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# MERCER COUNTY WORKFORCE ANALYSIS

## CONTENTS

Executive Summary..... 2

Purpose of This Report ..... 3

Target Industries ..... 4

Target Occupations ..... 6

Critical Knowledge, Skills, And Abilities ..... 15

Appendix A: Target Industry Selection Approach..... 18

Appendix B: Detailed List of Target Industries ..... 21

Appendix C: O\*NET Competency Definitions ..... 27

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## EXECUTIVE SUMMARY

The workforce analysis in the following pages highlights some of the key characteristics of the Mercer County, New Jersey economy with particular focus on the best opportunities for workforce development. Some of the key takeaway points from this study are as follows:

- EMSI identified seven target industry groups for Mercer County—biotechnology & pharmaceutical manufacturing; computer systems design & network management; finance & insurance; various business services; all other manufacturing; transportation; and healthcare. In total, these industry groups grew by a remarkable 36% between 2002 and 2010. They also contribute greatly to the regional economy by accounting for 35% of the county's total exports.
- Biotechnology & pharmaceutical manufacturing, in particular, represents a significant opportunity for economic and workforce development. The industry group's location quotient of 3.62 shows that there are 262% more jobs in these industries than would be expected based on national per capita averages. These businesses create jobs for workers in middle-skill positions such as chemical technicians and high-skill positions such as chemists.
- EMSI identified 35 middle-skill occupations and 45 high-skill occupations that are crucial to the long-term sustainability of the target industries. These positions are projected to grow by 9% over the next five years, offer 2,071 job openings on an annual basis, and pay an average of \$33.87 per hour.
- Certain knowledge, skills, and abilities (KSAs) are fundamental to all of the target occupations. The crucial knowledge categories include customer and personal service, English language, education and training, and mathematics. Some of the integral skills and abilities are reading comprehension, critical thinking, and oral expression.

## PURPOSE OF THIS REPORT

Most economists predict that during the 21st century the American economy will face stiffer international competition than at any point in its history. In coping with these changes, regional leaders are becoming more aware of the need to identify the assets that give their regions a competitive advantage. The natural starting point for identifying these assets is to examine existing businesses that compose the local economy and in particular those businesses that have shown positive job growth in recent years. In so doing, regional leaders can identify those local industries that have a competitive edge and can give the area greater chances of success in the evolving economic landscape. The recent decline of many traditional, large-scale businesses in the United States has provided opportunities for many new, smaller-scale companies in various industries. As a way of latching onto these pockets of growth, the strategies of industry cluster-based economic development and targeted investment have increasingly become the mantra of national, state, and local policymakers.

This report identifies the industry groups within Mercer County, New Jersey that are the best fit for industry cluster development and highlights the specific occupations within those industry groups that provide exceptional employment opportunities due to their strengths in projected job growth, earnings, and average annual openings. Furthermore, the report provides data on the knowledge, skill, and ability (KSAs) characteristics that are most crucial for workers who are interested in entering these fields.

## TARGET INDUSTRIES

The key to target industry identification is to detect those pockets of growth that have occurred within various industry categories within Mercer County. These industry categories are easily located using data measures that highlight the concentration, growth, and commodity trade patterns of industries within Mercer County as compared to other areas in the United States. For those who are interested, much more detail on the methodology of the target industry analysis is contained in Appendix A of this report, and detailed lists of the 6-digit NAICS codes contained in each target industry group are located in Appendix B.

Using EMSI's customized target industry selection process, the following industry groups were identified as the most appropriate for the region:<sup>1</sup>

- Biotechnology & Pharmaceutical Manufacturing;
- Computer Systems Design & Network Management;
- Finance & Insurance;
- Various Business Services;
- All Other Manufacturing;
- Transportation; and
- Healthcare.

There are two summary tables shown in this section. The first contains the basic employment and growth data regarding the target industry groups. The second contains data on some of the more advanced labor market measurements specific to these groups. Both tables are ranked according to the overall strength of the groups. For definitions and information on these advanced measurements, refer to Appendix A.

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<sup>1</sup> It is important to note that these sectors do not necessarily include all specific industries within the industry sectors that share the same names. For instance, within the Finance and Insurance sector there are 40 unique industries but only 19 industries have been selected as potential target industries. To re-emphasize, we have sought to focus on the industries within each wider sector that have grown and/ or are projected to grow, rather than the industries that have experienced significant decline.

**Table 1: Employment and Growth Summary of Target Industry Groups**

Description	2002 Jobs	2010 Jobs	2015 Jobs	2002-10 Change	2002- 2010 % Change	2010-15 Projected Job Change	2010-2015 % Change
Biotechnology & Pharmaceutical Manufacturing	3,433	7,354	9,255	3,921	114%	1,900	26%
Finance & Insurance	13,166	17,699	19,446	4,533	34%	1,747	10%
Computer Systems Design & Network Management	7,638	8,785	9,932	1,148	15%	1,147	13%
Healthcare	17,767	22,893	24,601	5,126	29%	1,708	7%
Various Business Services	10,206	13,159	14,861	2,953	29%	1,702	13%
All Other Manufacturing	2,347	3,917	3,365	1,570	67%	(552)	(14%)
Transportation & Warehousing	1,447	2,357	2,660	910	63%	303	13%

