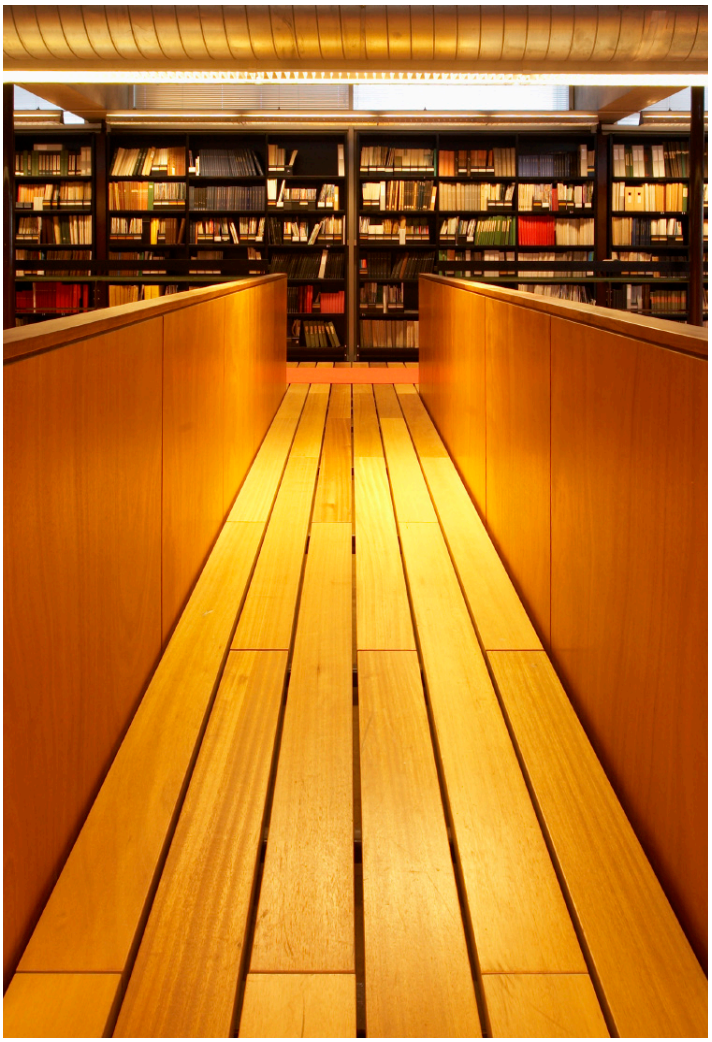
EMSI
Economic Modeling Specialists Inc.

Strategic Advantage

Scenario-Based Training Reference



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IMPORTANT:

Just a quick note on the purpose and proper use of this document: First, **do not** feel as though you need to work through this document from beginning to end. If you do, great. However, this guide has been designed as a reference which you can pick through to find useful how-to's relevant to your work. Second, and very important to us, **this reference is in no way intended to keep our customers at bay**. Please, if you have any questions at all, call us. If you have specific walkthroughs you'd like to work through with a Customer Solutions Consultant, call us. This reference should supplement, but not replace, personal trainings with one of us. We can be reached toll free at **866.999.3674**. Thanks, and we look forward to hearing from you.

STRATEGIC ADVANTAGE™ AT A GLANCE

The Strategic Advantage™ Scenario Based Training Reference Guide is your introduction to EMSI's suite of web-based labor market data analysis tools. It is provided as a companion to the live webinar training by an EMSI representative and will be referred to throughout the presentation. Please insure every participant has a copy of the Training Kit prior to the live webinar training.

ABOUT THE DATA

EMSI gathers and integrates economic, labor market, demographic, and education data from 70 government and private-sector sources, creating in-house a comprehensive and current database that is unsurpassed for its detail and accuracy. Industry, workforce, education, and demographic data are available from state and county levels all the way down to individual ZIP codes, and users can analyze data for any custom region defined by county, ZIP code, or metropolitan/micropolitan statistical areas. In addition, by combining dozens of data sources, we can fill gaps in individual sources (such as suppressions[1] and missing proprietors/self employed workers)—yielding a composite database that exploits the strengths of all. Finally, our database is updated biannually, so our subscribers have access to the most up-to-date information possible.

In order to capture the most comprehensive, complete, and up to date data set possible EMSI combines covered employment data from Quarterly Census of Employment and Wages (QCEW) produced by states and reported to the Department of Labor with total employment data in Regional Economic Information System (REIS) published by the Bureau of Economic Analysis (BEA), augmented with County/ZIP Business Patterns (CBP) and Nonemployer Statistics (NES) published by the U.S. Census Bureau.

Briefly, the EMSI data integration process begins with the BEA's REIS, which is considered the most accurate (but high-level/low-detail) data source. EMSI unsuppresses REIS data where necessary using CBP, and then uses QCEW (also unsuppressed using CBP) and NES to determine how to divide the high-level REIS numbers among more detailed industry codes—a process known as disaggregation. This employment is compared to the state-level numbers and adjusted accordingly, since state-level data contains fewer suppressions and is considered more accurate.

Key Data Concepts:

- EMSI utilizes data published by state agencies.
- EMSI combines state data with federal sources to capture proprietors, self employed workers, and other types of workers not captured by state data.
- EMSI removes suppressions using a mathematical engine and data from the US Census Bureau.
- Unlike most state agencies, EMSI updates data biannually so that it is never more than one year old.

1 A suppression is a missing data point (usually an industry employment number) in published government databases, due to government non-disclosure policies that prevent data from being published if it can be connected to a specific business establishment. Also called a "non-disclosable" data point. EMSI's sophisticated algorithms replace suppressions with educated estimates.

THE MODULES

EMSI data and analysis is accessed by users via a web-based application called Strategic Advantage™ (www.economicmodeling.com) which can be divided into four main components or modules. This overview should serve as a reference for users trying to find information within the tool.

Economic Forecaster (EF)

The EF is the primary data center and is broken out into four sections: Industry tool, Occupation tool, Demographics tool and Economy Overview tool.

The **Industry tool** allows you to view current and forecasted data for various industries in a region, including job growth/decline, unemployment, earnings per worker, establishments, industry concentration (location quotient), competitiveness (shift share), staffing patterns, and more. The tool allows you to run most reports for any custom collection of one or more industries at various levels of industry detail.

The **Occupation tool** allows you to view current and projected data for various SOC (Standard Occupational Classification) occupations in your region, including occupation growth/decline, earnings, shift share, location quotient, unemployment by occupation group, inverse staffing patterns, and more.

The **Demographics tool** provides an interface to published and projected regional demographic data—current and projected population numbers by gender, age, and ethnicity.

The **Economy Overview tool** allows you to generate an instant, high-level overview of your region's industries, occupations, and demographics.

Economic Impact (EI)

The Economic Impact module brings the full power of regional input-output modeling to your desktop, in addition to flexible and easy-to-use analysis of industries, industry clusters, and regional economic base. Input-output is an analysis that allows planners to add or subtract jobs from regional industries to assess the total impacts from ripple effects.

For economic development, workforce, and education professionals, the EI is a critical tool for understanding a region's current economy and planning for future economic challenges and opportunities. It can be divided into four sections: Cluster tool, Industry tool, State of Economy tool and Advanced Options.

The **Cluster tool** provides powerful analysis of regional industries in terms of industry clusters. Rank clusters for employment size, growth, earnings, location quotient, and shift share, and compare regional clusters to state or national clusters.

The **Industry Tool** performs very similar functions to the Cluster Tool, except that reports generate results for any industry (without reference to industry clusters). You can run industry impact scenarios with the input-output model, perform gap analysis to strengthen industry supply chain links, rank industries using a variety of indicators, and discover suggested industries to complement the existing regional economy.

The **State of the Economy tool** identifies which industry sectors drive your economy—bringing money into the region and keeping it there—as well as full data on jobs, earnings, and sales for all industries and industry clusters in the region.

To access the **Advanced Options** utility, click "Advanced" in the lower right corner of the EI home page. This utility allows advanced users to modify the EI's model for your region and to create custom clusters to use with any region.

Career Pathways (CP)

The term "*career pathways"* has various meanings for workforce and education professionals. In the context of our Career Pathways module, the term refers to data and analysis related to occupational competency requirements, regional human capital, and ways of identifying employment and re-training opportunities for unemployed or dislocated workers.

It can be divided into three sections: Competency Analysis tool, Transition Workers tool and Occupational Analysis tool.

The main purpose of the **Competency Analysis tool** is to provide an overview of the competencies required by the jobs in your current and projected regional economy. It works by translating job numbers and projections into skills, knowledge, and abilities using O*NET occupation/competency crosswalks. This tool also allows you, among other things, to compare your region's human capital to the national average using location quotients, which measures how "concentrated" a certain competency is in the regional workforce.

The **Transition Workers** tool allows you to perform analysis relating to scenarios of businesses opening, closing, expanding, or laying off workers. It works by integrating information about employment projections, staffing patterns, and occupational competency requirements. For maximum flexibility, it provides both industry-oriented and occupation-oriented approaches to this analysis. It identifies promising transition occupations using an algorithm that calculates the "compatibility" of occupations by comparing the level and importance of various types of skills, knowledge, and abilities required by each occupation.

The **Occupational Analysis tool** includes three reports that help you analyze occupations in terms of their competency requirements, which are defined either by the O*NET database or by custom profiles that you can create.

Educational Analyst (EA)

The Educational Analyst module is designed to help regional workforce, education, and training professionals access the information they need to plan for the region's future knowledge and skill needs. It combines highly detailed data on regional occupations with information about regional post-secondary institutions, educational attainment, and high school graduations. In addition, it matches occupations to post-secondary programs, allowing users to quickly assess the regional labor market outlook for specific programs.

It can be divided into four sections: Programs tool, Peer Comparisons tool, Career Clusters tool, and Educational Capital tool.

The **Programs tool** is a powerful strategic planning asset for education and workforce professionals because it accesses high-resolution labor market data and links it to post-secondary programs of study. This saves valuable research time by instantly presenting an overview and 10-year outlook for all occupations served by a specific program.

The **Peer Comparison tool** provides a user-friendly interface to selected elements from the national IPEDS database of information about post-secondary educational institutions. It gives college leaders and researchers the ability to benchmark dozens of institutional characteristics against any those of any other institution in the country. In addition, the tool can auto-generate a peer group for a given institution and produce a report on comparing it to the group.

The **Career Clusters tool** allows users to view labor market data aggregated by career clusters which are an increasingly important model in education and workforce development. Originally developed by the U.S. Department of Education's Office of Vocational and Adult Education, they are now being maintained by the States' Career Clusters Institute (www.careerclusters.org). Career clusters are useful models that group occupations with similar skill and interest requirements, and define pathways of career advancement within each cluster.

Education professionals are increasingly interested in career clusters because of the most recent Carl D. Perkins career and technical education legislation (known as Perkins IV), which requires accountability measures, proof that states' programs are in line with labor market needs, and an specifically authorizes funding for career cluster initiatives. Workforce development professionals are also becoming more in tune with career clusters, not only because of their closer than ever connections with educators, but also because career one-stop centers created by the Workforce Investment Act can use career clusters and pathways to counsel jobseekers and transition dislocated workers to new occupations.

The **Educational Capital tool** provides vital information about a region's current and projected educational attainment and high school graduations. This information can reveal which demographic groups can most benefit by attaining certain educational attainment levels, and how many potential college students the region has.

