and sightseeing transportation; support activities	120	100	-20	-16.7
Warehousing and storage	2,560	3,030	470	18.4
Publishing industries, except Internet	2,250	2,570	320	14.2
Motion picture, video, and sound recording industries	2,500	2,170	-330	-13.2
Internet publishing and broadcasting; ISPs, and data processing	1,440	1,590	150	10.4
Broadcasting, except Internet; telecommunications	590	760	170	28.8%

Industry	2013	2025	Change	
			Absolute	Percent
Monetary authorities - central bank; credit intermediation and related activities	3,830	3,970	140	3.7
Securities, commodity contracts, investments	10,760	10,520	-240	-2.2
Insurance carriers and related activities	14,950	17,600	2,650	17.7
Real estate	13,810	14,210	400	2.9
Rental and leasing services; lessors of nonfinancial intangible assets	30,670	35,750	5,080	16.6
Professional and technical services	3,650	3,470	-180	-4.9
Management of companies and enterprises	44,710	59,610	14,900	33.3
Administrative and support services	5,790	5,540	-250	-4.3
Waste management and remediation services	55,680	64,070	8,390	15.1
Educational services	2,040	2,620	580	28.4
Ambulatory health care services	20,850	23,850	3,000	14.4
Hospitals	36,760	59,950	23,190	63.1
Nursing and residential care facilities	26,840	31,290	4,450	16.6
Social assistance	18,100	23,630	5,530	30.6
Performing arts and spectator sports	14,830	20,060	5,230	35.3
Museums, historical sites, zoos, and parks	5,580	5,940	360	6.5
Amusement, gambling, and recreation	840	1,080	240	28.6
Accommodation	8,910	10,890	1,980	22.2
Food services and drinking places	3,960	4,500	540	13.6
Repair and maintenance	48,260	52,770	4,510	9.3
Personal and laundry services	11,770	11,970	200	1.7
Membership associations and organizations	11,040	14,220	3,180	28.8
Private households	15,600	17,300	1,700	10.9
Category	4,970	6,350	1,380	27.8
Federal civilian	5,130	4,840	-290	-5.7
Federal military	2,820	2,930	110	3.9
State and local	64,710	72,120	7,410	11.5

A-2: Employment Forecast by Occupation 2013 to 2025

Occupations	2013	2025	Change	
			Absolute	Percent
Top executives	12,760	12,480	-280	-2.2
Advertising, marketing, promotions, public relations, and sales managers	3,660	3,900	240	6.6
Operations specialties managers	9,360	9,680	320	3.4
Other management occupations	15,890	17,250	1,360	8.6
Business operations specialists	22,310	25,610	3,300	14.8
Financial specialists	17,340	20,220	2,880	16.6
Computer specialists	18,170	21,350	3,180	17.5
Mathematical science occupations	640	760	120	18.8
Architects, surveyors, and cartographers	1,130	1,350	220	19.5
Engineers	10,250	10,250	0	0.0
Drafters, engineering, and mapping technicians	5,310	5,240	-70	-1.3
Life scientists	1,530	1,910	380	24.8
Physical scientists	1,600	1,810	210	13.1
Social scientists and related occupations	2,680	3,310	630	23.5
Life, physical, and social science technicians	1,830	2,020	190	10.4
Counselors, Social workers	4,510	5,920	1,410	31.3
Miscellaneous community and social service specialists	2,200	2,900	700	31.8
Religious workers	4,070	4,530	460	11.3
Lawyers, judges, and related workers	3,720	4,350	630	16.9
Legal support workers	2,490	3,010	520	20.9
Postsecondary teachers	2,750	3,210	460	16.7
Primary, secondary, and special education teachers	8,840	10,420	1,580	17.9
Other teachers and instructors	2,340	2,830	490	20.9
Librarians, curators, and archivists	1,420	1,620	200	14.1
Other education, training, and library occupations	3,630	4,170	540	14.9
Art and design occupations	3,040	3,310	270	8.9
Entertainers and performers, sports and related occupations	2,830	3,150	320	11.3
Media and communication occupations	3,060	3,510	450	14.7
Media and communication equipment occupations	1,030	1,130	100	9.7
Health diagnosing and treating practitioners	23,990	32,650	8,660	36.1
Health technologists and technicians	15,470	20,580	5,110	33.0
Other healthcare practitioners and technical occupations	770	930	160	20.8
Nursing, psychiatric, and home health aides	14,920	21,160	6,240	41.8
Occupational and physical therapist assistants and aides	850	1,320	470	55.3
Other healthcare support occupations	7,740	11,460	3,720	48.1
First-line supervisors/managers, protective service workers	1,810	2,040	230	12.7
Fire fighting and prevention workers	2,850	3,470	620	21.8
Law enforcement workers	10,510	11,940	1,430	13.6
Other protective service workers	9,530	10,880	1,350	14.2
Supervisors, food preparation and serving workers	4,380	4,750	370	8.4
Cooks and food preparation workers	14,280	15,620	1,340	9.4
Food and beverage serving workers	31,080	34,740	3,660	11.8
Other food preparation and serving related workers	6,460	7,140	680	10.5