**Table 2: Advanced Measurement Summary of Target Industry Groups**

Description	Median Earnings Per Worker	2010 LQ	Average Jobs Multiplier	Regional Integration	Shift Share Competitive Effect	% of Total Exports
Biotechnology & Pharmaceutical Manufacturing	\$75,711	3.62	2.52	54.8%	3,684	8.9%
Finance & Insurance	\$68,734	1.68	1.78	24.9%	1,287	11.8%
Computer Systems Design & Network Management	\$76,604	1.59	1.92	67.9%	728	4.2%
Healthcare	\$56,218	1.02	1.45	90.6%	1,441	1.4%
Various Business Services	\$68,030	1.48	1.67	37.8%	652	6.0%
All Other Manufacturing	\$50,983	1.27	1.69	45.0%	2,134	2.8%
Transportation & Warehousing	\$48,212	0.43	1.55	32.6%	899	0.5%

## TARGET OCCUPATIONS

EMSI used a multi-level approach to identify key occupations in the region. The approach evaluates several components of occupational data, including industry staffing patterns (i.e., how concentrated the occupations are within the target industry groups), projected growth, projected annual openings, (which includes both new job growth and openings due to turnover), and average educational attainment. The selected occupations are primarily those where 20% or more of the workers are staffed in one of the target industry groups. The occupations in which less than 20% of the workers are in the target industries are those that stand out as relevant due to the strength of growth, earnings, and annual openings—but which are not essential for the long-term sustainability of the target industries. These occupations should still be considered as viable opportunities for WIB customers, but these occupations typically represent demand within a small section of an industry sector. They are not associated with a large number of high-growth industries, which means that the future of these job opportunities may not be as sure as those that are key to the target industry groups.<sup>2</sup>

Tables 3 and 4 contain a list of the 122 occupations that are most significant in terms of the three aforementioned criteria. Table 3 displays middle-skill occupations, or occupations that typically require more than a high school diploma but less than a bachelor’s degree. These jobs are catered towards WIA-eligible and dislocated workers who are looking to find a job quickly that would require two years or less of additional training. Table 4 displays the high-skill occupations, or occupations that typically require a bachelor’s degree or a degree plus work experience. This list is primarily designed for workers who already have a bachelor’s or postgraduate degree and who are highly experienced in one or more fields (e.g., finance, computer science, healthcare).

Most of the columns in Tables 3 and 4 are self-explanatory but a few require clarification. There are two columns regarding wages. The first shows the median hourly wages for area workers, while the second shows the “Career Track Wages” for area workers.<sup>3</sup> The purpose of displaying these wage rates is to show that the earnings potential for workers who remain in the position for a long time and continue to gain experience will be likely to earn wages closer to this amount than to the median hourly wage level. The final column, “TI Concentration,” shows the proportion of jobs that are staffed within the previously identified target industries. SOC codes in which 20% or more of all jobs are

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<sup>2</sup> An example would be architects, except landscape and naval (SOC: 17-1011). Although the construction industry is not projected have substantial growth, for other cultural or economic reasons, this particular occupation is projected to grow by 9% over the next five years.

<sup>3</sup> The “Career Track Wages” column actually represents the 75-percentile wage level for all workers in this category. Essentially this means that 75% of all workers in that category are paid that amount or lower; or conversely, only 25% of all workers are paid a higher wage than the amount shown here.

among the target industries should be considered crucial to the long-term sustainability of the target industries.

The columns labeled HW, HG, and HA represent the rankings of each occupation on the spectrums of all wages (HW), growth (HG), and annual openings (HA). By design, all of these occupations are strong in each of these categories but the three symbols indicate exactly how each occupation compares to the regional median for each of these measurements. The symbol “★” indicates that the occupation is slightly below the regional median—this can be interpreted as the mid-low range. The symbol “☆” indicates that the occupation ranks slightly above the regional median—this can be interpreted as the mid-high range. The symbol “✱” indicates that the occupation ranks far above the regional median—this can be interpreted as the high range. Occupations with three “✱” symbols are the most competitive across the board, in terms of growth, annual openings, and earnings.<sup>4</sup>

**Table 3: Middle-Skill Target Occupations**

SOC Code	Description	2011 Jobs	2016 Jobs	Growth	% Growth	Annual Openings	Median Wages	Career Track Wages	H W	H G	H A	TI Concentration
11-9199	Managers, all other	3,906	4,224	318	8%	161	\$34.85	\$44.86	★	★	★	39%
29-1111	Registered nurses	4,121	4,309	188	5%	108	\$33.00	\$37.27	★	★	★	70%
41-3099	Sales representatives, services, all other	2,017	2,141	124	6%	74	\$27.41	\$36.46	★	★	★	54%
53-3032	Truck drivers, heavy and tractor-trailer	1,325	1,509	184	14%	60	\$23.46	\$29.30	★	★	★	59%
13-1041	Compliance officers, except agriculture, construction, health and safety, and transportation	1,347	1,531	184	14%	51	\$33.10	\$41.06	★	★	★	32%
41-1012	First-line supervisors/managers of non-retail sales workers	1,251	1,343	92	7%	44	\$32.54	\$49.92	★	★	★	49%
29-2061	Licensed practical and licensed vocational nurses	925	970	45	5%	37	\$22.48	\$25.79	★	★	★	75%
15-1099	Computer specialists, all other	867	908	41	5%	27	\$34.37	\$46.04	★	★	★	50%
43-4011	Brokerage clerks	439	488	49	11%	22	\$25.12	\$28.80	★	★	★	98%

<sup>4</sup> Technically the divisions in each range are determined by the inter-quartile range. The cutoff point for the mid-low range is the first quartile; for the mid-high range, it is the third quartile.