Training Scenarios

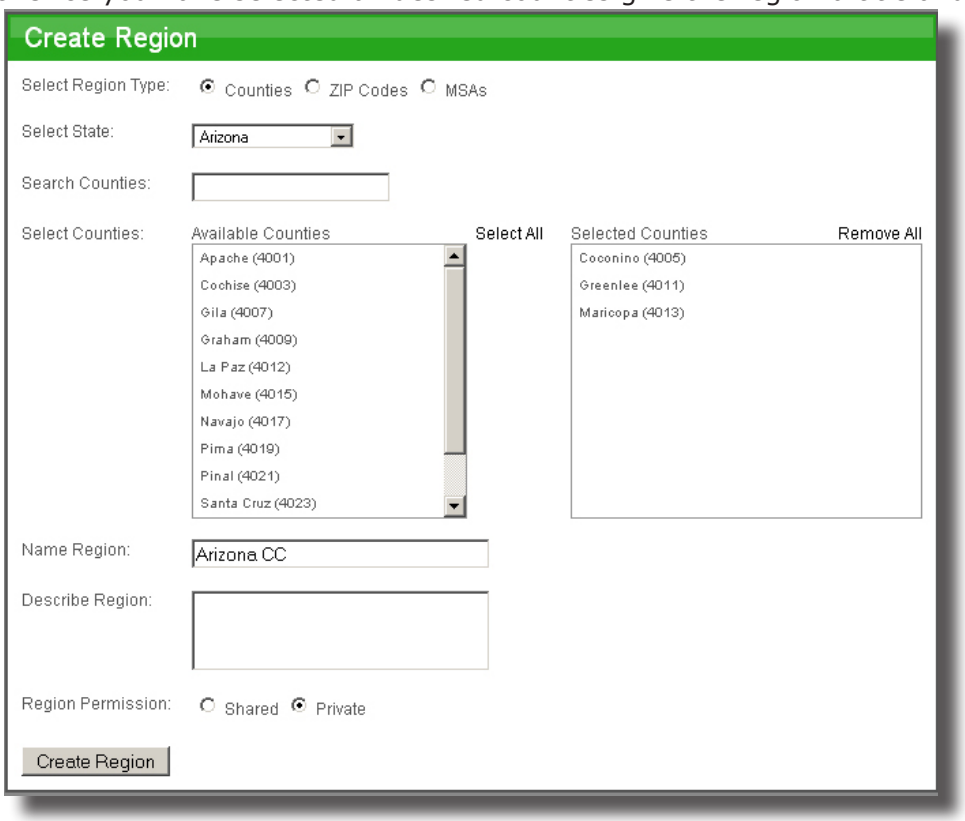
The following training scenarios are intended to convey an understanding of how Strategic Advantage™ can be used in a real setting. Each section contains a workflow description and an explanation of the report output. Workflow descriptions assume users have already created a region and are starting from the Strategic Advantage™ start page.

HOW TO CREATE A REGION

Before attempting the workflow described in the following scenarios users must first create a region for which to access data.

Workflow Description:

- From the Strategic Advantage™ start page (after logging in) select one of the module tabs (i.e. "Economic Forecaster")
- Click **Create Region**>>
  - In the bottom left hand corner of the screen click "Create Region" next to the globe icon.
- Select **Region Type**>>
  - Under "Available Counties" select "Counties", "ZIP Codes" or "MSAs" depending on the level of data you have access to and the kind of region you would like to create. If you are unsure select "Counties."
- Select **State**>>
  - Use the drop down box to select the state in which you would like to access data.
- Select **Counties and/or ZIP Codes**>>
  - If you are building a county level region use the viewing window to select the counties to include in the region. You can select counties from multiple states. As you select they will automatically show up in the "Selected Counties" window in the upper right. Once you have selected all desired counties give the region a title and click "Create."
  - If you are building a ZIP level region first select the county that contains the desired ZIP codes using the drop down box. You can select ZIPs from multiple counties and states. As you select they will automatically show up in the "Selected ZIP Codes" window in the upper right. Once you have selected all desired counties give the region a title and click "Create."



HOW TO ASSESS WORKFORCE DEMAND FOR A SINGLE PROGRAM

This scenario addresses how to identify workforce demand for educational programs by mapping CIP program codes to SOC occupation codes along with regional occupation projections and replacement job estimates which indicate a demand for workers.

Required Modules:

- ✓ Educational Analyst

Workflow Description:

- Click the **Educational Analyst** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select that the saved region for which you would like to access data.
- Click **Programs** tool>>
- Click **Program Report**>>
- Choose **Timeframe**>>
  - Under "Growth Period" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Choose **Result Set**>>
  - Use the check boxes to select the data elements you would like to view. If you are unsure what you would like to view, check all of the boxes.
- Choose **Program**>>
  - Select CIP (TOP if you are in California)
  - Choose the program you would like to view workforce demand data for by selecting the program sector and the program using the drop down boxes…
  - **…OR** choose the program you would like to view workforce demand data for by selecting the icon and performing a text based search.
- Choose **Education Range**>>
  - Under "Choose Education Limit", select "All Levels" if you would like to view all occupations trained for by the chosen program regardless of education level…
  - **…OR** Select "Select Range" and specify the education level of occupations you would like to view workforce demand data for in order to limit results.
- Click **Run>>**

Report Output:

The table lists summary information about all the occupations currently mapped to the selected program, which is displayed in the first section of the table. These are the occupations trained for by the selected program(s).

The second section, "Program Occupations," lists the codes and titles of all occupations currently mapped to the selected program.

Under "Basic Information" is various summary data for all the occupations:

- Start/End Year Occupational Jobs: Total employment in all the given occupations in the start and end years of the selected timeframe.

- Total Change / Total % Change: The total job change (in jobs and percentage) among all the given occupations over the selected timeframe.

- Median Hourly Earnings: The median hourly earnings per worker in all given occupations.

Occupational Breakdown

- This optional section includes a bar graph and table that show labor market information (start/end year jobs, annual openings, earnings, and education level) for each occupation that is currently mapped to the selected program. “Annual openings” refers to the sum of new and replacement jobs in the occupation over the given timeframe, divided by the number of years in the timeframe.

Occupational Change (if program maps to more than one occupation)

- This optional section focuses on employment change in each of the occupations mapped to the selected program. Regional change is expressed in jobs and percentage terms, while state and national percentages are shown for comparison.

Occupational Distribution

- This optional map shows the sub-regions where jobs in all the given occupations are concentrated in the current region.

HOW TO ASSESS WORKFORCE DEMAND FOR MULTIPLE PROGRAMS

This scenario addresses how to create a profile of programs so that workforce demand data can be compiled for multiple programs at once.

Required Modules:

- ✓ Educational Analyst

Workflow Description:

STEP 1: Create a profile

- Click the **Educational Analyst** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Programs** tool>>
- Click **Profile Manager>>**
  - Under "Programs/Profiles" select "Profile Manager."
  - The Profile Manager will allow you create a customized profile of program offerings for your organization.
- Choose **Task**>>
  - Under "Available Tasks" select "create" profile.
- Create **Custom Profile**>>
  - Under "Profile Name" type in the title of your profile.
  - Under "Profile Type" select CIP (TOP if you are in California)
  - Under "Use Template" select "No".
- Click **Go**>>
- Select programs to include in profile>>
  - Under "Program supersector" use the drop down box to select the top level program category to view detailed programs within that section.
  - For each selected program supersector detailed programs will be displayed with check boxes in the right hand column.
  - Use the check boxes to select programs to include in the profile.
- Click **Back>>**

STEP 2: Run Program Review Report

- Click **Program Review>>**
- Choose **Timeframe**>>
  - Under "Growth Period" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Choose **Profile**>>
  - Under "Profile Type" select CIP (TOP if you are in California).
  - Under "Select Profile" use the drop down box to select the profile you would like to view. For our purposes, select the profile we created in Step 1.
- Choose **Education Range**>>
  - Under "Choose Education Limit", select "All Levels" if you would like to view all occupations trained for by the chosen profile programs regardless of education level…
  - **…OR** Select "Select Range" and specify the education level of occupations you would like to view workforce demand data for in order to limit results.
  - **Note:** Selecting education range is important for community colleges because their focus is on granting Associate Degrees and Postsecondary Vocational Awards. This functionality allows them to view only the workforce demand for occupations that require that level of education.
- Click **Run>>**

Report Output

- The Profile Summary table shows every program code and description in the profile. Next to each one is the labor market information for all occupations currently mapped to that program.

    - **Start/End Year Jobs:** Total jobs (published or projected, depending on the year) in all the occupations currently mapped to the program.
    - **Annual Openings:** Annual average of both new and replacement jobs over the timeframe.
    - **EPW:** Median hourly earnings per worker for all occupations mapped to the program.
    - **Total/% Change:** The change in total employment from the start year to the end year of the timeframe.
    - **Change comparison:** The percentage difference between jobs change for the program's occupations and all occupations in the region.

- Detailed program sections include a table for every program in the current profile. Each table shows the same information as the summary above, except that it is given for every occupation mapped to the given program, and the "Change Comparison" column is replaced by the education level required by each occupation listed.

HOW TO FIND NEW PROGRAMS WITH HIGH WORKFORCE DEMAND… *or* … WHAT ARE THE HIGH WAGE, HIGH GROWTH OCCUPATIONS AND HOW DO I TRAIN FOR THEM?

This scenario addresses how to find in-demand programs educational institutions should consider offering. In-demand programs are recommended based on the high wage, high demand occupations for which they train.

Required Modules:

- ✓ Educational Analyst

Workflow Description:

- Click the **Educational Analyst** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Programs** tool>>
- Click **Find Programs**>>
- Select **Timeframe**>>
  - Under "Growth Period" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Select **Occupation Source**>>
  - Under "Occupation Source" select "Find Programs by Top Occupations." If you already know the occupation you would like to train for select "Find Programs by Select Occupations" and use the drop down boxes to find the occupation, click "Add", then "Run."
- Select **Limit**>>
  - Under "Limit Results" use the drop down box to select the number of top occupations you would like to view. For our purposes, select "Top 30."
- Choose **Education Range**>>
  - Under "Choose Education Limit", select "All Levels" if you would like to view all occupations trained for by the chosen profile programs regardless of education level…
  - **…OR** Select "Select Range" and specify the education level of occupations you would like to view workforce demand data for in order to limit results.
  - **Note:** Selecting education range is important for community colleges because their focus is on granting Associate Degrees and Postsecondary Vocational Awards. This functionality allows them to view only the high growth/high wage occupations that require that level of education.
- Choose **Report**>>
  - Under "Result Set" check the boxes indicating how you want to rank top occupations; by High Wage and Growth, High Wage, or High Growth. For our purposes select all three boxes.
- Click **Run**>>

Report Output:

Depending on the options selected, there may be up to three tables. All these tables share the same columns: start/end year jobs, jobs change, education level, and median hourly earnings per worker (EPW). Each occupation in these tables has an expand icon (>) next to it, which will reveal all the programs that are currently mapped to it. *For each occupation, these are the programs that a college would offer to train for this occupation.*

- **Occupations Ranked by Wage and Growth**: The table shows the highest wage occupations that also have high growth. Only occupations that rank highly in both respects will appear on the table.

