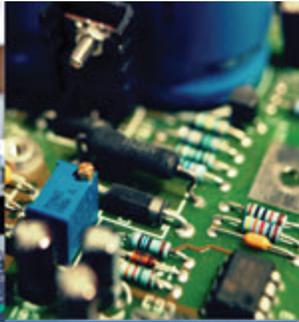




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Technology Workforce Issues and Opportunities in the California Innovation Corridor



This Workforce Skills Analysis is a product of the
California Space Authority

Through a grant from the U.S. Department of Labor Workforce Innovation in Regional Economic Development (WIRED)



Prepared by Paul V. Oliva
Oliva Global Communications
Under contract to CSA

November 14, 2008



Technology Workforce Issues and Opportunities in the California Innovation Corridor Workforce Skills Analysis for 100 Key Entities

WIRED California Innovation Corridor Project 3.1

Go to www.innovatecalifornia.net for more information



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Los Angeles County Economic Development Corporation
Los Angeles City Workforce Investment Board
Greater Antelope Valley Economic Alliance
Orange County Workforce Investment Board
Orange County Business Council
Riverside County Economic Development Agency
San Bernardino Workforce Investment Board
San Luis Obispo County Economic Vitality Corporation
San Luis Obispo Private Industry Council
South Bay Economic Development Partnership
South Bay Workforce Investment Board
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Acknowledgments

The Honorable Andrea Seastrand



Governed by a statewide board of directors, the California Space Authority (CSA) is a nonprofit organization representing the interests of California's diverse space enterprise community to facilitate vibrant space enterprise throughout California.

CSA was the first entity of its kind to develop a comprehensive, statewide Space Enterprise Strategic Plan that engages stakeholders from across the state to address critical issues affecting space enterprise development. In late 2005, the U.S. Department of Labor (DOL) announced a powerful initiative called Workforce Innovation in Regional Economic Development (WIRED) that closely aligned with the strategic objectives and findings of the California Space Enterprise Strategic Plan 2004-2006.

In January 2006, the State of California through the California Labor and Workforce Development Agency (CLWD) submitted the CSA-led WIRED proposal to the DOL. In February of that year, the California Innovation Corridor was spawned when the State of California, with CSA as the program lead, became one of 13 first-generation WIRED regions nationwide selected to assist the federal government in addressing the priorities outlined in the American Competitiveness Initiative. The California Innovation Corridor was originally comprised of more than 60 private and public sector partners spanning 13 counties to "optimize the Corridor for innovation and 21st Century workforce competitiveness."

CSA and its partners are achieving this objective through the implementation of 25 projects that fall under one of three strategic goals: innovation support, industrial rejuvenation, and talent development.

The report before you is a major component of our talent development efforts designed to create a globally competitive workforce capable of driving innovation through the 21st century. It summarizes findings from a survey of nearly 200 employers representing innovation industries across a seven-county region in Southern California that includes some of the nation's most important aerospace and other employers. The project team included six Workforce Investment Boards (WIBs) from the Corridor, as well as eight Economic Development Corporations (EDCs) and input from CLWD's Labor Market Information Division and the International Association of Nanotechnology (IANANO).

CSA extends its appreciation to the hundreds of stakeholders representing the government, industry, academia, economic and workforce development entities, who worked tirelessly toward the success of this initiative. In particular, I would like to recognize the dedication and leadership that Christine Purcell, CSA's Manager of Industry Workforce and Manufacturing Development, lent to this effort. As a result of your efforts, California is positioning itself as a leader in the 21st century.

Sincerely,

The Honorable Andrea Seastrand
Executive Director
California Space Authority

Acknowledgments

Christine M. Purcell, SPHR



As manager of this project, I join Andrea Seastrand in thanking all of the stakeholders, including study respondents, CSA members, and WIRED partners that participated in this Workforce Skills Analysis. This was one of 25 integrated WIRED projects, and the level of integration across these projects—as well as common findings, requirements and outcomes—greatly exceeded our initial thoughts.