13-1023	Purchasing agents, except wholesale, retail, and farm products	449	484	35	8%	19	\$31.45	\$38.76	*	*	*	50%
31-9092	Medical assistants	597	647	50	8%	16	\$16.42	\$19.46	*	*	*	83%
29-2052	Pharmacy technicians	349	379	30	9%	15	\$13.73	\$16.48	*	*	*	24%
31-9091	Dental assistants	409	434	25	6%	13	\$17.39	\$21.80	*	*	*	94%
51-9023	Mixing and blending machine setters, operators, and tenders	173	217	44	25%	12	\$10.29	\$18.58	*	*	*	80%
31-9099	Healthcare support workers, all other	366	400	34	9%	11	\$17.38	\$20.04	*	*	*	72%
29-2034	Radiologic technologists and technicians	382	404	22	6%	10	\$30.09	\$35.31	*	*	*	84%
19-4099	Life, physical, and social science technicians, all other	193	204	11	6%	10	\$18.73	\$23.55	*	*	*	31%
49-2022	Telecommunications equipment installers and repairers, except line installers	243	270	27	11%	9	\$28.60	\$34.03	*	*	*	80%
49-9052	Telecommunications line installers and repairers	234	258	24	10%	8	\$26.48	\$30.32	*	*	*	81%
29-2021	Dental hygienists	227	241	14	6%	7	\$37.79	\$41.54	*	*	*	97%
19-4031	Chemical technicians	156	172	16	10%	6	\$22.79	\$26.70	*	*	*	75%
29-2012	Medical and clinical laboratory technicians	126	137	11	9%	5	\$23.09	\$26.86	*	*	*	72%
19-4021	Biological technicians	80	90	10	13%	5	\$19.42	\$23.22	*	*	*	47%
49-9041	Industrial machinery mechanics	188	200	12	6%	5	\$24.94	\$32.17	*	*	*	39%
19-4091	Environmental science and protection technicians, including health	78	83	5	6%	4	\$23.75	\$29.55	*	*	*	38%
27-3099	Media and communication workers, all other	105	115	10	10%	4	\$21.27	\$35.01	*	*	*	24%
51-9011	Chemical equipment operators and tenders	68	78	10	15%	3	\$19.96	\$26.34	*	*	*	92%

29-2031	Cardiovascular technologists and technicians	101	107	6	6%	3	\$28.75	\$35.75	*	*	*	81%
29-1126	Respiratory therapists	100	105	5	5%	3	\$33.67	\$37.67	*	*	*	77%
17-3029	Engineering technicians, except drafters, all other	87	93	6	7%	3	\$29.99	\$38.30	*	*	*	43%
29-2032	Diagnostic medical sonographers	91	97	6	7%	2	\$34.01	\$38.91	*	*	*	85%
31-2021	Physical therapist assistants	63	66	3	5%	2	\$25.29	\$30.10	*	*	*	84%
51-9041	Extruding, forming, pressing, and compacting machine setters, operators, and tenders	33	38	5	15%	2	\$15.08	\$18.50	*	*	*	78%
17-3025	Environmental engineering technicians	42	46	4	10%	2	\$26.48	\$34.55	*	*	*	33%
25-3021	Self-enrichment education teachers	1,613	1,822	209	13%	66	\$17.81	\$25.82	*	*	*	2%
39-9031	Fitness trainers and aerobics instructors	765	916	151	20%	43	\$18.90	\$27.17	*	*	*	2%
47-2111	Electricians	765	863	98	13%	37	\$28.20	\$45.19	*	*	*	5%
37-1011	First-line supervisors/managers of housekeeping and janitorial workers	923	1,037	114	12%	32	\$14.80	\$19.36	*	*	*	5%
25-2011	Preschool teachers, except special education	976	1,020	44	5%	28	\$12.76	\$17.84	*	*	*	1%
39-1021	First-line supervisors/managers of personal service workers	513	570	57	11%	25	\$18.36	\$25.02	*	*	*	8%
47-1011	First-line supervisors/managers of construction trades and extraction workers	603	650	47	8%	21	\$32.92	\$45.05	*	*	*	2%
11-9051	Food service managers	533	583	50	9%	20	\$23.04	\$30.29	*	*	*	4%
47-2152	Plumbers, pipefitters, and steamfitters	544	584	40	7%	18	\$30.11	\$43.89	*	*	*	3%
49-9021	Heating, air conditioning, and refrigeration mechanics and	372	402	30	8%	12	\$26.47	\$32.89	*	*	*	6%

	installers											
47-4011	Construction and building inspectors	330	358	28	8%	12	\$30.47	\$36.78	*	*	*	5%
49-9099	Installation, maintenance, and repair workers, all other	293	327	34	12%	11	\$15.49	\$21.86	*	*	*	9%
33-2011	Fire fighters	260	274	14	5%	11	\$28.04	\$30.55	*	*	*	1%
13-1051	Cost estimators	227	253	26	11%	10	\$32.66	\$38.44	*	*	*	16%
47-2051	Cement masons and concrete finishers	251	268	17	7%	10	\$27.16	\$32.47	*	*	*	6%
47-2073	Operating engineers and other construction equipment operators	239	260	21	9%	8	\$26.80	\$35.71	*	*	*	3%
17-3011	Architectural and civil drafters	193	206	13	7%	7	\$23.93	\$31.17	*	*	*	2%
27-1025	Interior designers	128	141	13	10%	6	\$22.01	\$33.36	*	*	*	7%
27-4011	Audio and video equipment technicians	126	134	8	6%	5	\$24.00	\$28.50	*	*	*	16%
29-2056	Veterinary technologists and technicians	92	106	14	15%	5	\$15.37	\$19.04	*	*	*	6%
53-7032	Excavating and loading machine and dragline operators	115	123	8	7%	5	\$32.10	\$38.27	*	*	*	2%
53-7081	Refuse and recyclable material collectors	80	92	12	15%	5	\$24.95	\$40.50	*	*	*	1%
51-8021	Stationary engineers and boiler operators	124	133	9	7%	4	\$25.08	\$29.20	*	*	*	18%
17-3031	Surveying and mapping technicians	90	102	12	13%	4	\$17.21	\$20.68	*	*	*	3%
51-7011	Cabinetmakers and bench carpenters	55	65	10	18%	3	\$17.67	\$20.69	*	*	*	14%
17-3022	Civil engineering technicians	98	105	7	7%	3	\$30.03	\$33.71	*	*	*	2%
49-2092	Electric motor, power tool, and related repairers	40	42	2	5%	2	\$17.97	\$21.21	*	*	*	7%
49-3042	Mobile heavy equipment mechanics, except engines	56	60	4	7%	2	\$25.33	\$33.20	*	*	*	4%