- **Occupations Ranked by Wage:** The bubble graph and table show occupations with highest median hourly wages. On the bubble graph, each circle represents an occupation. The circle's horizontal position indicates its projected growth, its vertical position indicates its median hourly

wage, and its size indicates total employment in the occupation.

- **Occupations Ranked by Growth:** The bar graph and table show occupations with largest projected change in total employment.

For each of the occupation ranking tables (high wage, high growth, high wage and growth), there is another table that shows the top programs associated with those occupations. The programs are ranked by the number of times they appear in the mappings for the ranked occupations. *If a college were to offer one of these programs they would be training for multiple top occupations at once.*

HOW TO TRAIN FOR INDUSTRIES

This scenario addresses how to train for industries by (1) identifying important regional industries, (2) identifying occupations in demand in those industries, and (3) identifying the educational programs needed to train for those occupations.

Required Modules:

- ✓ Economic Forecaster
- ✓ Educational Analyst

Workflow Description:

Step 1: Identify Focus Industry

- *Note: If you already know what industry you would like to train for skip to Step 2.*
- Click the **Economic Forecaster** tab from the SA start page>>
- Select a **Region**>>
    - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Industry** tool>>
- Click **Highest Ranked**>>
- Select **Growth Period**>>
    - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Select **Result Set**>>
    - Under "Result Set" check the boxes next to the "Rank By" options. To rank industries by the number of jobs they have in the region, select "Jobs." To rank industries by growth, select "Growth," etc. For our purposes check all of the boxes.
- Choose **Industry Level**>>
    - Under "Industry Level" select the circle next to the level of NAICS industry detail for which you would like to view data. Selecting "2" will allow you to view very broad aggregated categories like "Manufacturing" and "Construction." Selecting "5" will allow you to target specific industries such as "Pharmaceutical and Medicine Manufacturing." For our purposes, select "5."
- Select **Limit**>>
    - Under "Limit Results" select the number of industries that you would like to see ranked. For our purposes, select "Top 30."
- Click **Run**>>

Report Output:

The output depends on the options selected—the report will have up to five sections, one for each ranking metric used (jobs, earnings, growth, shift share, and location quotient). Each section includes both visual and tabular data that shows top industries in descending order. This report allows you to view top ranking regional industries and identify those vital to the economy based upon the following indicators.

- ***Largest Industries***; The bar graph and table show the regional industries that account for the largest number of jobs in the start year of the selected timeframe. Additional table data: end year jobs, total and percent change in jobs, and average earnings per worker.

- ***Highest Paying Industries***; The bar graph and table show the regional industries with the highest average earnings per worker (including all benefits and proprietor income) in the start year of the selected timeframe. Additional table data: total start year and end year jobs, and total and percent change in jobs.

- ***Fastest Growing Industries***; The bar graph and table show the regional industries with the highest employment growth (in jobs) over the selected timeframe. Industries in the chart are ranked from left to right by total job change. Additional table data: total start/end year jobs, percent job change, and earnings per worker.

- ***Most Competitive Industries***; The bar graph and table show the results of a shift share analysis. Top regional industries are ranked by the "competitiveness effect," which is the industry's job growth that exceeds national trends over the selected timeframe. For details on shift share analysis and terminology, see Appendix A or email info@economicmodeling.com. Additional table data: earnings per worker.

- ***Top Industry Location Quotients***; The bubble graph and table show regional industries with the highest location quotients (LQs) relative to the nation, along with the change in LQ over the selected timeframe. For details, see or email Appendix A or email info@economicmodeling.com.

Step 2: Select Focus Industry and Identify Staffing Patterns (Top Occupations Employed by the Industry)

Based upon information contained in the previous report, choose an industry upon which to focus. Write the name of the industry and associated NAICS code down so that you can remember it later.

- Click **Back**>>
  - Scroll to the top of the screen and click the "Back" button embedded within the page.
- Click **Staffing Patterns**>>
- Select **Growth Period**>>
  - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- **Select Area**>>
  - Under "Result Set" select the area for which you would like to view the staffing pattern; "region", "state", or "nation". For our purposes, select "region."
- Select **Limit**>>
  - Under "Limit Results" use the drop down box to select the number of occupations to display. For our purposes, choose "Top 30 Occupations."
- Select **Additional Columns**>>
  - Here you can choose to return the "Education Level" or "Median Earnings" for the occupations staffing the industry you're exploring.
- Select **Industry**>>
  - Under "Add Industry" first select the level of NAICS industry detail you would like to view (2, 3, 4, and 5.) For our purposes, select "5" or the same detail as the focus industry you've selected.
  - Next use the drop down boxes or click the icon to find the sector and industry you decided to focus on earlier.
  - Click "Add" when you have found the correct industry.
- Click **Run**>>

Report Output:

The following report details the primary occupations employed in the selected industry based on a regionalized staffing pattern. Employment numbers are also accompanied by a projection.

- **Mapping Generated for Industries**
  - This table lists all the industries selected for the report. Occupation data shown in the report will aggregated from employment in all the selected industries.

- **Fastest Changing Occupations**
  - The two tables show occupations with highest change (positive or negative) in the selected industries over the given timeframe, ranked by both actual job change and percentage change.

- **Occupational Makeup**
  - The bar graph shows the ten occupations with largest employment within the selected

industries. The table shows the same information, except that it shows percent change and lists as many occupations as you selected in the "Limit Results" report option. In both the graph and the table, occupations are ranked by start year jobs in descending order. Note that this is not total employment for these occupations; it is total employment for these occupations within the selected industries only.

Step 3: Map Occupations to Programs

Now that we have identified the top occupations employed within the selected industry, the final step is to find the programs that should be offered to train for those occupations. Export the industry staffing pattern report to Word or PDF by clicking the associated icon in the top right hand corner of the page. This will allow us to recall the top occupations when needed.

- Click the **Educational Analyst** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Programs** tool>>
- Click **Find Programs**>>
- Select **Growth Period**>>
  - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Select **Occupation Source>>**
  - Under "Choose Type" click the circle next to "Find Programs by Select Occupations."
- Select **Occupations**>>
  - Under "Add Occupation" use the drop down boxes to find the top occupations employed by the target industry from the staffing pattern that was saved in Step 2…
  - …**Or** click the icon and search for the occupations
  - Once you've found an occupation select it and click "Add." You can add multiple occupations to the list so add the top ten occupations from the industry staffing pattern.
  - If you accidentally add the wrong occupation use the icon to remove it.
  - Once you've add the ten top occupations employed by the target industry click "Save" on the top right hand side of that viewing panel.
  - Enter a name for the group (e.g. the name of the target industry) and click the icon. It will take you to a list of saved groups. Click the next to the group you just saved and it will take you back to the previous page.
- Click **Run**>>

Report Output:

In Step 1, we began by selecting an industry that displayed high growth or another important quality. In Step 2, we identified the top occupations employed in that industry through a regional staffing pattern. This report is the result of Step 3. It provides the final step in understanding how to train for a specific industry by mapping the selected occupations to the education programs (by CIP code) used to train those occupations. Through this process, we have identified how to create a pipeline of workers for a targeted industry.

- **Selected Occupations with Programs**
  - The bar graph and table show information about all the selected occupations that have at least one associated program (program "mapping"). The bar graph shows job change for each occupation by showing total start year and end year jobs. The table shows typical labor market information for each occupation, and each occupation is expandable with the > icon to reveal associated programs.
- **Top Programs for Selected Occupations**
  - The table shows the programs associated with the selected occupations, ranked by the number of times they appear in those occupations' mappings.

HOW TO IDENTIFY IMPORTANT REGIONAL INDUSTRIES

This scenario addresses how to find important regional industries; the largest employing, highest paying, fastest growing, most concentrated and most competitive industries in the regional economy.

Required Modules:

- ✓ Economic Forecaster

Workflow Description:

Option 1: Use "Highest Ranked" Report

- Click the **Economic Forecaster** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Industry** tool>>
- Click **Highest Ranked**>>
- Select **Growth Period**>>
  - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Select **Result Set**>>
  - Under "Result Set" check the boxes next to the "Rank By" options. To rank industries by the number of jobs they have in the region, select "Jobs." To rank industries by growth, select "Growth," etc. For our purposes check all of the boxes.
- Choose **Industry Level**>>
  - Under "Industry Level" select the circle next to the level of NAICS industry detail for which you would like to view data. Selecting "2" will allow you to view very broad aggregated categories like "Manufacturing" and "Construction." Selecting "5" will allow you to target specific industries such as "Pharmaceutical and Medicine Manufacturing."
- Select **Limit**>>
  - Under "Limit Results" select the number of industries that you would like to see ranked. For our purposes, select "Top 30."
- Click **Run**>>

Report Output:

The output depends on the options selected—the report will have up to five sections, one for each ranking metric used (jobs, earnings, growth, shift share, and location quotient). Each section includes both visual and tabular data that shows top industries in descending order. This report allows you to view top ranking regional industries and identify those vital to the economy based upon the following indicators.

- ***Largest Industries***; The bar graph and table show the regional industries that account for the largest number of jobs in the start year of the selected timeframe. Additional table data: end year jobs, total and percent change in jobs, and average earnings per worker.
- ***Highest Paying Industries***; The bar graph and table show the regional industries with the highest average earnings per worker (including all benefits and proprietor income) in the start year of the selected timeframe. Additional table data: total start year and end year jobs, and total and percent change in jobs.
- ***Fastest Growing Industries***; The bar graph and table show the regional industries with the highest employment growth (in jobs) over the selected timeframe. Industries in the chart are ranked from left to right by total job change. Additional table data: total start/end year jobs, percent job change, and earnings per worker.
- ***Most Competitive Industries***; The bar graph and table show the results of a shift share analysis. Top regional industries are ranked by the "competitiveness effect," which is the industry's job growth that exceeds national trends over the selected timeframe. For details on shift share analysis and terminology, see Appendix A or email info@economicmodeling.com. Additional table data: earnings per worker.
- ***Top Industry Location Quotients***; The bubble graph and table show regional industries with

the highest location quotients (LQs) relative to the nation, along with the change in LQ over the selected timeframe. For details, see Appendix A or email info@economicmodeling.com.

Option 2: Use "Jobs by Industry" Tables

- Click the **Economic Forecaster** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Industry** tool>>
- Click **Jobs by Industry>>**
- Select **Growth Period**>>
  - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data. For our purposes, select 2006-2016.
- Select **Columns>>**
  - Under "Additional Columns" check the boxes next to the industry data elements you would like to analyze (in addition to standard elements such as employment, earnings, etc). For our purposes, select "National Location Quotient" and "Establishment Data."
- Select **Result Set**>>
  - Under "Result Set" select the circle next to "Show All Industries." You can also select "Show Selected Industries" to narrow results to a specific group of industries.
- Click **Run**>>

Report Output:

The report that generates is actually an interactive table. The columns include basic industry data including any of the additional elements selected on the previous options menu. You should see the following columns:

- NAICS Code
  - Industry definitions are based on North American Industry Classification System codes
- Description
  - Industry Sector Names
- 2006 Jobs
  - Number of jobs in the base year 2006 (or whatever year was selected on the options menu)
- 2016 Jobs
  - Number of jobs in the projection year 2016 (or whatever projection year was selected on the options menu)
- Change
  - The change (increase or decrease) in the number of jobs between the base and projection year.
- % Change
  - The percent increase or decrease based on change in jobs
- 2006 National LQ
  - Regional industry concentration in the base year based on national location quotient (for more info on location quotient see the attached pullout or the Help Console)
- 2016 National LQ
  - Regional industry concentration in the projection year based on national location quotient (for more info on location quotient see the attached pullout or the Help Console)
- EPW
  - Average earnings per worker including wages, benefits and all other forms of compensation. Industry EPW is not a reflection of wage and salary, rather an indication of total industry earnings per industry job (for more information see the Help Console)
- 2006 Establishments
  - Number of physical business locations from Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW). Note: One business can have two separate physical locations and be counted as two establishments.

