WEIE Labor Market Context: Methods & Resources

The labor market component of the partnership case studies consisted of secondary analysis of existing public and proprietary data sources, supplemented and contextualized using the primary qualitative data collected by SRI's on-the-ground research team.

- A similar analysis of structure and dynamics can be applied to different regional workforce cases using the cited data sources, which are either public or available by request or purchase. These sources are summarized in the following table, along with possible alternative sources for obtaining similar data and information.
- Methods of analysis of each data type are described in the subsequent section.

Key Data Sources for WEIE Case Study Analysis:				
Data Type	**Source for WEIE Analysis**	**Availability**	**Data Description**	**Possible Alternatives**
Traditional Labor Market Data	**Occupational employment statistics (OES) Survey,** *Bureau of Labor Statistics (BLS), U.S. Department of Labor (USDOL)*	Free & Public	Annual U.S. employment and wage data, by occupation	**O*NET** (sponsored by USDOL) provides a free, online, user-friendly interface to explore occupational data (including data compiled from the BLS' OES Survey and QCEW). State departments of labor typically publish structural employment data and analysis
	Quarterly Census of Employment and Wages (QCEW), *BLS, USDOL*	Free & Public	Quarterly U.S. employment and wage data, by industry	
Company Data	**2012 National Establishment Time-Series (NETS) Database.** *Walls & Associates.*	Private (available for purchase)	Establishment-level data on employment and other (self-reported) company data	Company data can be obtained from a variety of sources, including the media and companies themselves.
Job Advert Data	**Rothwell, J. (2014).** Still searching: Job vacancies and STEM skills. *Metropolitan Policy Program at Brookings Institution*	Private / Public[1]	Job-advertisement data, with variables including skills, occupations, geography, and salary data	There are multiple vendors offering job-advertisement data & analysis for purchase or subscription, such as: Monster Government Solutions; Burning Glass Labor Insight™; Wanted Analytics; and The Conference Board Help Wanted OnLine®
Resume Data	**Indeed** (www.Indeed.com)	Free online search	Searchable full-text resumes, typically including: educational credentials, job history, and skills	Resume data may also be collected directly from alumni, from other free, searchable internet databases (i.e. LinkedIn). Indeed and other job sites may also provide resume data for purchase.

Traditional Labor Market Data Analysis

Analytical Components:
- *Structure Analysis*. Characterizes the regional level and concentration of employment in occupations and industry sectors. Includes: (1) the key occupations targeted by the community college partnership program, and (2) the key industry sectors that employ workers in those occupations.
- *Dynamics Analysis*. Characterizes the change over time in the employment structure of the regional economy.

Methodology: Using traditional labor market data from the Bureau of Labor Statistics (BLS), SRI developed a profile of the regional labor markets in the key occupations and industries for each partnership program.

Profiles of the Key Occupations for Each Region and the United States: We first identified the appropriate target 2000 & 2010 Standard Occupational Classifications (SOCs)[2] for each program, based on: available program documentation, interviews and other qualitative evidence, and the National Center for Education Statistics' crosswalk between Classification of Instructional Programs (CIPs) and SOCs[3]. Using BLS *Occupational Employment Statistics (OES) Survey* data, we then calculated the regional level of employment, regional employment concentration compared to the national average (location quotient[4]), and trends in employment from 2002 through 2013. This is helpful for understanding if the target occupations are particularly prevalent, or 'in-demand' in the region, and whether employment is steady or volatile, and growing or contracting over time.

Industry Cluster Profiles for Each Region and the United States: SRI defined a custom list of 26 industry clusters and 84 sub-clusters, based on 3- to 6-digit NAICS (North American Industry Classification System) codes. Using BLS *Quarterly Census of Employment & Wages* (QCEW) data, we calculated the 2013 and 2007 employment levels, establishments, wages, location, and employment growth rates for each industry cluster and sub-cluster in each case study region,[5] as well as for the United States. This provides a useful overview of the regional economy, and is an intermediary step towards characterizing the regional occupational profiles for key industries.

Defining the National Occupational Profile for Each Industry Sub-Cluster/Cluster: SRI used a national dataset from BLS's OES survey that breaks down the SOC-based employment within each NAICS industry code to create an "occupational profile" for each industry sub-cluster and cluster at the national level. The "occupational profile" shows the percentage of jobs in each industry sub-cluster/cluster that fall into each of the 824 SOC codes. This is an intermediary step towards characterizing the regional occupational profiles for key industries.