**Table 4: High-Skill Target Occupations**

SOC Code	Description	2011 Jobs	2016 Jobs	Growth	% Growth	Annual Openings	Median Wages	Career Track Wages	H W	H G	H A	TI Concentration
13-1111	Management analysts	3,967	4,426	459	12%	157	\$36.41	\$48.45	*	*	*	74%
15-1031	Computer software engineers, applications	3,912	4,398	486	12%	129	\$44.79	\$52.55	*	*	*	78%
41-3031	Securities, commodities, and financial services sales agents	1,896	2,185	289	15%	113	\$28.36	\$49.87	*	*	*	95%
13-2011	Accountants and auditors	3,030	3,220	190	6%	88	\$30.82	\$38.33	*	*	*	40%
13-2052	Personal financial advisors	2,091	2,403	312	15%	84	\$27.55	\$49.30	*	*	*	95%
15-1051	Computer systems analysts	2,199	2,323	124	6%	71	\$38.09	\$48.27	*	*	*	63%
11-3031	Financial managers	2,040	2,198	158	8%	67	\$49.01	\$64.96	*	*	*	68%
13-2051	Financial analysts	1,375	1,535	160	12%	56	\$30.99	\$41.96	*	*	*	88%
15-1032	Computer software engineers, systems software	1,256	1,427	171	14%	44	\$43.89	\$56.48	*	*	*	84%
15-1081	Network systems and data communications analysts	787	927	140	18%	42	\$34.76	\$48.70	*	*	*	73%
13-1073	Training and development specialists	755	824	69	9%	33	\$30.82	\$39.52	*	*	*	43%
15-1071	Network and computer systems administrators	1,010	1,084	74	7%	31	\$37.57	\$45.28	*	*	*	57%
27-1024	Graphic designers	694	745	51	7%	31	\$21.73	\$30.84	*	*	*	34%
11-3021	Computer and information systems managers	1,090	1,154	64	6%	30	\$53.18	\$66.44	*	*	*	65%
27-3031	Public relations specialists	683	740	57	8%	27	\$30.11	\$39.21	*	*	*	40%
19-3021	Market research analysts	513	579	66	13%	26	\$29.57	\$41.68	*	*	*	67%

13-1079	Human resources, training, and labor relations specialists, all other	525	580	55	10%	24	\$27.78	\$35.27	*	*	*	28%
13-2099	Financial specialists, all other	747	796	49	7%	23	\$33.48	\$41.94	*	*	*	58%
41-3021	Insurance sales agents	649	683	34	5%	22	\$25.35	\$37.05	*	*	*	85%
13-1072	Compensation, benefits, and job analysis specialists	502	546	44	9%	22	\$29.16	\$34.45	*	*	*	47%
19-2031	Chemists	380	414	34	9%	19	\$37.05	\$45.40	*	*	*	78%
11-9041	Engineering managers	436	470	34	8%	16	\$61.50	\$75.00	*	*	*	51%
11-9121	Natural sciences managers	250	283	33	13%	14	\$55.09	\$73.13	*	*	*	72%
17-2081	Environmental engineers	334	369	35	10%	14	\$39.72	\$44.26	*	*	*	34%
15-1061	Database administrators	351	371	20	6%	10	\$41.13	\$47.70	*	*	*	56%
17-2199	Engineers, all other	265	290	25	9%	10	\$40.42	\$50.23	*	*	*	47%
17-2141	Mechanical engineers	241	255	14	6%	9	\$38.75	\$51.30	*	*	*	52%
17-2112	Industrial engineers	166	184	18	11%	8	\$38.39	\$47.38	*	*	*	74%
13-2061	Financial examiners	135	163	28	21%	8	\$41.87	\$53.04	*	*	*	56%
29-1199	Health diagnosing and treating practitioners, all other	192	208	16	8%	7	\$27.66	\$39.88	*	*	*	76%
29-2011	Medical and clinical laboratory technologists	194	209	15	8%	7	\$29.61	\$33.39	*	*	*	75%
21-1022	Medical and public health social workers	188	198	10	5%	7	\$26.61	\$30.80	*	*	*	57%
29-1129	Therapists, all other	128	143	15	12%	6	\$24.75	\$37.66	*	*	*	78%
19-2099	Physical scientists, all other	141	154	13	9%	6	\$31.89	\$43.65	*	*	*	62%
19-1029	Biological scientists, all other	134	145	11	8%	6	\$34.35	\$43.77	*	*	*	43%
11-2031	Public relations managers	183	191	8	4%	6	\$58.99	\$80.88	*	*	*	43%
19-1012	Food scientists and technologists	68	80	12	18%	5	\$36.66	\$47.67	*	*	*	67%
13-1081	Logisticians	101	113	12	12%	5	\$32.82	\$41.85	*	*	*	65%