Using the Tables

Initially the table shows aggregated top level industry sectors like Agriculture, forestry, fishing and hunting, Mining, and Utilities. Use the ▶ icons next the industry description to "drill down" and reveal more detail. This initial "drill down" interface allows you to explore industries within their sectoral relationships but does not allow detailed analysis. For increased functionality, follow the workflow below.

- Select **5-Digit** detail>>
    - Near the top right hand side of the screen find the drop down box displaying "All Levels." Click the drop down box and select "5-Digit." The table will automatically re-sort now displaying industries at the 5-digit NAICS detail level.
- **Sort** the table>>
    - You are now looking at a long table of detailed industries. They are currently still sorted by NAICS code. To sort by any of the other data elements, click the column heading. For our purposes, click "Change" to sort the table by industries adding the most new jobs to the economy.
    - Once the table resorts you will be looking at a table of industries ranked by the "Change" column- those adding the most new jobs to the economy.
- **Filter** the data>>
    - In addition to sorting data by column headings you can filter the data further to narrow down the table. For example, we've already sorted by growth, now narrow the list of high growth industries down to those that also have a high location quotient.
    - Near the top right hand corner of the table click the "Filter" icon. After clicking on this icon additional drop down boxes will be displayed which allow you to filter the data.
        - Select the first drop down box on the left hand side that says "NAICS Code." The drop down box will reveal additional options. Select "2006 National LQ."
        - The second drop down box should say "greater than or equal to." Leave this drop down box as is.
        - In the blank field to the right of the second drop down box we'll enter the location quotient that we want to set as the lowest for our table of industries. Enter a location quotient of "2" meaning we want to filter out the industries that are less concentrated in the region. (For an explanation of location quotient, see Appendix A)
        - Click "Add." The table will regenerate. Industries are still sorted by growth but now we have filtered out industries that have a lower concentration in the region.

Additional Functionality

- **Trim** and **Export** the data>>
    - If you would like to narrow down your table by removing individual industries, or by selecting only a few industries to keep, you have the ability to "trim" the data.
    - Begin by clicking on the industries you would like to keep on the table and export later. They will highlight green when selected (to unselect an industry, click it again.)
    - Click the "Trim" button near the top right hand side of the table. Three options will be revealed- "Keep Selected Rows," "Remove Selected Rows," or "Reset."
    - For our purposes, click "Keep Selected Rows."
    - Now only the industries you would like to export remain. To export them click the "Excel" icon in the top right hand corner of the screen.

HOW TO ANALYZE THE BASIC DEMOGRAPHICS OF THE POPULATION

This scenario addresses how to find basic demographic data on the population including age, gender, and race/ethnicity along with projections.

Required Modules:

- ✓ Economic Forecaster

Workflow Description:

- Click the **Economic Forecaster** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Demographics >>**
- Click **Demographic Report>>**
- Select **Growth Period**>>
  - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Select **Demographic Area**>>
  - Under "Demographic Area" use the drop-down box next to "Select Area." To analyze demographics by race/ethnicity, select "race/ethnicity." To sort demographics by age, select "age," etc. For each of these a different set of options will appear below in the "Choose Demographics" box. For our purposes choose "age."
- Select **Demographic Breakdown>>**
  - Under "Demographic Breakdown" check the boxes for the areas you'd like to bring back in the report. You'll notice that whatever area you've selected under "Demographic Area" will be checked, and that you will be unable to change it without changing your selection under "Demographic Area." Select both "race/ethnicity" and "gender" for our purposes.
- **Choose Demographics>>**
  - Under "Choose Demographics" select the age cohorts you'd like to bring back in the report. Clicking the cohorts in the box highlights them green. For this report highlight all of the cohorts.
- Click **Run**>>

Report Output:

The report output details the race/ethnicity, age, and gender data for your region. It looks at broad level demographics, but can easily be customized to home in on or more specific ethnic groups or age cohorts. As we currently have it though, you have:

- **Selected Demographics**
  - This table details the age cohorts we chose to look at.
- **Age Breakdown**
  - The initial graph presents each age cohort in terms of the baseline numbers and projected growth or decline.
  - The subsequent table gives us the same information in hard numbers, as well as the change in numbers and the percent change. The table also lists totals at the bottom.
- **Race/Ethnicity Breakdown**
  - The initial graph presents each racial/ethnic group in terms of the baseline numbers and projected growth or decline.
  - The subsequent table gives us the same information in hard numbers, as well as the change in numbers and the percent change. The table also lists totals at the bottom.
- **Gender Breakdown**
  - The initial graph presents genders in terms of the baseline numbers and projected growth or decline.
  - The subsequent table gives us the same information in hard numbers, as well as the change in numbers and the percent change. The table also lists totals at the bottom.

HOW TO ANALYZE THE AGE OF THE POPULATION

This scenario addresses how to analyze age of the population to identify trends such as an aging workforce or out-migration of younger workers.

Required Modules:

- ✓ Economic Forecaster

Workflow Description:

- Click the **Economic Forecaster** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Demographics >>**
- Click **Demographic Report>>**
- Select **Growth Period**>>
  - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Select **Demographic Area**>>
  - Under "Demographic Area" use the drop-down box next to "Select Area." Select "age."
- Select **Demographic Breakdown>>**
  - Under "Demographic Breakdown" the box for "Age Breakdown" will already be checked. If the other categories are checked, uncheck them.
- **Choose Demographics>>**
  - Under "Choose Demographics" select all of the age. Clicking the cohorts in the box highlights them green. For this report highlight all of the cohorts.
- Click **Run**>>

Report Output:

Now that we've pulled back the data for the age cohorts in your region we can analyze the results. As this report gives us information on the entire workforce we can see the aging workforce, as well as the changes we can expect in younger cohorts

- Identify the aging workforce
  - The graph will show the older cohorts to the right. The two bars for each age cohort represent base year and projection year. Obviously, the more the projection year bar surpasses base year bar, the more that age cohort is growing over the projection period. The age cohort with the greatest disparity between the two bars will be the cohort growing the most. Focusing on the older cohorts we can use this graphical display to identify changes in the aging workforce.
  - The table shows the older cohorts toward the bottom and also displays information for base and projection years. The advantage of this table is the two extra columns that register the change over the projection period in both:
    - numbers (the difference between the base and projection years)
    - percentages (the percent of the base year this difference represents)
  - Using these two measures you should be able to confirm or deny that your population is showing a large portion entering the cohort
- Track changes in the younger population
  - Once you've identified the changes your workforce is headed for, you can then turn to see how the younger populations will stack up against that need.
  - It's likely that some cohort in your region will be showing decline. As the population moves through time some of the younger cohorts will not support the cohort they are moving into. For instance, if you have 10,000 10-14 year olds in 2006 and 12,000 15-19 year olds, by the time those cohorts have moved up there will be a loss of 2,000 in the 15-19 age cohort.
  - As you sort through the younger cohorts you'll be able to see how your emerging workforce will be able to support the loss you might be experiencing in aging workers.

HOW TO ANALYZE RACE/ETHNICITY OF THE POPULATION

This scenario addresses how to analyze the race/ethnicity of the population to reveal trends such as how minority groups effect overall growth of the population.

Required Modules:

- ✓ Economic Forecaster

Workflow Description:

- Click the **Economic Forecaster** tab from the SA start page>>
- Select a **Region**>>
    - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Demographics >>**
- Click **Demographic Report>>**
- Select **Growth Period**>>
    - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Select **Demographic Area**>>
    - Under "Demographic Area" use the drop-down box next to "Select Area." Select "race/ethnicity."
- Select **Demographic Breakdown>>**
    - Under "Demographic Breakdown" the box for "Race/Ethnicity Breakdown" will already be checked. If the other categories are checked, uncheck them.
- **Choose Demographics>>**
    - Under "Choose Demographics" choose all of the race/ethnicity groups by clicking and highlighting each of them in green.
- Click **Run**>>

Report Output:

This report focuses on the diversity of race/ethnicities in your region. If you're merely interested in seeing the breakdown, you'll find it most useful to look at the base year numbers and make a comparison of the relative size of each group. However, to spot emerging groups pay close attention to the percentage growth. A relatively small group projected to grow by a high percentage indicates changes in your region you should be aware of as you make strategic plans.

HOW TO IDENTIFY EDUCATIONAL ATTAINMENT OF THE POPULATION

This scenario addresses how to analyze the education attainment of the population twenty five years of age and older. Educational attainment data can be used for analyses such as identifying potential gaps in the education system or as an economic development tool to recruit businesses by showing a highly educated workforce.

Required Modules:

- ✓ Educational Analyst

Workflow Description:

- Click the **Educational Analyst** tab for the SA start page>>
- Select a **Region**>>
    - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Educational Capital**>>
- Click **Educational Attainment Report**>>
- Select **Growth Period**>>
    - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Select **Demographic Area**>>
    - Under "Demographic Area" use the drop-down box next to "Select Area." To analyze demographics by race/ethnicity, select "race/ethnicity." To sort demographics by education, select "education," etc. For each of these a different set of options will appear below in the "Choose Demographics" box. For our purposes choose "race/ethnicity." You'll notice that, unlike the demographics report, we don't have the option to choose age here, the reason being that have already limited the age to the population over 25 years old.
- **Choose Demographics**>>
    - Under "Choose Demographics" select the groups you'd like to include in the report. Clicking a group highlights them blue. For our purposes, highlight all the groups.
- Click **Run**>>

Report Output:

By pulling back the "Educational Attainment Report" with the Demographic Area set as "race/ethnicity," you can now see the educational attainment for the various ethnic groups in your region.

- **Selected Demographics (Population +25)**
    - This table details the ethnic groups we chose to look at.
- **Race/Ethnicity Breakdown**
    - This table gives you an overview of the groups we'll be looking at. You have each race/ethnicity group and the current population over 25, the projected population, the change in job numbers, and the percent change.
- **Education Breakdown**
    - The first graph and table "Selected Demographics by Education Level" show the population over 25 listed by Educational Attainment along with the projected growth for each. Remember that this is considering all of the race/ethnicity groups because they were all selected for this report. If you wanted to know the breakdown of educational attainment for only Asians and White Hispanics we would select to bring only those back.
    - "% of Selected Demographics by Education" shows a comparison between the educational attainment percentages for the region, state, and nation. Because each column shows the total percentages for the selected demographics, they all equal 100% in the totals.

HOW TO ANALYZE HIGH SCHOOL GRADUATES

This scenario addresses how to analyze regional high school graduates by race/ethnicity along with projections. High school graduate data can be used to identify the potential pipeline of students for post-secondary education as well as trends in high school graduate minority groups.