Occupations	2013	2025	Change	
			Absolute	Percent
Supervisors, building and grounds cleaning and maintenance workers	1,580	1,800	220	13.9
Building cleaning and pest control workers	20,330	22,170	1,840	9.1
Grounds maintenance workers	6,680	7,930	1,250	18.7
Supervisors, personal care and service workers	1,100	1,370	270	24.5
Animal care and service workers	1,220	1,480	260	21.3
Entertainment attendants and related workers	2,960	3,440	480	16.2
Funeral service workers	350	460	110	31.4
Personal appearance workers	3,910	5,430	1,520	38.9
Transportation, tourism, and lodging attendants	700	810	110	15.7
Other personal care and service workers	13,670	18,610	4,940	36.1
Supervisors, sales workers	8,290	8,310	20	0.2
Retail sales workers	48,810	49,480	670	1.4
Sales representatives, services	9,570	10,760	1,190	12.4
Sales representatives, wholesale and manufacturing	11,960	11,350	-610	-5.1
Other sales and related workers	7,830	8,560	730	9.3
Supervisors, office and administrative support workers	7,860	8,890	1,030	13.1
Communications equipment operators	940	890	-50	-5.3
Financial clerks	21,990	24,100	2,110	9.6
Information and record clerks	33,100	36,690	3,590	10.8
Material recording, scheduling, dispatching, and distributing occupations	22,320	21,520	-800	-3.6
Secretaries and administrative assistants	25,690	29,520	3,830	14.9
Other office and administrative support workers	25,840	27,850	2,010	7.8
Supervisors, farming, fishing, and forestry workers	500	470	-30	-6.0
Agricultural workers	10,960	9,350	-1,610	-14.7
Fishing and hunting workers	180	150	-30	-16.7
Forest, conservation, and logging workers	660	640	-20	-3.0
Supervisors, construction and extraction workers	3,420	4,060	640	18.7
Construction trades and related workers	29,270	33,650	4,380	15.0
Helpers, construction trades	2,250	2,710	460	20.4
Other construction and related workers	3,060	3,540	480	15.7
Extraction workers	510	450	-60	-11.8
Supervisors of installation, maintenance, and repair workers	3,030	3,090	60	2.0
Electrical and electronic equipment mechanics, installers, and repairers	3,220	3,290	70	2.2
Vehicle and mobile equipment mechanics, installers, and repairers	10,070	10,180	110	1.1
Other installation, maintenance, and repair occupations	21,290	23,010	1,720	8.1
Supervisors, production workers	5,390	4,480	-910	-16.9
Assemblers and fabricators	17,330	13,990	-3,340	-19.3
Food processing occupations	5,160	5,390	230	4.5
Metal workers and plastic workers	20,200	14,540	-5,660	-28.0
Printing occupations	1,650	1,360	-290	-17.6
Textile, apparel, and furnishings occupations	4,320	4,160	-160	-3.7
Woodworkers	5,270	4,790	-480	-9.1
Plant and system operators	2,070	2,110	40	1.9
Other production occupations	21,520	19,360	-2,160	-10.0
Supervisors, transportation and material moving workers	2,360	2,270	-90	-3.8
Air transportation occupations	350	390	40	11.4
Motor vehicle operators	22,770	24,280	1,510	6.6
Rail transportation occupations	310	330	20	6.5