13-1121	Meeting and convention planners	129	138	9	7%	5	\$20.12	\$26.46	*	*	*	26%
13-2031	Budget analysts	193	202	9	5%	5	\$34.47	\$41.67	*	*	*	25%
17-2061	Computer hardware engineers	111	116	5	5%	4	\$51.58	\$63.77	*	*	*	79%
17-2041	Chemical engineers	62	70	8	13%	3	\$43.33	\$51.94	*	*	*	72%
11-3042	Training and development managers	99	106	7	7%	3	\$60.31	\$70.66	*	*	*	60%
23-2099	Legal support workers, all other	133	141	8	6%	3	\$23.78	\$37.47	*	*	*	27%
13-2071	Loan counselors	66	73	7	11%	2	\$20.31	\$26.65	*	*	*	20%
25-3099	Teachers and instructors, all other	3,092	3,309	217	7%	90	\$14.41	\$25.65	*	*	*	2%
25-2021	Elementary school teachers	2,657	2,804	147	6%	89	\$30.97	\$39.68	*	*	*	0%
25-2022	Middle school teachers	1,802	1,892	90	5%	58	\$38.52	\$48.42	*	*	*	0%
17-2051	Civil engineers	769	864	95	12%	31	\$38.46	\$45.42	*	*	*	5%
25-9031	Instructional coordinators	667	720	53	8%	25	\$35.98	\$43.54	*	*	*	4%
25-2041	Special education teachers, preschool, kindergarten, and elementary school	587	625	38	6%	22	\$37.57	\$45.61	*	*	*	1%
11-9021	Construction managers	797	871	74	9%	21	\$36.32	\$48.71	*	*	*	4%
17-1011	Architects, except landscape and naval	508	555	47	9%	18	\$36.49	\$46.45	*	*	*	1%
25-3011	Adult literacy, remedial education, and GED teachers and instructors	613	651	38	6%	17	\$21.23	\$29.13	*	*	*	1%
27-1014	Multi-media artists and animators	274	304	30	11%	12	\$13.70	\$22.72	*	*	*	17%
25-2042	Special education teachers, middle school	334	354	20	6%	12	\$37.04	\$44.82	*	*	*	0%
25-9099	Education, training, and library workers, all other	349	367	18	5%	11	\$21.78	\$30.62	*	*	*	1%
21-1092	Probation officers and correctional treatment specialists	316	336	20	6%	11	\$30.77	\$42.11	*	*	*	0%

25-2012	Kindergarten teachers, except special education	261	275	14	5%	8	\$30.60	\$38.21	*	*	*	0%
17-1022	Surveyors	76	85	9	12%	4	\$27.95	\$34.22	*	*	*	3%

## CRITICAL KNOWLEDGE, SKILLS, AND ABILITIES

In the world of workforce development, there has been much talk in recent years on the topic of worker preparedness, specifically with regard to the knowledge, skills, and abilities (or KSAs) that are required to succeed in the workforce. Every workforce investment board wants to know which KSAs are most important to their region and which KSAs are most desirable when individuals wish to further their careers. In order to answer these questions, EMSI used the O\*NET database to identify key competencies that are in demand for the key occupations in the region. The O\*NET project is a source of occupational data and information developed by the U.S. Department of Labor's Employment and Training Administration. The system provides both qualitative and quantitative descriptions of over 800 occupation classifications. The information collected is based on real-world data and collected through ongoing surveys of an occupation's worker population and occupation experts.

The critical KSAs are provided for several distinct groups of occupations. First and foremost, Table 5 shows the KSAs that are most important for the general group of key occupations. This information should be interpreted as the list of KSAs that are crucial for workers in any industry or occupation. Mercer County WIB should emphasize these attributes for all workers to help them find employment. In Tables 6 through 10, we display the KSAs that are most essential for workers in various industry categories. Naturally, the specific competencies required for individuals entering the biotechnology field will differ from those of individuals entering the business field.

These groups correspond roughly to the industry groups that were identified earlier in this report, except for a few categories that have been merged due to the similarities of the groups' staffing patterns. The finance and insurance industry group has merged with various business services, and the all other manufacturing group has merged with transportation. Altogether, there are six competency profiles: general; biotechnology and pharmaceuticals manufacturing; computer systems design and network management; finance, insurance and business services; healthcare; and other manufacturing and transportation. Some of the O\*NET KSAs are easy to grasp immediately but others such as "Active Learning" are a bit more abstract. For reference, the O\*NET definitions of each KSA category are displayed in Appendix C.

**Table 5: Critical General KSAs**

Knowledge	Skills	Ability
Customer and Personal Service	Monitoring	Oral Comprehension
English Language	Reading Comprehension	Oral Expression
Education and Training	Speaking	Written Comprehension
Mathematics	Critical Thinking	Written Expression
Administration and Management	Active Listening	Deductive Reasoning
Computers and Electronics	Writing	Problem Sensitivity
Clerical	Time Management	Near Vision

**Table 6: Critical Biotechnology and Pharmaceuticals Manufacturing KSAs**

Knowledge	Skills	Ability
Chemistry	Reading Comprehension	Written Comprehension
Mathematics	Active Learning	Oral Comprehension
English Language	Coordination	Deductive Reasoning
Computers and Electronics	Active Listening	Oral Expression
Education and Training	Mathematics	Problem Sensitivity
Mechanical	Troubleshooting	Inductive Reasoning
Engineering and Technology	Critical Thinking	Information Ordering