Required Modules:

- ✓ Educational Analyst

Workflow Description:

- Click the **Educational Analyst** tab from the SA start page**>>**
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Educational Capital**>>
- Click **High School Graduation Report**>>
- Select **Growth Period**>>
  - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016).
- Select **Demographic Area**>>
  - Under "Demographic Area" use the drop-down box next to "Select Area." To analyze demographics by race/ethnicity, select "race/ethnicity." For each of these a different set of options will appear below in the "Choose Demographics" box. For our purposes choose "race/ethnicity." You'll notice that, unlike the demographics report, we don't have the option to choose age here, as we have already limited the age to the 15-19 age cohort.
- **Choose Demographics**>>
  - Under "Choose Demographics" select the groups you'd like to include in the report. Clicking a group highlights them blue. For our purposes, highlight all the groups.
- Click **Run**>>

Report Output:

Selected Demographics

- This table details the ethnic groups we chose to look at. Keep in mind the fact that our demographics are limited to the 15-19 age cohort for this report.
-

High School Graduations by Race/Ethnicity

- The pie chart shows the percentage each race/ethnicity makes up of the total number of High School Graduates in the base year.
- The table shows a more nuanced view of those same numbers, including:
  - Projection year numbers
  - The difference between base and projection years
  - The percent of change over that period.
- That table also includes totals for all of those columns.

Comparison to State and Nation

- The "Graduates as Percentage of 15-19 Age Cohort" chart shows base year information, including:
- The percent of high school graduates in each demographic for each demographic
  - A comparison between the region, state, and nation
- The table below shows the numbers for the data in the table.

HOW TO RECOMMEND CAREER PATHWAYS FOR DISLOCATED WORKERS

This scenario addresses how to recommend career pathways for dislocated workers using O*NET data from the Department of Labor. O*NET ranks occupations for their level of knowledge, skills, and abilities and can be used to recommend compatible occupations which have a measure of transferability in skills.

Required Modules:

- ✓ Career Pathways

Workflow Description:

- Click the **Career Pathways** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Choose **Transition Workers** tool>>
- Click **From Occupation**>>
- For "**Timeframe**" >>
  - Use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- For "**Choose Occupation**">>
  - If you know the SOC code or category, you can use the top drop-down menu to choose the top-level SOC category, and then the bottom drop-down menu to choose the occupation at the detailed level. Click on the appropriate occupation.
  - If you don't know the SOC code, you can click on the magnifying glass icon to open a search box. For example: if you enter "Welder," the box below will return "51-4121.06: Welders, Cutters, and Welder Fitters." Click on the appropriate occupation.
- For "**Select Limit**">>
  - Under "Limit Results" select the number of occupations you would like to see ranked that are most compatible to the occupation you selected in the previous step. For our purposes, select "Top 30 Compatible Occupations."
- Click **Run**>>

Report Output:

The output ranks the top occupations most compatible to the effected occupation (for our example, welders) using EMSI's Compatibility Index. The Compatibility Index employs O*NET data from the Department of Labor to analyze skill gaps and recommend occupations with a measure of skills transferability.

Under "Source Occupation" are the selected occupation's code, title, and description, along with the following employment information:

- **Start Year Size:** The total regional jobs in the source occupation.
- **Job Change:** The projected change in employment in the source occupation over the timeframe chosen. Typically, only occupations with projected decline are good source occupations for worker transitioning—of course, a local event such as imminent business closure will not be accounted for by projections, so local knowledge must prevail here.
- **Hourly Earnings:** Ideally, workers should receive comparable or higher earnings after they transition to a new occupation. So the source occupation selected should provide comparable or lower earnings compared to the target occupations listed later.
- **Job Zone:** If the chosen source occupation has a low Job Zone (1-3), then workers have less time and money invested in their current skill set, and so they will profit more by transition from that occupation to a new one.
- **Yearly Turnover:** Turnover in the source occupation provides more information about likely future unemployment than total job change alone. Turnover can also be a fairly good indicator of demand for workers in that occupation.

Under "Target Occupations" is similar information which is either aggregated or averaged for all the compatible occupations that the tool has discovered.

- **Potential Labor Pool:** This is the current total number of jobs in all compatible target occupations found. It should be large enough to receive workers transitioning from the source occupation you selected.
- **Labor Pool Change:** The projected change in employment for all compatible target occupations found, over the timeframe you selected. Target occupations should be growing, or at least not show significant decline.
- **Median Hourly Earnings:** Target occupations should have comparable or higher earnings compared to the source occupation. This number is actually the average of all the occupations' median hourly earnings.
- **Average Job Zone:** Target occupations with lower Job Zones (1-3) are better candidates for worker re-training because they require less time and money for training. Occupations with high Job Zones generally require a bachelor's or professional degree in a related field, which is much more difficult and expensive to attain.

The bubble graph provides a quick visual comparison of the ten most compatible target occupations for the source occupation you selected. Each "bubble" on the graph represents one occupation. The bubble's size represents the number of regional jobs in that occupation, the bubble's vertical position shows its median hourly earnings, and its horizontal position shows its projected job growth over the timeframe you selected.
The source occupation is shown as a circle with red cross-hairs through its center. All occupations to the right of it have higher projected growth, while those to the left have lower growth. Occupations above it have higher median earnings, while those below it have lower median earnings.

In a typical worker transition scenario, one or more potential target occupations should have the same or higher earnings and job growth compared to the source occupation—in other words, they will be in the upper right quadrant defined by the red cross-hairs. This means that workers transitioning out of the source occupation will likely find better earnings and employability in those target occupations. On the other hand, occupations in the lower-left are less promising target occupations because workers would probably sacrifice earnings and employability to move into them.

The table summarizes labor market information for each candidate source occupation, including start and end year jobs, median hourly earnings, Job Zone (see explanation above), yearly turnover (number of yearly openings likely in the occupation due to workers leaving or retiring), and EMSI's compatibility index score.

About EMSI's Compatibility Index:
Occupation compatibility, or the similarity between two occupation's competencies, is another term that is crucial for interpreting Career Pathways analysis. The module calculates the compatibility of two occupations by comparing their O*NET skill, knowledge, and ability profiles, which contain two scores for each competency element (e.g., knowledge of biology): the attainment level and the importance level. Our algorithm uses the differences between competency levels, weighted by importance levels, to determine how compatible two occupations are. Several assumptions are made in calculating compatibility:

- The O*NET categories of Knowledge, Skills, and Abilities are sufficient to determine compatibility between occupations.
- The desirability transitioning workers from one occupation to another decreases exponentially as the distance increases between a source occupation's O*NET score in one category and the target occupation's score in that category.
- Over-qualification is just as much of a problem as under-qualification for a worker moving from one job to another.

HOW TO FIND HIGH WAGE, HIGH GROWTH OCCUPATIONS

This scenario addresses how to find high wage, high growth occupations in the regional economy using occupation projections and average hourly earnings.

Required Modules:

- ✓ Economic Forecaster

Workflow Description:

Option 1: Use "Highest Ranked" Report in Economic Forecaster

- Click the **Economic Forecaster** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Occupations** tool>>
- Click **Highest Ranked**>>
- Select **Growth Period**>>
  - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Select **Result Set**>>
  - Under "Result Set" check the boxes next to the "Rank By" options. To rank occupations by the number of jobs they have in the region, select "Jobs." To rank occupations by growth, select "Growth," etc. For our purposes check all of the boxes.
- Choose **Occupation Level**>>
  - Under "Occupation Level" select the circle next to the level of SOC occupation detail for which you would like to view data. Selecting "2" will allow you to view very broad aggregated categories like "Healthcare practitioners" and "Management occupations." Selecting "5" will allow you to target specific occupations such as "Physicians and Surgeons."
- Select **Limit**>>
  - Under "Limit Results" select the number of occupations that you would like to see ranked. For our purposes, select "Top 30."
- Click **Run**>>

Report Output:

The output depends on the options selected—the report will have up to five sections, one for each ranking metric used (jobs, earnings, growth, shift share, and location quotient). Each section includes both visual and tabular data that shows top occupations in descending order. This report allows you to view top ranking regional occupations and identify those vital to the economy based upon the following indicators.

Largest Occupations; The bar graph and table show the regional occupations that account for the largest number of jobs in the start year of the selected timeframe. Additional table data: end year jobs, total and percent change in jobs, and average earnings per worker.

Highest Paying Occupations; The bar graph and table show the regional occupations with the highest average earnings per worker (including all benefits and proprietor income) in the start year of the selected timeframe. Additional table data: total start year and end year jobs, and total and percent change in jobs.

Fastest Growing Occupations; The bar graph and table show the regional occupations with the highest employment growth (in jobs) over the selected timeframe. Occupations in the chart are ranked from left to right by total job change. Additional table data: total start/end year jobs, percent job change, and earnings per worker.

Most Competitive Occupations; The bar graph and table show the results of a shift share analysis. Top regional occupations are ranked by the "competitiveness effect," which is the occupation's job growth that exceeds national trends over the selected timeframe. For details on shift share analysis and terminology,

see the Help Console or email info@economicmodeling.com. Additional table data: earnings per worker.

Top Occupation Location Quotients; The bubble graph and table show regional occupations with the highest location quotients (LQs) relative to the nation, along with the change in LQ over the selected timeframe. For details, see the Help Console or email info@economicmodeling.com.

***Change comparison*:** The percentage difference between jobs change for the program's occupations and all occupations in the region.

Option 2: Use "Jobs by Occupation" Report in Economic Forecaster

- Click the **Economic Forecaster** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Occupation** tool>>
- Click **Jobs by Occupation>>**
- Select **Growth Period**>>
  - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data. For our purposes, select 2006-2016.
- Select **Columns>>**
  - Under "Additional Columns" check the boxes next to the occupation data elements you would like to analyze (in addition to standard elements such as employment, earnings, etc). For our purposes, select "National Location Quotient," "Educational Level," and "Average Earnings."
- Select **Result Set**>>
  - Under "Result Set" select the circle next to "Show All Occupations." You can also select "Show Selected Occupations" to narrow results to a specific group of occupations.
- Click **Run**>>

Report Output:

The report that generates is actually an interactive table. The columns include basic occupation data including any of the additional elements selected on the previous options menu. You should see the following columns:

- SOC Code
  - Occupation definitions are based on Standard Occupational Classification codes
- Description
  - Occupation Category Names
- 2006 Jobs
  - Number of jobs in the base year 2006 (or whatever year was selected on the options menu)
- 2016 Jobs
  - Number of jobs in the projection year 2016 (or whatever projection year was selected on the options menu)
- Change
  - The change (increase or decrease) in the number of jobs between the base and projection year.
- % Change
  - The percent increase or decrease based on change in jobs
- 2006 National LQ
  - Regional occupation concentration in the base year based on national location quotient (for more info on location quotient see the attached pullout or the Help Console)
- 2016 National LQ
  - Regional occupation concentration in the projection year based on national location quotient (for more info on location quotient see the attached pullout or the Help Console)

- EPW (Median and Average)
    - Average earnings per worker including wages, benefits and all other forms of compensation. Occupation EPW is not a reflection of wage and salary, rather an indication of total occupation earnings per occupation job (for more information see the Help Console)

Using the Tables:

Initially the table shows aggregated top level occupation categories like Management occupations and Healthcare practitioners. Use the icons next the occupation description to "drill down" and reveal more detail. This initial "drill down" interface allows you to explore occupations within their broader categorization but does not allow detailed analysis. For increased functionality, follow the workflow below.