Occupations	2013	2025	Change	
			Absolute	Percent
Water transportation occupations	250	290	40	16.0
Other transportation workers	1,950	2,090	140	7.2
Material moving occupations	28,520	26,720	-1,800	-6.3

A-3: Economic Base Employment 2013 and 2015 by Education Attainment

Occupation	2013 export dependent employment	2025		Percent by education requirement			Change 2013–25	
		Export dependent employment	Percent of occupation	BA or higher	Assoc. degree	High school	Absolute	Percent
High-Education Attainment	**71,005**	**81,693**	**52.7**	**71.3**	**7.1**	**7.3**	**12,297**	**15.1**
Advertising, marketing, promotions, public relations	1,936	2,057	53.9	69.2	6.1	8.2	128	6.2
Architects, surveyors, and cartographers	402	476	39.2	82.2	7.6	1.0	87	18.4
Art and design occupations	1,354	1,465	45.2	53.9	11.8	12.1	120	8.2
Computer specialists	8,940	10,509	53.6	64.8	10.7	6.1	1,707	17.5
Counselors, social workers	2,635	3,262	55.1	76.0	5.8	6.4	777	23.8
Engineers	5,697	5,697	63.3	78.4	8.2	4.7	0	0.0
Entertainers and performers, sports and related occup.	1,156	1,280	42.2	50.6	6.6	15.0	136	10.6
Financial specialists	9,125	10,602	59.6	60.6	8.0	11.5	1,716	16.2
Health diagnosing and treating practitioners	7,993	10,238	33.2	85.5	8.2	2.1	2,876	28.1
Lawyers, judges, and related workers	1,038	1,276	46.3	99.8	0.0	0.1	292	22.9
Librarians, curators, and archivists	174	249	53.5	77.0	4.9	6.0	107	42.9
Life scientists	646	813	55.4	90.5	4.3	0.1	210	25.8
Mathematical science occupations	344	407	64.2	88.4	4.0	1.6	75	18.3
Media and communication occupations	1,437	1,637	51.1	65.3	7.1	8.6	228	13.9
Miscellaneous community and social service specialists	1,470	1,828	63.0	52.8	9.5	14.4	445	24.4
Other education, training, and library occupations	2,321	2,658	70.8	80.4	5.1	4.4	386	14.5
Other healthcare practitioners and technical occupations	238	295	42.9	63.3	7.6	11.5	70	23.9
Other management occupations	3,718	4,124	33.0	54.1	7.9	15.2	449	10.9
Other sales and related workers	2,021	2,197	25.8	51.5	6.4	17.8	191	8.7%
Other teachers and instructors	1,312	1,567	62.4	58.4	8.1	12.2	305	19.5%
Physical scientists	627	730	57.2	93.3	2.5	0.1	120	16.4
Postsecondary teachers	1,836	2,142	66.7	95.1	2.2	0.1	306	16.7
Primary, secondary, and special education teachers	6,501	7,487	71.8	78.5	5.3	5.6	1,134	15.2
Religious workers	2,259	2,486	55.2	66.3	5.6	9.9	251	10.1
Social scientists and related occupations	1,072	1,322	49.6	92.8	2.6	0.6	309	23.4
Top executives	5,024	4,891	45.3	63.7	5.6	11.6	-129	-2.6