I especially wish to thank the team members:

- Oliva Global Communications
- Kern Economic Development Corporation
- Los Angeles County Economic Development Corporation
- Los Angeles City Workforce Investment Board
- Greater Antelope Valley Economic Alliance
- Orange County Workforce Investment Board
- Orange County Business Council
- Riverside County Economic Development Agency
- San Bernardino Workforce Investment Board
- San Luis Obispo County Economic Vitality Corporation
- San Luis Obispo Private Industry Council
- South Bay Economic Development Partnership
- South Bay Workforce Investment Board
- Ventura County Workforce Investment Board
- Labor Market Information Division (LMID) of the California Employment Development Department (EDD)

Among the common findings, four projects including this one¹ found that critical workers for innovation industries—regardless of level or position—require improved levels of communication, interdisciplinary knowledge, problem solving, and systems thinking.

This study aligned with the Department of Labor O*NET structure and followed a methodology consistent with the California Economic Strategy Panel's *Industry Clusters of Opportunity* process. We used data-driven analysis coupled with expertise from workforce and economic development professionals to evaluate critical high wage, high tech growth industries and occupations. This process created new partnerships and common processes, and it strengthened those that were in place. Sustainable innovative initiatives have resulted, fostering California's global competitiveness in the 21st century.

Sincerely,

Ms. Christine M. Purcell, SPHR
Manager, Industry Workforce and Manufacturing Development
California Space Authority

¹ The Smart Supplier Initiative, the University Innovation study, the 21st Century Workforce Profiles study, and this workforce skills analysis.

Technology Workforce Issues and Opportunities In the California Innovation Corridor

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Executive Summary

Technology Workforce Issues and Opportunities In the California Innovation Corridor

Significant changes are occurring in the composition of California industry—and related workforce demands by employers.

Under a grant to the California Innovation Corridor as part of the US Department of Labor WIRED Initiative, the California Space Authority partnered with workforce investment boards and economic development offices to conduct a workforce skills analysis of 200 employers in a seven-county area of Southern California. The purpose of the assessment was to gather information about the skills required for critical employment positions and to identify future workforce gaps in order to develop a strategy to address future California Innovation Corridor employer needs.

The assessment was designed to focus on key space and information technology companies, government employers, space entrepreneurial and small business companies, and manufacturing companies. The research was based around the analytical approach recommended by the California Economic Strategy Panel's California Regional Economies Project.

Industry data analysis. Working with the California Employment Development Department, Labor Market Information Division (LMID), all partners received a set of county-level data compiled by 3-digit NAICS code (North America Industry Classification Standard) that detailed employment, wage, and other size, growth, and industry concentration data. The datasets were used to identify employment trends in each county and determine a set of NAICS codes to be used to target companies for survey work that would represent innovation industries and clusters.

California Innovation Corridor. Looking at industry clusters in the 13-county California Innovation Corridor, major employment growth categories in the 2001-2006 period included, in order by amount of employees, the business management and support services; wholesale and retail; recreation and travel; healthcare and pharmaceuticals/chemicals; construction; financial services; and energy production/distribution. The remaining three clusters, all of which were manufacturing, contracted. They included chemical and material manufacturing; computers, electrical and electronic equipment; and all manufacturing.

Clusters of Opportunity. The Orange County Workforce Investment Board identified CIC clusters of opportunity for this report using the LMID datasets combined with an IMPLAN Input-Output System under the model provided by the 2005 California Regional Economies Project. The resulting CIC clusters of opportunity include food & agriculture, energy production & distribution, construction, transportation & logistics, environmental & waste management, education, personal services & education, and business management & support services.

Seven-county survey area. The data for the seven counties paints a picture of change. Ten of the 32 large, high-wage categories show strong growth in employment, though only four show a weekly wage per employee of greater than \$900. No strong-growth, top-wage jobs were in manufacturing industries. The top 20 largest NAICS sectors showed good growth overall, adding over 300,000 jobs in the 2001-2006 period. Professional and technical services reported impressive numbers across the board—450,000 workers with an average weekly wage of \$964, totaling more than \$7.2 billion of payroll for the region, and adding nearly 46,000 new jobs.