Defining the Regional Occupational Profile for Each Industry Sub-Cluster/Cluster: Using the national-level "occupational profile" for each industry sub-cluster/cluster, SRI then created estimates of the number of workers employed in each occupational group (SOC) by every industry sub-cluster/cluster in each case study region. This analysis allows us to identify the key industry sub-clusters and clusters that hire the highest number of regional workers from the key occupational codes (SOCs), and to compare industry concentrations to the national average.

Regional Structure of Key Industries that Hire Workers in Target Occupations: Using the industry sub-cluster/cluster "occupational profiles" described above, SRI then identified the industry sub-clusters and clusters that have the greatest demand (at the national level and each case study region) for hiring the key occupational codes (SOCs) trained by the partnership programs. This analysis allowed us to compare how regional employment demand for the key occupations in each region compares to national averages.

Company Data

Analytical Components:
- *Structural Analysis*. Identifies dominant companies or establishments in the key industries by comparing company/establishment employment numbers to total regional employment in those industries.
- *Dynamics Analysis*. Tracks changes in employment over time by program partners and, if applicable, other large or dominant employers in the key industries.

Methodology:
For the advanced manufacturing case, SRI utilized the 2012 National Establishment Time-Series (NETS) Manufacturing Database (a subset of the full NETS database) to better understand the hiring dominance, or "footprint," and employment trends for the program's large-scale partner. This included the industry share of regional employment, share or total manufacturing employment, and changes in employment over time for the company's regional establishment.

Note that if the approximate number of regional employees for a company is known, the "footprint" of a particular company in a region can be easily approximated through comparison to the traditional labor market data from BLS QCEW discussed in the previous section. Trends in company employment over time may be more difficult to track without access to data such as NETS, unless the company is willing to share that data, but major changes (e.g. layoffs, closures, or expansions) for a large regional employer will often be covered by the media and/or known to regional stakeholders.

Job Advertisement Data

Analytical Components:
- *Dynamics Analysis*. Identifies current regional and national demand for new jobs in program target occupations, skills, and industries.
  Outcomes Analysis. Paired with outcomes data (i.e. the jobs & skills of graduates), this analysis employs job advertisement data to understand the labor market demand or value of jobs and skills (discussed in the 'Resume Data' section below).

Methodology:
This analysis of job advertisements drew from a database developed by Rothwell (2014), but note that similar data and analysis can be customized for purchase from a number of different labor market intelligence vendors (e.g., Monster Government Solutions; Burning Glass Labor Insight™; Wanted Analytics; or The Conference Board Help Wanted OnLine®).

Demand and value of target occupations: Online job advertisement data tends to be biased towards certain types of occupations, such as high-skill jobs, which are more frequently posted online (EMSI, 2015; Rothwell, 2014). We therefore construct our job posting frequency metric as a regional-to-national ratio for the *same* group of target occupations, to determine if those jobs are unusually in-demand in the region of study. We also compare the average value of those occupations (derived from mean salary data) to the average regional value for all occupations, as well as the national values for the target occupations and all occupations.

Demand and value of the target occupation skill clusters: Targeting training towards occupations that are in-demand in the regional labor market is important, but the broader value of those skills in the labor market is also important to the resilience of those workers to short-term shocks and long-term changes in the regional labor market structure. We are therefore seek to understand the broader regional demand for and value of the skills associated with these targeted occupations. To do so, for each group of target occupations we constructed a weighted skills cluster, with the weights equal to the frequency with which that skill occurred for job-advertisements within the target occupations at the national level. Using these skill-frequencies, we then calculated the weighted average skill value for the region[6], and compared that to a national valuation of the same weighted cluster of skills, and to the overall job-averages discussed previously.

Resume Data

Analytical Components:
- *Outcomes Analysis*. Identifies the data contained in resumes about skills, credentials, and employment – all of which are outcomes of interest for community college partnership programs. Through an extension of the job advertisement data analysis described above, SRI characterized regional labor-market value/demand for the set of alumni skills identified in the resume data.

Methodology:
Resume data for the WEIE analysis was collected and coded into a database that included the skills, occupations, and industries of employment of current students and recent graduates of the partnership case study programs.