- Select **5-Digit** detail>>
    - Near the top right hand side of the screen find the drop down box displaying "All Levels." Click the drop down box and select "5-Digit." The table will automatically resort now displaying occupations at the 5-digit SOC detail level.
- **Sort** the table>>
    - You are now looking at a long table of detailed occupations. They are currently still sorted by SOC code. To sort by any of the other data elements, click the column heading. For our purposes, first click "Change" to sort the table by occupations adding the most new jobs to the economy. This shows the high growth occupations. Next, click "Median EPW" to sort the table by occupations with the highest individual hourly earnings.
- Select the "**Filter"** tab in the upper right hand corner to isolate occupations with certain earnings or growth attainment >>
    - For our example, in the first drop down menu, select "Median EPW." In the second menu, select "greater than or equal to." In the last menu, enter "30" in order to return only occupations which make more than $30 per hour.
    - Next, you can add another filter on top of the previous one. Keeping the first drop down menu as "AND," select "Change" from the second menu. Keeping "greater than or equal to" in the third menu, enter "500" in the last menu. This will now return only those occupations which make at least $30/hour *and* are projected to grow by at least 500 jobs within 10 years.

Option 3: See the "How to Find New Programs with High Workforce Demand… or… What are the High Wage, High Growth Occupations and How Do I Train for Them?" scenario above.

HOW TO CAREER COUNSEL USING CAREER CLUSTERS

Career clusters are an increasingly important model in education and workforce development. Originally developed by the U.S. Department of Education's Office of Vocational and Adult Education, they are now being maintained by the States' Career Clusters Institute (www.careerclusters.org). Career clusters are useful models that group occupations with similar skill and interest requirements, and define pathways of career advancement within each cluster.

Education professionals are increasingly interested in career clusters because of the most recent Carl D. Perkins career and technical education legislation (known as Perkins IV), which requires accountability measures, proof that states' programs are in line with labor market needs, and an specifically authorizes funding for career cluster initiatives.

Workforce development professionals are also becoming more in tune with career clusters, not only because of their closer than ever connections with educators, but also because career one-stop centers created by the Workforce Investment Act can use career clusters and pathways to counsel jobseekers and transition dislocated workers to new occupations.

Required Modules:

- ✓ Educational Analyst

Workflow Description:

Step 1: Identify Important Regional Career Clusters

- Click the **Educational Analyst** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Select **Career Clusters**>>
- Choose **Rank Career Clusters**>>
- Select **Timeframe**>>
  - Use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Select **Education Level**>>
  - Under "Report Options" use the drop down box to select the education levels for the occupations you would like to view by Career Cluster. For our purposes, select "All Education Levels."
- Select **Result Set**>>
  - Under "Result Set" check the boxes next to the metrics you would like to use to rank Career Clusters. For our purposes, select "Growth" and "Location Quotient."
- Click **Run**>>

Report Output:

The Report Output ranks regional Career Clusters for the selected indicators employment size, growth, and concentration (location quotient). This information reveals the largest employing Career Clusters, those adding the most jobs to the economy, and those with the highest relative concentration compared to the national average.

- ***Career Clusters Ranked by Growth***
  The bar graph and table rank all 16 career clusters by total job change over the given timeframe. The "Replacement Jobs" column indicates the total replacement jobs in the cluster expected to come available during the entire timeframe. The "% Change/Repl" column is derived by taking the total new and replacement jobs in the cluster and dividing that by the total jobs in the cluster. In other words, it shows the total openings in the cluster as a percentage of the total jobs in the cluster. The "EPW" column gives the averaged median hourly earnings of all occupations in the cluster.

- ***Career Clusters Ranked by Location Quotient***
  The bar graph and table rank all 16 career clusters by the start year location quotient of all occupations in each cluster. Location quotient for career clusters is the relative regional number of jobs in the cluster as compared to the nation. An LQ greater than 1, for example, indicates that the region has relatively more jobs in those occupations compared to the national average. The table also gives end year LQ and the % change in LQ over the given timeframe. See **Appendix A** for more information on location quotient.

- ***Career Clusters Ranked by Shift Share***
  The graph and table rank clusters by the shift share analysis number called the "competitive effect," which is job growth beyond what might have been expected if the region followed national trends. Shift share is a standard method of estimating how much of regional job growth is due to national trends and how much is due to regional factors. "Job Change" is actual published/ projected change in jobs; "Expected Change" is the change that would have been expected if the regional occupations had followed national overall and occupation-specific growth trends. The "Competitive Effect" is then the job change minus the expected change. See **Appendix A** for more information on shift share.

Step 2: Analyze Detailed Career Cluster Information

Now that we have an idea of what Career Clusters are important in the region, the following report allows you to zero-in on a particular career cluster, to analyze what **pathways** and **occupations** within the cluster perform best in terms of jobs, growth, and earnings. This information is essential for any targeted Career Cluster training program.

- Click the **Back** button embedded in the current page>>
- Choose **Career Cluster Report**>>
- Select **Timeframe**>>
  - Under "Growth Period" use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- Select **Career Cluster**>>
  - Under "Select Career Cluster" select the career cluster category (for our example, "Health Science").
- Select **Pathway**>>
  - Under "Select Pathway" choose a sub-category. For our purposes, choose "Biotechnology Research and Development."
- Select **Education Level**>>
  - Under "Educational Level" use the drop down box to select the occupational education levels for which you would like to access career cluster data. For our example, choose "All Education Levels."
- Choose **Result Set**>>
  - Under "Display" check the boxes next to the indicators by which you would like to rank occupations. "Size" is total regional jobs in the occupations, "Growth" is total job change, and "Earnings" is median hourly earnings per worker. Each selected option will add a graph and table to the report which shows the top-ranked occupations in that category. For our purposes, select all three.
- For **Limit Results**>>
  - Use the drop down box to select the number of top occupations you would like to view. For our purposes, select "Display All."
- Click **Run**>>

Report Output:

Executive Summary
This table shows basic information for all occupations within the selected cluster/pathway, sub-totaled by education level: start/end year jobs, total job change, replacement jobs, and hourly earnings per worker. It provides an excellent overview on the outlook for occupations in this cluster/pathway and provides a basis for targeting specific occupations for training.

Largest Occupations
The bar graph and table show the largest occupations (in terms of jobs) in the selected cluster/pathway. The graph shows the top ten, while the table shows as many occupations as were specified in the "Limit Results" report option.

Largest Growth
The bar graph and table show the occupations (in the selected cluster/pathway) with the highest total change in jobs over the timeframe. The graph shows only the top ten, while the table shows as many occupations as were specified in the "Limit Results" report option. Additional columns in the table include "Annual Turnover," which is the projected number of positions expected to open each year due to retirements and other causes). "Replacement jobs" is simply the total turnover jobs over the entire timeframe (i.e., annual turnover multiplied by the number of years in the timeframe).

Highest Earnings
The bar graph and table show the occupations with the highest median hourly earnings in the selected cluster/pathway. The earnings graph includes jobs as well, in order to immediately show whether a high-paying occupation also has a significant number of jobs. The graph shows only the top ten occupations, while the table shows as many as were selected in the "Limit Results" report option.

HOW TO DEVELOP A RAPID RESPONSE STRATEGY FOR DISLOCATED WORKERS

The local economy doesn't stay the same year after year. Companies, factories, and—sometimes—entire regional industries will execute major layoffs, close up shop, or relocate in another county or state. When such a scenario presents itself, economic analysis and direction are indispensable keys to economic recovery and growth. When finding themselves without a job, a group of workers with a specific set of skills can often be transitioned into a different industry which requires a similar skill-set. By analyzing occupational compatibility and the availability of appropriate training, economic developers can ensure that their local economy can continue to grow as the local economy changes.

Required Modules:

- ✓ Career Pathways

Workflow Description:

- Click the **Career Pathways** tab from the SA start page>>
- Select a **Region**>>
    - In the "Choose Region" window, select the saved region for which you would like to access data.
- Choose **Transition Workers** tool>>
- Click **From Industry**>>
- For "**Timeframe**" >>
    - Use the drop down boxes to select the base year and projection year for which you would like to access data (e.g. 2006-2016)
- For "**Choose Industry**">>
    - If you know the NAICS code or category, you can use the top drop-down menu to choose the top-level NAICS category, and then the bottom drop-down menu to choose the industry at the detailed level. Click on the appropriate industry.
    - If you don't know the NAICS code, you can click on the icon to open a search box. Select the appropriate industry and click "Add."
- Click **Run**>>

Report Output:

The table shows the selected source industry, and the top 5 occupations employed in that industry- and therefore the most likely occupations impacted by the layoffs. These occupations are the "source occupations" mentioned in the remainder of the report; each one will be matched to 10 possible target occupations. The target occupations are the occupations with the highest skills transferability as identified by EMSI's Compatibility Index. The Compatibility Index uses O*NET data from the US Department of Labor to analyze skill gaps and recommend occupations with a measure of skills transferability.

Under "Target Occupations" are several pieces of information about the target occupations that the tool has discovered:

- **Median Hourly Earnings**: Ideally, workers in target occupations should have earnings comparable to or higher than those of workers in the source occupations. This number is actually the average of all the occupations' median hourly earnings.
- **Average Base Year Jobs**: This number helps provide an estimate of the size of the labor pool into which you can transition workers from the source industry.
- **Average Growth:** Occupations with strong projected growth are generally better target occupations.
- **Average Job Zone**: Job Zone is a measure of how much education and/or training a required by an occupation. A high Job Zone (5) indicates that workers in that occupation have a large amount of time and money invested in their current competencies, while a low Job Zone indicates that they have very little time and/or money invested. Occupations with lower Job Zones are generally better targets for rapid and cost-effective transitions.

The "Most Compatible Occupations" graph provides a quick, visual comparison of the most compatible target occupations for each source occupation. Each "bubble" on the graph represents one occupation. The bubble size represents the number of regional jobs in that occupation, the bubble's vertical position shows its median hourly earnings, and its horizontal position shows its projected job growth over the timeframe you selected. Each source occupation is shown as a circle with red cross-hairs through its center. All occupations to the right of the source occupation have higher projected growth, while those to the left have lower growth. Occupations above the source occupation have higher median earnings, while those below it have lower median earnings.

In a typical worker transition scenario, good target occupations should have good earnings and strong job growth—that is, they should be in the upper right quadrant as defined by the red cross-hairs. This means that workers in the source occupation will likely find better earnings and employability by transitioning into the target occupations.

The table summarizes labor market information for each candidate source occupation, including start and end year jobs, median hourly earnings, Job Zone (see explanation above), yearly turnover (number of yearly openings likely in the occupation due to workers leaving or retiring), and our own compatibility index score.

About the EMSI's Compatibility Index:
Occupation compatibility, or the similarity between two occupation's competencies, is another term that is crucial for interpreting Career Pathways analysis. The module calculates the compatibility of two occupations by comparing their O*NET skill, knowledge, and ability profiles, which contain two scores for each competency element (e.g., knowledge of biology): the attainment level and the importance level. Our algorithm uses the differences between competency levels, weighted by importance levels, to determine how compatible two occupations are. Several assumptions are made in calculating compatibility:

- The O*NET categories of Knowledge, Skills, and Abilities are sufficient to determine compatibility between occupations.
- The desirability transitioning workers from one occupation to another decreases exponentially as the distance increases between a source occupation's O*NET score in one category and the target occupation's score in that category.
- Over-qualification is just as much of a problem as under-qualification for a worker moving from one job to another.