**Table 7: Critical Computer Systems Design and Network Management KSAs**

Knowledge	Skills	Ability
Computers and Electronics	Troubleshooting	Written Comprehension
Customer and Personal Service	Active Learning	Oral Comprehension
Telecommunications	Reading Comprehension	Oral Expression
English Language	Critical Thinking	Deductive Reasoning
Mathematics	Judgment and Decision Making	Written Expression
Education and Training	Active Listening	Near Vision
Clerical	Systems Analysis	Information Ordering

**Table 8: Critical Finance, Insurance and Business Services KSAs**

Knowledge	Skills	Ability
Customer and Personal Service	Active Listening	Oral Expression
Clerical	Reading Comprehension	Oral Comprehension
English Language	Critical Thinking	Written Comprehension
Computers and Electronics	Monitoring	Deductive Reasoning
Administration and Management	Judgment and Decision Making	Written Expression
Mathematics	Time Management	Near Vision
Education and Training	Writing	Problem Sensitivity

**Table 9: Critical Healthcare KSAs**

Knowledge	Skills	Ability
Customer and Personal Service	Reading Comprehension	Oral Comprehension
Medicine and Dentistry	Active Listening	Oral Expression
Psychology	Speaking	Problem Sensitivity
English Language	Critical Thinking	Near Vision
Education and Training	Writing	Written Comprehension
Mathematics	Social Perceptiveness	Inductive Reasoning
Clerical	Service Orientation	Deductive Reasoning

**Table 10: Critical Other Manufacturing, Transportation & Warehousing KSAs**

Knowledge	Skills	Ability
Mechanical	Operation Monitoring	Visualization
Production and Processing	Equipment Maintenance	Control Precision
Mathematics	Troubleshooting	Reaction Time
Engineering and Technology	Operation and Control	Oral Comprehension
Education and Training	Critical Thinking	Oral Expression
Customer and Personal Service	Equipment Selection	Information Ordering
English Language	Learning Strategies	Manual Dexterity

## APPENDIX A: TARGET INDUSTRY SELECTION APPROACH

In economic development, especially industry and workforce development, data analysis is a crucial element. Data provide a descriptive component of what has happened, what is currently happening, and what is projected to happen within a given industry. Moreover, data can be evaluated from varying perspectives to provide a larger context of economic understanding. For example, geographically specific data can give stronger understanding of regional-specific effects when compared to a larger geography (*e.g.*, state and nation) and indicate whether a region may have a comparative advantage in a particular sector. In order to capture multiple viewpoints of historical and projected industry performance, EMSI gathered, developed, or calculated metrics to describe the following industry characteristics:

1. Historical Growth
2. Future Growth Projection
3. Industry Concentration (Location Quotient)
4. Industry Competitive Effects (Shift Share Analysis)
5. Export Orientation
6. Job Multiplier Effects
7. Earnings Multiplier Effects
8. Industry Average Wage
9. Excess Demand/ Regional Integration

Each characteristic provides a different perspective of industry performance, regional fit, or economic ripple effects for 1079 six-digit industry codes, as classified by North American Industry Classification System (NAICS) categories. As the region considers potential industry targets, these perspectives should help guide determining focus areas.

**Historical Growth:** Measures the past performance of an industry sector and identifies whether industries have been growing/declining/emerging and the rate of change

**Future Growth Projection:** Incorporates historical growth and performance with additional factors and expectations of growth/decline at a larger geographic scale (*i.e.*, state, nation-wide, and even global expectations). Industry projection rates are based off of New Jersey's Office of Employment and Training projections and adjusted to current employment estimates.

**Industry Concentration (Location Quotient):** The location quotient variable is a comparative statistic used to calculate relative employment concentration of a given industry against the average employment of the industry in a larger geography (*e.g.*, nation). Industries with a higher location

quotient (usually greater than 1.2) indicate that a region/state has a comparative advantage or specialization in the production of that good or service.

**Industry Competitiveness Effect (Shift Share Analysis):** A standard method of regional economic analysis that attempts to separate regional job growth into its component causes. The three main causes identified are the “national growth effect,” which is regional growth that can be attributed to the overall growth of the entire U.S. economy; the “industrial mix effect,” which is regional growth that can be attributed to positive trends in the specific industry or occupation at a national level; and the “regional competitiveness effect,” which is growth that cannot be explained by either overall or industry-specific trends. A positive value indicates that a local industry has a competitive advantage compared to the nation. Note: Positive shift share values do not explain why an industry has a competitive advantage, only that there are potential factors that contribute to the industry’s ability to outperform the national average rate of growth/decline.

**Export Orientation:** This variable can be measured in multiple ways. Through the development of an input-output model, metrics estimating export amounts can be calculated for each six-digit NAICS code. Since employment levels vary significantly between industries, production output and export amounts also vary. To account for this and provide a comparable metric, percent exports per job was calculated. Industries that predominately export their product bring new money into the economy, which in turn drive many other local sectors and service providers. Furthermore, export-oriented industries that require less labor input per unit of output can generate significant amounts of new dollars for an economy through job and output growth. Identifying these sectors helps bring a stronger understanding of the economic benefits gained from targeted sector strategies.

**Job Multiplier Effects:** A jobs multiplier indicates how important an industry is to regional job creation. For example, a jobs multiplier of 3 would mean that for every job created by that industry, 2 other jobs would be created in other industries (for a total of 3 jobs). Higher job multipliers in industries that are associated with higher average wages tend to have larger positive impacts on an economy.

**Earnings Multiplier Effects:** An earnings multiplier indicates the level of additional earnings associated with adding one new dollar of earnings to an industry in an economy. This variable is important in understanding how targeted investment in an industry (especially higher-paying industries) affects the overall quality of jobs created.