Occupation	2013 export dependent employment	2025		Percent by education requirement			Change 2013–25	
		Export dependent employment	Percent of occupation	BA or higher	Assoc. degree	High school	Absolute	Percent
Middle-Education Attainment	**44,606**	**51,100**	**48.5**	**16.4**	**8.3**	**37.4**	**7,439**	**14.6**
Air transportation occupations	151	173	62.2	48.0	11.4	12.4	26	14.7
Business operations specialists	9,083	10,555	51.8	48.4	10.7	15.6	1,710	16.2
Drafters, engineering, and mapping technicians	2,618	2,573	58.3	21.0	29.1	16.3	-44	-1.7
Electrical and electronic equipment mechanics, installers, and repairers	1,122	1,150	36.9	11.6	16.9	33.0	29	2.5
Fire fighting and prevention workers	1	19	36.9	22.3	17.3	22.7	230	1227.8
First-line supervisors/managers, protective service workers	18	53	46.1	29.3	15.7	20.0	107	201.1
Health technologists and technicians	4,768	6,037	31.4	23.3	25.5	19.4	1,606	26.6
Law enforcement workers	16	105	40.9	25.8	11.0	28.4	586	556.6
Legal support workers	846	1,039	45.6	39.3	14.9	17.4	238	22.9
Life, physical, and social science technicians	732	830	58.0	39.4	12.1	21.1	112	13.5
Media and communication equipment occupations	501	548	51.2	41.6	12.1	16.0	51	9.3
Occupational and physical therapist assistants and aides	250	387	29.8	15.2	32.3	20.3	—	55.2
Operations specialties managers	5,181	5,375	62.6	48.7	8.4	16.6	201	3.7
Other healthcare support occupations	2,420	3,219	28.6	11.6	16.6	28.9	1,064	33.0
Other protective service workers	2,881	3,318	37.2	26.4	8.8	30.7	503	15.2
Sales representatives, services	6,393	7,097	66.0	49.4	8.9	15.1	782	11.0
Sales representatives, wholesale and manufacturing	5,149	4,869	43.2	47.1	8.1	18.3	-265	-5.4
Supervisors, office and administrative support workers	2,986	3,381	43.3	29.2	11.3	25.6	447	13.2
Transportation, tourism, and lodging attendants	322	371	48.7	27.9	8.3	28.6	56	15.1

Occupation	2013 export dependent employment	2025		Percent by education requirement			Change 2013–25	
		Export dependent employment	Percent of occupation	BA or higher	Assoc. degree	High school	Absolute	Percent
Low-Education Attainment	**209,852**	**212,908**	**51.1**	**9.5**	**7.1**	**42.8**	**3,101**	**1.5**
Agricultural workers	14,431	694	41.1	13.8	4.9	31.5	-661	-95.2
Animal care and service workers	325	386	28.0	16.9	8.2	34.5	72	18.7
Assemblers and fabricators	14,420	10,971	78.4	5.4	6.3	48.5	-2,624	-23.9
Building cleaning and pest control workers	6,948	7,555	35.9	6.1	4.8	42.9	660	8.7
Communications equipment operators	363	341	41.4	15.8	10.7	34.6	-21	-6.1
Cooks and food preparation workers	3,353	3,650	24.1	6.5	4.7	41.0	323	8.9
Entertainment attendants and related workers	1,499	1,711	49.7	23.3	8.2	30.8	241	14.1
Extraction workers	249	216	48.5	4.0	4.9	50.0	-29	-13.2
Financial clerks	9,014	9,868	44.4	16.1	10.9	34.4	935	9.5
Fishing and hunting workers	169	125	87.1	13.6	7.6	42.2	-32	-25.8
Food and beverage serving workers	6,765	7,478	21.5	9.1	5.4	43.4	789	10.5
Food processing occupations	3,993	4,164	77.6	4.9	4.4	42.7	178	4.3
Forest, conservation, and logging workers	451	433	80.2	6.7	3.5	42.4	-17	-3.9
Funeral service workers	76	94	20.4	4.5	6.5	46.0	22	23.7
Grounds maintenance workers	2,440	2,834	36.7	6.8	4.2	34.0	457	16.1
Information and record clerks	13,980	15,536	48.2	23.9	11.3	28.9	1,729	11.1
Material moving occupations	14,840	13,790	54.1	4.3	4.3	50.1	-975	-7.1
Material recording, scheduling, dispatching, and distrib. occup.	8,846	8,461	45.9	13.6	9.3	38.2	-368	-4.4
Metal workers and plastic workers	19,283	11,730	81.2	4.3	6.5	50.7	-4,595	-39.2
Motor vehicle operators	12,724	13,603	61.9	8.6	6.1	44.9	939	6.9
Nursing, psychiatric, and home health aides	5,415	7,102	35.4	8.0	7.1	40.0	2,212	31.2
Other construction and related workers	196	263	18.3	5.8	4.4	44.4	89	34.0
Other food preparation and serving related workers	1,392	1,525	21.4	8.6	5.0	42.4	146	9.6
Other installation, maintenance, and repair occupations	6,342	6,868	33.1	9.4	12.2	39.0	569	8.3
Other office and administrative support workers	9,753	10,579	44.5	24.3	11.3	29.8	896	8.5