HOW TO RECRUIT BUSINESSES USING REGIONAL WORKFORCE AND EDUCATION CAPITAL

One of the key deciding factors in business location decisions is how equipped the regional workforce is to meet businesses human capital needs. This scenario addresses how to recruit business using regional workforce and education capital data.

Step 1 will identify the top occupations required by the business using industry staffing patterns. This will give us an idea of the workforce needs the target business will have.

Step 2 will identify not only the availability of workers in the region for the required occupations, but also the potential labor pool for each occupation based on EMSI's Compatibility Index. The Compatibility Index will define the potential labor pool by identifying the top ten most compatible occupations (i.e. transferable skills) with the required occupations.

Step 3 will identify the educational training programs available within the regions that currently train workers for the required occupations.

Required Modules:

- ✓ Economic Forecaster
- ✓ Career Pathways

Workflow Description:

Step 1: Identify Occupations Required by Target Industry

- Click the **Economic Forecaster** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Industry** tool>>
- Click **Industry Report>>**
- Select **Growth Period**>>
  - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data. For our purposes, select 2006 to 2011.
- Select **Report Options>>**
  - Under "Result Set" check the boxes next to "Top Occupations" and "Jobs Map."
- Select **Industry**>>
  - Under "Add Industry" first select the level of NAICS industry detail you would like to view (2, 3, 4, and 5.) For our purposes, select "5.
  - Next, use the drop down boxes or click the icon to find the sector and industry encompassing the target business. If you are having trouble identifying the correct industry use the NAICS industry search engine at http://www.census.gov/epcd/naics02/naicod02.htm or contact an EMSI consultant by phone at 866-999-3674 or by email at customerservice@economicmodeling.com.
  - Click "Add" when you have found the correct industry.
- Click **Run**>>

Report Output:

The report output summarizes employment and earnings for the selected industry, identifies the top occupations required by the industry, and maps how industry jobs are distributed throughout the region.

Executive Summary
This table provides information on total jobs, growth/decline, LQ, and shift share for all the selected industries taken together.

- **Selected Industries:** A list of all industries included in the report.
- **Basic Information:** Total jobs and change in jobs over the selected timeframe for all selected

industries, as well as current average earnings per worker.

Industry Change Summary
The graph and table show total jobs and jobs change aggregated for all selected industries, compared at the regional, state, and national levels. The table also includes average earnings per worker and total establishments.

Top Occupations in Selected Industries
The graph and table show total jobs and jobs change in the top occupations within the selected industries. These numbers are generated using regionalized industry staffing patterns. For the purposes of this scenario, these are the occupations required by the target business and will be referred back to in Step 2 and Step 3.

Industry Breakdown (if multiple industries were selected)
The graph and table show start year and end year jobs for each selected industry in the selected timeframe. The table also shows average earnings per worker and total establishments.

Industry Distribution
The map and table show total employment in all selected industries by sub-region area (either counties or ZIP codes, depending on the current region type).

****Export this report to Word or PDF and save it to your desktop. It will be referred to in Step 2 and Step 3.***

Step 2: Identify Potential Labor Pool for Required Occupations

- Click the **Career Pathways** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Transition Workers** tool>>
- Click **Into Occupation**>>
- Select **Growth Period**>>
  - Under "Timeframe" use the drop down boxes to select the base year and projection year for which you would like to access data. For our purposes, select 2006 to 2011.
- Choose **Occupation**>>
  - Refer to the report generated in Step 1 to find the list of top occupations required by the target business. Use the drop down boxes to select the occupation category and the specific occupation or use the icon to perform a text based search. Begin by selecting the top occupation on the list. Once you have generated the following report. Repeat this process for each of the occupations on the list.
- Limit **Matches**>>
  - Under "Limit Matches" select the number of compatible occupations which the report will display by clicking on the drop-down box. For our purposes, select "Top 10 Compatible Occupations." If the top ten compatible occupations do yield a significant potential labor pool expand it to the top twenty.
- Click **Run**>>

Report Output:

The report output has two sections: Transition into Occupation Summary and Compatible Occupations. This report identifies the top ten most compatible occupations with the top occupation required by the target business. This information is useful in recruiting businesses because it shows the region not only has an availability of workers in the specific required occupation but in a much larger pool or workers with transferable skills.

Transition into Occupation Summary:
Under "Target Occupation" are the selected occupation's code, name, and description, along with employment information:

- **Start Year Size:** The total regional jobs in that occupation.
- **Job Change:** The projected change in employment in this occupation over the projection period chosen.
- **Hourly Earnings:** The average hourly earnings for the target occupation.
- **Job Zone:** The "depth of field" for the occupation (scores range 1-5). Job zone one indicates little or no preparation needed up to job zone five indicating extensive preparation and experience.
- **Yearly Turnover:** Turnover indicates the number of openings (new or replacement) in the target occupation.
- Under "Source Occupations" is similar information which is aggregated or averaged for all the compatible occupations that the tool has discovered.
- **Potential Labor Pool:** This is the current total number of jobs in all compatible occupations found. It should be large enough to supply workers for the target occupation you selected.
- **Labor Pool Change:** The projected change in employment for all compatible occupations found, over the timeframe you selected.
- **Median Hourly Earnings:** Source occupations should have comparable or lower earnings compared to the target occupation. This number is actually the average of all the occupations' median hourly earnings.
- **Average Job Zone:** Occupations with lower Job Zones (1-3) are better candidates for worker re-training because workers in those occupations do not have a large amount of time and/or money invested in their current skills and knowledge.

Compatible Occupations:

This section provides detailed information about the compatible occupations that the tool has found. The bubble graph provides a quick visual comparison of the ten most compatible source occupations for the selected target occupation. Each "bubble" on the graph represents one occupation. The bubble's size represents the number of regional jobs in that occupation, the bubble's vertical position shows its median hourly earnings, and its horizontal position shows its projected job growth over the timeframe you selected.
The target occupation is shown as a circle with red cross-hairs through its center. All occupations to the right of the target occupation have higher projected growth, while those to the left have lower growth. Occupations above the target occupation have higher median earnings, while those below it have lower median earnings.

In a typical worker transition scenario, the target occupation should have good earnings and strong job growth, while candidate source occupations should be below and to the left of the target occupation. This means that there is a source of workers in compatible occupations who will likely find better earnings and employability by transitioning into the target occupation. On the other hand, occupations in the upper-right quadrant (as defined by the red cross-hairs) are probably not good source occupations because workers in those occupations would probably sacrifice earnings and employability to move into the target occupation.
The table below the bubble graph provides details on each compatible source occupation, listing as many occupations you selected in the **Limit Matches** report option.

About the EMSI's Compatibility Index:

Occupation compatibility, or the similarity between two occupation's competencies, is another term that is crucial for interpreting Career Pathways analysis. The module calculates the compatibility of two occupations by comparing their O*NET skill, knowledge, and ability profiles, which contain two scores for each competency element (e.g., knowledge of biology): the attainment level and the importance level. Our algorithm uses the differences between competency levels, weighted by importance levels, to determine how compatible two occupations are. Several assumptions are made in calculating compatibility:

- The O*NET categories of Knowledge, Skills, and Abilities are sufficient to determine compatibility between occupations.
- The desirability transitioning workers from one occupation to another decreases exponentially as the distance increases between a source occupation's O*NET score in one category and the target occupation's score in that category.
- Over-qualification is just as much of a problem as under-qualification for a worker moving from one job to another.

Step 3: Identify Existing Training Programs for Required Occupations

Now that we have identified the top occupations employed within the target industry and the potential labor pool for each occupation, the final step is to find the programs currently offered that train for those occupations.

- Click the **Career Pathways** tab from the current page>>
- Click **Occupational Analysis** tool>>
- Click **Occupational Programs**>>
- Select **Occupation**>>
    - Under "Choose Occupation" use the drop down boxes to find the top occupations employed by the target business from the staffing pattern identified in Step 1…
    - …**Or** click the icon and search for the occupations.
- Check **Show All Related CIPs**>>
- Check **Show Completions Map**>>
- Click **Run**>>

Report Output:

In Step 1, we began by viewing an industry report for the target business and identified the top occupations required by that business using a staffing pattern. In Step 2, we identified the potential labor pool for the target occupations by finding compatible occupations that could be transitioned with a minimal amount of retraining. This report is the result of Step 3. It provides the final step in showing a region's potential to support an incoming businesses workforce by demonstrating the regional training programs already in place that train the top occupations employed by the target business. *Note: the Report Output displays this information for one occupation at a time. Repeat Step 3 for each of the top occupations required by the businesses to display regional training potential.*

Selected Occupation
The first part of the report shows the code, title, and description of the occupation selected.

Occupational Programs
This section summarizes all relevant programs found (using CIP codes and titles) and total number of regional students who completed those programs in the most recent data year ("Completions"). For example, the occupation "registered nurses" corresponds to multiple CIP programs, including "Adult Health Nurse," "Nurse Anesthetist," "Nurse Midwife," and so on. The table will show only the programs actually offered in your region, unless you chose to display all related CIPs.

Occupational Programs by Institution
This section shows a detailed table showing completions in the region (or in surrounding states, if that option was selected) by institution and award level (associate's degree, bachelor's degree, and so on). If the table is large, you can show only certain rows by using a filter, which specifies a criterion that rows need to meet in order to be displayed.

Institution Information
The table shows the names and contact information for all institutions that offer programs of study relevant to the occupation you selected. These are the same institutions listed in the previous table.

HOW TO ASSESS THE ECONOMIC IMPACT OF A BUSINESS LOCATION, EXPANSION, OR CLOSURE

This scenario addresses how to assess the economic impact ("ripple effect") of jobs added or removed in a given industry.

Required Modules:

- ✓ Economic Impact

Workflow Description:

- Click the **Economic Impact** tab from the SA start page>>
- Select a **Region**>>
  - In the "Choose Region" window, select the saved region for which you would like to access data.
- Click **Industry** tool>>
- Click **Run Industry Scenario**>>
- Select **Industry**>>
  - Under "Choose Industry" use the drop down boxes to select the sector and industry for which you would like to access data…
  - …**Or** click the 🔍 icon and search for the industry.
  - If you are having trouble identifying the correct industry use the NAICS industry search engine at http://www.census.gov/epcd/naics02/naicod02.htm or contact an EMSI consultant by phone at 866-999-3674 or by email at customerservice@economicmodeling.com.
- Select **Modification Type**>>
  - Under "Modify Industry" check the circle box next to "jobs."
- **Add/Subtract Jobs**>>
  - Next to "Add/Subtract" type in the number of jobs to add…
  - …**Or** use the "minus" sign to subtract jobs.
- Choose **Results Set**>>
  - Under "Results Set" select the circle box next to Jobs.
- Click **Run**>>

Report Output:

Executive Summary
This table shows the scenario impacts at a glance: total change in jobs, earnings, and earnings per worker, in addition to jobs, earnings, and sales multipliers. **Jobs Change** is the key indicator. It represents total impact- the jobs that you added/subtracted on the previous page plus all ripple effect jobs. The multipliers shown are multipliers for the whole scenario. If you entered a job loss of 500 for two different industries, for example, and the scenario jobs multiplier is 2.5, this means that the model predicts a total loss of 2,500 jobs (including the original 1,000 jobs lost that you originally entered). The earnings per worker (EPW) indicator displays how a given scenario affects EPW in the region.