**Industry Average Wage:** This metric is calculated on the wages of occupations typically employed in an industry. This provides a perspective on the quality of jobs within a given industry, answering the question of whether the industry typically provides family-sustaining wages.

**Excess Demand (Regional Integration):** Measured using an input-output model, excess demand can also be viewed as regional/ state imports. The metric describes how much of a good or service is purchased from outside the area and can indicate the area’s inability to produce its own supply. The

consulting team cautions against over-interpreting this variable, as cross-hauling (inter-regional and inter-state trade) does exist due to specialization in other areas. These data are relevant in several different ways. First, a high regional integration percentage indicates that this industry group displays a strong regional supply-chain, which can be further built upon to increase the number of jobs and amount of wages in related industries. Conversely, if a region has a high level of industry requirements and is only producing a small portion of output to meet those requirements with the remaining amount being imported, then an opportunity may exist to further develop that particular industry.

## APPENDIX B: DETAILED LIST OF TARGET INDUSTRIES

**Table B.1: Biotechnology & Pharmaceutical Manufacturing**

NAICS Code	Description
325199	All Other Basic Organic Chemical Manufacturing
325411	Medicinal and Botanical Manufacturing
325412	Pharmaceutical Preparation Manufacturing
325413	In-Vitro Diagnostic Substance Manufacturing
325414	Biological Product (except Diagnostic) Manufacturing
325620	Toilet Preparation Manufacturing
333314	Optical Instrument and Lens Manufacturing
339112	Surgical and Medical Instrument Manufacturing
339113	Surgical Appliance and Supplies Manufacturing
339115	Ophthalmic Goods Manufacturing
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing
334516	Analytical Laboratory Instrument Manufacturing
541711	Research and Development in Biotechnology
541712	Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)

**Table B.2: Finance & Insurance**

NAICS Code	Description
522110	Commercial Banking
522120	Savings Institutions
522190	Other Depository Credit Intermediation
522291	Consumer Lending
522320	Financial Transactions Processing, Reserve, and Clearinghouse Activities
522390	Other Activities Related to Credit Intermediation
523110	Investment Banking and Securities Dealing
523120	Securities Brokerage
523910	Miscellaneous Intermediation

523920	Portfolio Management
523930	Investment Advice
523999	Miscellaneous Financial Investment Activities
524126	Direct Property and Casualty Insurance Carriers
524127	Direct Title Insurance Carriers
524210	Insurance Agencies and Brokerages
525110	Pension Funds
525120	Health and Welfare Funds
525190	Other Insurance Funds
525990	Other Financial Vehicles

**Table B.3: Computer Systems Design & Network Management**

NAICS Code	Description
511210	Software Publishers
512110	Motion Picture and Video Production
517110	Wired Telecommunications Carriers
517410	Satellite Telecommunications
518210	Data Processing, Hosting, and Related Services
519130	Internet Publishing and Broadcasting and Web Search Portals
519190	All Other Information Services
541490	Graphic Design Services
541511	Custom Computer Programming Services
541512	Computer Systems Design Services
541513	Computer Facilities Management Services
541519	Other Computer Related Services

**Table B.4: Healthcare**

NAICS Code	Description
621111	Offices of Physicians (except Mental Health Specialists)
621112	Offices of Physicians, Mental Health Specialists
621210	Offices of Dentists
621320	Offices of Optometrists
621330	Offices of Mental Health Practitioners (except Physicians)

621340	Offices of Physical, Occupational and Speech Therapists, and Audiologists
621399	Offices of All Other Miscellaneous Health Practitioners
621420	Outpatient Mental Health and Substance Abuse Centers
621492	Kidney Dialysis Centers
621493	Freestanding Ambulatory Surgical and Emergency Centers
621511	Medical Laboratories
621610	Home Health Care Services
621910	Ambulance Services
621991	Blood and Organ Banks
621999	All Other Miscellaneous Ambulatory Health Care Services
622110	General Medical and Surgical Hospitals
622210	Psychiatric and Substance Abuse Hospitals
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals
623110	Nursing Care Facilities
623210	Residential Mental Retardation Facilities
623220	Residential Mental Health and Substance Abuse Facilities
623311	Continuing Care Retirement Communities
624310	Vocational Rehabilitation Services

**Table B.5: Various Business Services**

NAICS Code	Description
541611	Administrative Management and General Management Consulting Services
541612	Human Resources Consulting Services
541613	Marketing Consulting Services
541614	Process, Physical Distribution, and Logistics Consulting Services
541618	Other Management Consulting Services
541620	Environmental Consulting Services
541690	Other Scientific and Technical Consulting Services
541810	Advertising Agencies
541820	Public Relations Agencies
551114	Corporate, Subsidiary, and Regional Managing Offices
541213	Tax Preparation Services
541214	Payroll Services
561110	Office Administrative Services
561410	Document Preparation Services
561421	Telephone Answering Services
541830	Media Buying Agencies

541840	Media Representatives
541850	Display Advertising
541860	Direct Mail Advertising
541870	Advertising Material Distribution Services
541890	Other Services Related to Advertising
541910	Marketing Research and Public Opinion Polling