Resume collection: In January 2015, resumes were collected from Indeed, an online database that includes both job postings and resumes. An initial pool of resumes was identified via keyword searches related to the community college and program, and these were downloaded and manually verified for inclusion in the analysis (to eliminate false matches from the keyword searches). Because individuals posted resumes on their own initiative and not all students are equally likely to post their resumes on Indeed, this resume sample should not be considered representative of the overall student and alumni population. A more representative group of resumes might be obtained with access to student enrollment and graduation records, using a mix of web-searches and/or direct outreach to alumni.

Resume coding of occupations: SRI compiled the most recent occupations listed in resumes of participants from the colleges under study and mapped them onto the Occupational Information Network (O*NET)-SOC structure. Occupations in the resume pool were matched to O*NET-SOC occupations based on the job titles and responsibilities. The O*NET-SOC taxonomy of 974 occupations is based on the SOC system, but occasionally breaks down 6-digit SOC occupations into two or more 8-digit O*NET-SOC positions, thus affording a higher degree of specificity in some instances. The resume occupation data allowed SRI to determine how many of the alumni in the resume database were currently or recently employed in a program target occupation.

Resume coding of jobs by industry: Next, SRI categorized employer industries according to its custom list of 26 industry clusters and 84 sub-clusters, which are defined based on 3- to 6-digit North American Industry Classification System (NAICS) codes. Employer NAICS codes were retrieved through the Hoovers commercial database[7], or assigned manually in instances when businesses had no database record. The resume jobs by industry data allowed us to determine how many of the alumni in the resume database were currently or recently employed in a program key industry.

Resume coding of skills: First, the skills were compiled from the resumes. Skills were drawn primarily from "Skills" sections of resumes; for resumes lacking such sections, skills were collected based on the core job duties listed in the employment histories. As there was no feasible method to identify and remove skills existing prior to program participation, we included all skills listed on the resumes. Our review of the resumes resulted in a set of 110 skills for the advanced manufacturing case and a set of 278 skills for the IT case. Next, these skills were mapped to the skills from the job-advertisement database discussed in the previous section. Because this database includes several thousand skills, an initial match was done using fuzzy-matching software, and all matches generated were then manually reviewed.

Demand and value of the resume skill clusters: Using the mapped skills, SRI constructed a weighted resume skills cluster, with the weights equal to the frequency with which that skill occurred in the resume data. Using these skill-frequencies, we then calculated the weighted average skill value for the region, and compared that to a national valuation of the same weighted cluster of skills, and to the overall job-averages discussed previously.

---

[1] Summary data is published in the cited paper, the full dataset is private and additional data access is at the discretion of the author.

[2] The Standard Occupational Classification (SOC) system is a classification system for workers used by Federal statistical agencies. Additional information is available through the Bureau of Labor Statistics: http://www.bls.gov/soc/

[3] Available at: http://nces.ed.gov/ipeds/cipcode/resources.aspx?y=55

[4] "Location quotients" are defined as the concentration of employment in a sub-cluster/cluster within a region as compared to the national average. They are calculated as follows: (cluster employment in region/total employment in region) / (cluster employment in U.S./total employment in U.S.).

[5] Note that due to differences in the BLS datasets available for Metropolitan Statistical Areas (MSAs) versus Counties, the data analysis for Advanced Manufacturing case covers private sector employment only, while the analysis the IT case includes both private sector and government employment.

[6] Note that when calculating the regional skill values we used MSA-level values unless the number of observations for that skill was less than 50; in which case we compiled data from a larger, multi-MSA region; and if there were still less than 50 observations we used the national average value for the skill.

[7] The Hoovers database is available via subscription at http://www.hoovers.com/

References

Bureau of Labor Statistics (BLS). United States Department of Labor. (2014). *Occupational employment statistics (OES)*. Retrieved 12/11/14 from http://www.bls.gov/oes/home.htm

Bureau of Labor Statistics (BLS). United States Department of Labor. (2015). *Quarterly census of employment and wages (OCEW)*. Retrieved 1/26/15 from http://www.bls.gov/cew/home.htm

Economic Modeling Specialists Incorporated (EMSI). (2015). *Contextualizing real-time and traditional labor market data.* Retrieved 7/18/2015 from www2.economicmodeling.com/contextualizing-real-time-report

Rothwell, J. (2014). *Still searching: Job vacancies and STEM skills*. Washington, DC: Metropolitan Policy Program at Brookings Institution.

Walls & Associates. (2013). *2012 National Establishment Time-Series database.* Author: Denver, CO.