Largest Impacts
These two tables show the industries that will experience the largest ripple effects, in both total and percentage terms. If you chose to show the results in terms of jobs, then these tables will show the number of jobs created or lost as a result of the original change; otherwise they will show change in earnings. In the percentage table, only industries with a change of 1% or greater are shown.

Scenario Results (All Affected Industries)
This section shows a large expandable table that shows the full results of the impact scenario on all industries in the regional economy (generally at a 4-digit NAICS level of detail). At first only industry super-sectors are shown; click the > icon to drill down to higher levels of detail.

The table columns include:

- **Original Jobs/Earnings**: total jobs or earnings in the industry before the changes you entered

went into effect (based on most recent available data).

- **Current Jobs/Earnings**: the total jobs or earnings in the industry after the ripple effects of your scenario were felt.
- **Change and % Change**: the total and percent change in jobs or earnings for each industry.
- **Earnings per Worker (K):** the earnings per worker in each industry.

Appendix A

ABOUT LOCATION QUOTIENT

A location quotient (LQ) analysis allows planners to quantify how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region "unique" in comparison to the national average.

In more exact terms, location quotient is a ratio that compares a region to a larger reference region according to some characteristic or asset. Suppose X is the amount of some asset in a region (e.g., manufacturing jobs), and Y is the total amount of assets of comparable types in the region (e.g., all jobs). X/Y is then the regional "concentration" of that asset in the region. If X' and Y' are similar data points for some larger reference region (like a state or nation), then the LQ or *relative* concentration of that asset in the region compared to the nation is (X/Y) / (X'/Y').

The basic uses of industry LQs (and, by extension, for clusters and occupations as well) include these:

- To determine which industries make the regional economy unique.
- To identify the "export orientation" of an industry and identify the most export-oriented industries in the region.
- To identify emerging export industries beginning to bring money into the region.
- To identify endangered export industries that could erode the region's economic base.

The following explanation assumes we are talking about industry LQs, but is applicable to clusters as well (which are simply sets of several industries whose data is aggregated for the purpose of LQ calculations).

Industry LQs are calculated by comparing the industry's share of regional employment with its share of national employment. Suppose that Breweries (NAICS 31212) account for 0.16% of all regional jobs but only 0.015% of all national jobs. The region's LQ for Breweries would then be (.16 / .015) = 10.67, meaning that Breweries are nearly 11 times more concentrated in the region than average.

Location quotient tells a much different story than merely job numbers or job growth. Industries with high LQ are typically (but not always) export-oriented industries, which are important because they bring money into the region, rather than simply circulating money that is already in the region (as most retail stores and restaurants do). Industries which have both high LQ and relatively high total job numbers typically form a region's economic base. Economic developers and government officials need to pay particular attention to these industries not only for the jobs they provide, but also for their multiplier effect—the jobs they create in other dependent industries like retail trade and food services.

LQ is augmented by two other pieces of information: size of industry/cluster/occupation in terms of jobs, and percent change in LQ over a given time period. A high-LQ industry with a small number of jobs may be an export-oriented industry, but is not vital to the region's economy. A large, high-LQ industry with declining LQ over time, however, is endangering the regional economy.

Consider an example: a city like Detroit, will have high-LQ industries in the manufacturing sector, specifically industries related to automobile and light truck manufacturing. This quantifies the well-known fact that automobiles are Detroit's major export. Because these industries also have very high total employment, a decline in employment or LQ indicates trouble for the entire economy. Growing employment paired with declining LQ, however, merely indicates that the industry is not growing as fast in the region as it is in the national economy.

Another example: an area like Sun Valley, Idaho will show high-LQ industries in hospitality sectors like hotels/motels and food services. This again quantifies Sun Valley's economic dependence on tourism, hospitality, and recreation—one of its major "export" industry clusters. Another large, high-LQ industry in Sun Valley is private households, which quantifies the concentration of wealthy home-owners who have out-of-region sources of income and employ workers like cooks, maids, groundskeepers, chauffeurs, etc.—and whose presence is another major driver of the local economy, though it is not what we typically think of as an "export."

ABOUT SHIFT SHARE

Shift share is a standard regional analysis method that attempts to determine how much of regional job growth can be attributed to national trends and how much is due to unique regional factors. The shift share section of various reports in EMSI's Strategic Advantage helps to answer the question "*Why* is employment growing or declining in this regional industry, cluster, or occupation?" To do this, shift share analysis splits regional job growth into three components: the national change effect, industrial mix effect, and regional competitiveness effect. Note that a timeframe (start year and end year) is required to perform shift share analysis, since shift share deals with job growth over time.

For the purposes of this explanation, we will focus on shift share analysis of industries. The explanation works equally well for clusters, since they are simply aggregations of industries. For occupations, shift share analysis is primarily a workforce-oriented view of industry data, since occupational growth and decline is tied to the growth and decline of the major industries employing workers in those occupations. You can translate industries to occupations and vice versa using the Staffing Patterns and Inverse Staffing Patterns reports in the Economic Forecaster.

Traditional shift share analysis involves four components: job change, national change effect, industrial mix effect, and regional competitiveness effect.

Our simplified analysis includes three basic components, all defined in the basic unit of "jobs":

- *Job Change:* This the actual and/or projected job change in the *regional* industry over the specified timeframe. The change is "actual" for historical data and "projected" for future years' data.
- *Expected Change:* The sum of the national growth effect and industrial mix effect. It is basically the job growth one would expect in the regional industry if it followed national trends exactly.
- *Competitive Effect:* The competitiveness effect is the most important and equals job change minus expected change. A positive competitiveness effect for an industry indicates the regional industry is outperforming national trends (both overall national trends and national trends in that specific industry). A negative effect means that the industry is underperforming compared to national trends.

Appendix B

COMPREHENSIVE DATA SOURCES

STATE DATA SOURCES

EMSI incorporates industry employment data produced by individual states' departments of commerce and labor. The only states that have failed to provide data are Connecticut, Maine, Massachusetts, Vermont, and Rhode Island.

- Alabama Department of Industrial Relations, Occupational Statistics.
- Alaska Department of Labor and Workforce Development, Occupational Employment Statistics.
- Arizona Dept. of Economic Security, Research Administration, Occupational Employment and Wage Estimates.
- Arkansas Department of Workforce Services, Occupational Wages.
- California Labor Market Information Department, OES Employment and Wages by Occupation.
- Colorado Department of Labor and Employment, Colorado Occupational Employment Statistics.
- Delaware Office of Occupational and Labor Market Information, Delaware Wages 2004.
- Florida Agency for Workforce Innovation, Occupational Employment Statistics and Wages.
- Georgia Dept. of Labor, Workforce Information & Analysis, Occupational Information Services Unit, Annual Wage or Salary Occupational Employment Statistics.
- Hawaii Department of Labor and Industrial Relations, Research and Statistics Office, Wages by Occupation.
- Idaho Commerce and Labor, Occupation Employment Statistics.
- Illinois Department of Employment Security, Employment Projections.
- Indiana Department of Workforce Development, Occupational Job Wages.
- Iowa Workforce Development, Occupation Employment Statistics.
- Kansas Department of Labor, Labor Market Information Services, Kansas Wage Survey.
- Kentucky Office of Employment and Training, Occupational Wages.
- Louisiana Department of Labor, Occupational Projections.
- Maryland Department of Labor, Licensing and Regulation, Office of Labor Market Analysis and Information, Occupational Projections.
- Michigan Department of Labor and Economic Growth, Bureau of Labor Market Information & Strategic Initiatives, Occupational Employment and Wage Estimate Report.
- Minnesota Department of Employment and Economic Development, Occupational Employment Statistics.
- Mississippi Department of Employment Security, Occupational Employment Statistics.
- Missouri Department of Economic Development, Occupational Employment Statistics.
- Montana Department of Labor & Industry, Research and Analysis Bureau, Occupational Employment Statistics.
- Nebraska Workforce Development, Nebraska Occupation Wages and Trends.
- Nevada Department of Employment, Training and Rehabilitation, Information Development & Processing Division, Research & Analysis Bureau, Occupational Employment Statistics.
- New Hampshire Department of Employment Security, Occupational Employment and Wages.
- New Jersey Department of Labor and Workforce Development, Occupational Employment Statistics Wage Survey.
- New Mexico Department of Labor, Bureau of Economic Research and Analysis, Occupational Employment Statistics.
- New York Department of Labor, Division of Research & Statistics, Occupational Employment Statistics.
- North Carolina Employment Security Commission, Labor Market Information Division, Occupational Employment Statistics.
- North Dakota Job Service, Labor Market Information Center, Occupational Wage Survey.
- Ohio Department of Job & Family Services, Labor Market Information Division, Occupational Wages and Employment.
- Oklahoma Employment Security Commission, Occupational Wage Network.
- Oregon Employment Department, Oregon Labor Market Information System, Occupational

Information.
- Pennsylvania Department of Labor and Industry, Center for Workforce Information and Analysis, Occupational Wages.
- South Carolina Employment Security Commission, Labor Market Information Department, Occupational Employment and Wage Estimates.
- South Dakota Department of Labor, Labor Market Information Division, Occupational Wage Estimates.
- Tennessee Department of Labor and Workforce Development, Research and Statistics Division, Tennessee Job Outlook.
- Texas Workforce Commission, Occupational Employment Statistics Program.
- Utah Department of Workforce Services, Occupational Wages.
- Virginia Employment Commission, Economic Information Services, Occupational Employment Statistics.
- Washington State Employment Security Department, Labor Market and Economic Analysis Branch, Occupational Wages.
- West Virginia Bureau of Employment Programs, Research Information & Analysis Division, Occupational Wages.
- Wisconsin Department of Workforce Development, Bureau of Workforce Information, Occupational Employment Statistics.
- Wyoming Department of Employment, Research and Planning, Occupations and Wages.

FEDERAL DATA SOURCES

- U.S. Department of Commerce
    - Bureau of Economic Analysis
        - Local Area Annual Estimates
        - State Annual Estimates
        - State Quarterly Income Estimates
- U.S. Census Bureau
        - American Community Survey
        - County Business Patterns
        - Population Division, County Population Estimates
        - Population Division, State Interim Population Projections
        - Census 2000 Summary File 1 (SF 1)
        - Census 2000 Summary File 3 (SF 3)
        - Nonemployer Statistics
        - ZIP Code Business Patterns
- U.S. Department of Labor
    - Bureau of Labor Statistics
        - Quarterly Census of Employment and Wages (QCEW)
    - Division of Labor Force Statistics
        - Current Population Survey (CPS)
    - Division of Occupational Employment Statistics
        - Occupational Employment Statistics (OES)
    - Local Area Unemployment Statistics (LAUS)
    - Office of Compensation and Working Conditions
        - National Compensation Survey (NCS)
    - Office of Occupational Statistics and Employment Projections
        - 2004-14 National Employment Matrix
        - Employment by occupation, 2004 and projected 2014
        - Occupational Employment, Training, and Earnings
    - Employment and Training Administration (ETA)
        - Characteristics of the Insured Unemployed
        - National O*NET Consortium, O*NET Production Database
- U.S. Department of Education, National Center for Education Statistics
    - Integrated Postsecondary Education Data System (IPEDS)
    - Office of Educational Research and Improvement for the CIP, 2000 Standard Occupational Classification Crosswalk to 2000 Classification of Instructional Programs

- U.S. Department of Health and Human Services, National Center for Health Statistics
    - Health, United States, 2005
- U.S. Postal Service
    - Address information Systems (AIS) Products, Delivery Statistics