**Table B.6: All Other Manufacturing**

NAICS Code	Description
311991	Perishable Prepared Food Manufacturing
314999	All Other Miscellaneous Textile Product Mills
315212	Women's, Girls', and Infants' Cut and Sew Apparel Contractors
321219	Reconstituted Wood Product Manufacturing
321920	Wood Container and Pallet Manufacturing
322222	Coated and Laminated Paper Manufacturing
323110	Commercial Lithographic Printing
323111	Commercial Gravure Printing
323112	Commercial Flexographic Printing
323113	Commercial Screen Printing
325312	Phosphatic Fertilizer Manufacturing
325612	Polish and Other Sanitation Good Manufacturing
325910	Printing Ink Manufacturing
326199	All Other Plastics Product Manufacturing
326291	Rubber Product Manufacturing for Mechanical Use
327125	Nonclay Refractory Manufacturing
327320	Ready-Mix Concrete Manufacturing
327331	Concrete Block and Brick Manufacturing
327390	Other Concrete Product Manufacturing
332312	Fabricated Structural Metal Manufacturing
332431	Metal Can Manufacturing
333120	Construction Machinery Manufacturing
333298	All Other Industrial Machinery Manufacturing
333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing
333611	Turbine and Turbine Generator Set Units Manufacturing
333912	Air and Gas Compressor Manufacturing
334113	Computer Terminal Manufacturing

334210	Telephone Apparatus Manufacturing
334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing
334411	Electron Tube Manufacturing
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing
334515	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals
335129	Other Lighting Equipment Manufacturing
335311	Power, Distribution, and Specialty Transformer Manufacturing
336350	Motor Vehicle Transmission and Power Train Parts Manufacturing
336399	All Other Motor Vehicle Parts Manufacturing
339113	Surgical Appliance and Supplies Manufacturing
339932	Game, Toy, and Children's Vehicle Manufacturing

**Table B.7: Transportation & Warehousing**

NAICS Code	Description
481111	Scheduled Passenger Air Transportation
481112	Scheduled Freight Air Transportation
481211	Nonscheduled Chartered Passenger Air Transportation
481212	Nonscheduled Chartered Freight Air Transportation
481219	Other Nonscheduled Air Transportation
482110	Rail transportation
484110	General Freight Trucking, Local
484121	General Freight Trucking, Long-Distance, Truckload
484122	General Freight Trucking, Long-Distance, Less Than Truckload
484220	Specialized Freight (except Used Goods) Trucking, Local
484230	Specialized Freight (except Used Goods) Trucking, Long-Distance
486210	Pipeline Transportation of Natural Gas
486910	Pipeline Transportation of Refined Petroleum Products
488111	Air Traffic Control
488119	Other Airport Operations
488190	Other Support Activities for Air Transportation
488390	Other Support Activities for Water Transportation
488410	Motor Vehicle Towing
488490	Other Support Activities for Road Transportation
488510	Freight Transportation Arrangement
493110	General Warehousing and Storage

493120 Refrigerated Warehousing and Storage

## APPENDIX C: O\*NET COMPETENCY DEFINITIONS

Tables C.1 through C.3 provide definitions of the competencies referred to in Tables 5 through 10.

These definitions are taken from the O\*NET resource center:

[http://online.onetcenter.org/help/online/browse\\_desc](http://online.onetcenter.org/help/online/browse_desc).

**Table C.1- Knowledge Competency Definitions**

Category	Description
Administration and Management	Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.
Chemistry	Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.
Clerical	Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.
Computers and Electronics	Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.
Customer and Personal Service	Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.
Education and Training	Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.
Engineering and Technology	Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.
English Language	Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.
Mathematics	Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.
Mechanical	Knowledge of machines and tools, including their designs, uses, repair, and maintenance.
Medicine and Dentistry	Knowledge of the information and techniques needed to diagnose and treat human injuries, diseases, and deformities. This includes symptoms, treatment alternatives, drug properties and interactions, and preventive health-care measures.
Production and Processing	Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.
Psychology	Knowledge of human behavior and performance; individual differences in ability, personality, and interests; learning and motivation; psychological research methods; and the assessment and treatment of behavioral and affective disorders.
Telecommunications	Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.



**Table C.2- Skill Competency Definitions**

Category	Description
Active Learning	Understanding the implications of new information for both current and future problem-solving and decision-making.
Active Listening	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
Coordination	Adjusting actions in relation to others' actions.
Critical Thinking	Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
Equipment Maintenance	Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.
Equipment Selection	Determining the kind of tools and equipment needed to do a job.
Judgment and Decision Making	Considering the relative costs and benefits of potential actions to choose the most appropriate one.
Learning Strategies	Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things.
Mathematics	Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.
Monitoring	Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.
Operation and Control	Controlling operations of equipment or systems.
Operation Monitoring	Watching gauges, dials, or other indicators to make sure a machine is working properly.
Reading Comprehension	Understanding written sentences and paragraphs in work related documents.
Service Orientation	Actively looking for ways to help people.
Social Perceptiveness	Being aware of others' reactions and understanding why they react as they do.
Speaking	Talking to others to convey information effectively.
Systems Analysis	Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.
Time Management	Managing one's own time and the time of others.
Troubleshooting	Determining causes of operating errors and deciding what to do about it.
Writing	Communicating effectively in writing as appropriate for the needs of the audience.

**Table C.3- Ability Competency Definitions**

Category	Description
Control Precision	The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.
Deductive Reasoning	The ability to apply general rules to specific problems to produce answers that make sense.
Inductive Reasoning	The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).
Information Ordering	The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).
Manual Dexterity	The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.
Near Vision	The ability to see details at close range (within a few feet of the observer).
Oral Comprehension	The ability to listen to and understand information and ideas presented through spoken words and sentences.
Oral Expression	The ability to communicate information and ideas in speaking so others will understand.
Problem Sensitivity	The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.
Reaction Time	The ability to quickly respond (with the hand, finger, or foot) to a signal (sound, light, picture) when it appears.
Visualization	The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged.
Written Comprehension	The ability to read and understand information and ideas presented in writing.
Written Expression	The ability to communicate information and ideas in writing so others will understand.