Occupation	2013 export dependent employment	2025		Percent by Education Requirement			Change 2013–25	
		Export dependent employment	Percent of occupation	BA or higher	Assoc. degree	High school	Absolute	Percent
Other personal care and service workers	7,290	9,401	55.1	21.4	6.9	32.4	2,723	29.0
Other production occupations	16,243	14,427	74.9	5.2	5.1	47.4	-1,613	-11.2
Other transportation workers	523	564	31.3	13.9	8.0	37.9	45	7.9
Personal appearance workers	891	1,140	21.0	8.8	7.6	40.9	318	27.9
Plant and system operators	563	585	63.1	11.3	11.5	39.9	23	3.9
Printing occupations	1,108	864	65.0	10.5	7.6	46.3	-190	-22.0
Rail transportation occupations	155	179	95.9	10.2	8.6	43.4	27	15.0
Retail sales workers	14,508	14,704	29.7	24.6	8.7	31.7	199	1.4
Secretaries and administrative assistants	9,201	10,537	40.0	16.8	13.1	32.8	1,529	14.5
Supervisors of installation, maintenance, and repair workers	931	954	35.7	12.1	11.6	38.0	23	2.4
Supervisors, building and grounds cleaning and maintenance workers	608	683	37.9	11.4	7.2	40.9	85	12.4
Supervisors, farming, fishing, and forestry workers	98	79	55.4	14.5	5.5	33.7	-16	-19.7
Supervisors, food preparation and serving workers	951	1,027	22.3	13.5	7.7	38.3	81	7.9
Supervisors, personal care and service workers	424	532	50.9	23.6	10.0	31.7	136	25.6
Supervisors, production workers	4,312	3,390	79.2	15.1	7.9	40.3	-725	-21.4
Supervisors, sales workers	2,750	2,756	33.5	24.6	8.9	32.1	6	0.2
Supervisors, transportation and material moving workers	1,312	1,255	60.4	17.0	8.8	36.0	-54	-4.3
Textile, apparel, and furnishings occupations	2,229	2,145	52.1	7.9	4.8	42.9	-81	-3.8
Vehicle and mobile equipment mechanics, installers, and repairers	3,245	3,282	35.2	4.4	7.9	46.3	38	1.2
Water transportation occupations	169	198	84.5	20.1	6.1	37.7	34	17.0
Woodworkers	4,701	4,229	88.4	7.9	6.1	41.6	-424	-10.0

Presentations

PowerPoint (combined 5 presentations–PDF)