However, there were some notable areas of employment contraction in the seven counties. Among the top 20 NAICS, the most severe job losses were, in order of greatest to least, management of companies and enterprises; computer and electronic product manufacturing; transportation equipment manufacturing; fabricated metal product manufacturing; and merchant wholesalers of durable goods. Telecommunications was another major loss. These losses represent some of the sectors in which

California innovation is transformed into commercial products. Further, the transportation equipment sector is where the region's aerospace companies reside.

Employer survey. Survey instruments were designed to collect employer data on critical occupations, skillsets, and employee performance. They were fielded by the partners between Q4 2006 and Q3 2008 with companies in NAICS categories deemed innovation industries, involving individual respondents in a capacity to assess hiring and employee performance at their respective companies.

Responses were collected from 182 companies in time for production of this report. Data from an additional 20 Kern County employers was subsequently collected and referenced but not included in the aggregated data analysis. The responses were from a good cross-section of company sizes and involved individual respondents with a sufficient level of authority to speak on workforce performance and needs at their company. Here are some of the key findings.

- Engineering was the single largest critical occupation. Out of six broad categories of occupations, engineering was the most mentioned critical occupation. Technicians and scientists also ranked highly among critical occupations.
- Science, Technology, Engineering and Mathematics (STEM) training is essential. Roughly eight out of ten times an innovation company in the survey pool mentioned a critical occupation or role, that role would fall within engineering, technical, scientific / R&D, mechanical, or computer science-related functions at the company.
- Employers seem to anticipate desiring a greater level of education or credentialing in the future. Among respondents who were asked to compare current hiring expectations with future ones, the importance of degree and certificate programs seemed to increase.
- The lack of workplace skills and work ethic among younger employees was a serious concern for many respondents. Several employers commented on difficulties with attitude and experience among newer hires and less experienced workers.
- Most critical occupations fall into high wage categories. The median wage for the largest category—engineers—runs from more than \$60,000 to over \$105,000 per year.
- Workplace skills and technical knowledge are the most serious problem. Workplace skills and technical knowledge were rated the highest in importance by employers, but employee performance is well below expectation in both categories.
- Problem-solving and work ethic skills were also serious cause for concern. Performance in both areas failed to exceed expectations, and both were rated important.
- Performance in social skills and computer skills exceeded expectations. However, based on respondent comments, there are specific issues within these categories. For instance, interpersonal workstyle issues were a top mention in open-ended questions.
- No educational preparation exceeds employer expectations. Both entry-level and professional level education are below expectation, and technical level education just meets a basic level of satisfaction.
- Critical skills shortages are real. More than three-quarters of respondents expressed some concern about critical skills shortages at the technical level, professional level, or both.

- Anticipated new future required skills center on technology and industry-specific skills. Seventy out of 82 mentions of new required skillsets addressed either IT/computer-related or new technology or industry-specific skills.
- Desired high school or community college training covers a wide range. Respondents were interested to about the same degree in training related to mechanical, trades, electronics, and industry-specific technical skills as opposed to workplace skills and communication / teamwork.

Recommendations and strategies. The partners were asked to comment on regional training resources and recommend strategies for training investments. They produced a range of recommendations:

- Improve on-the-job training (OJT) opportunities. Partners saw opportunities to build OJT and apprenticeship programs.
- Expand business-education collaboration for curricula and training programs and outreach. There was significant consensus that training strategies must systematically integrate input from business. There were a few different models advanced for doing so.
- Improve business, educator, student, employee, and parent understanding of training resources and employment prospects. There was extensive discussion of the difficulty for businesses and employees understanding training resources and prerequisites, as well as increasing student interest in training by improving awareness of identified growth occupations.
- Be aware of and responsive to generational issues and the difference between teachable practical skills and skills related to individual character. There was consensus that action was needed to improve both practical and character-based skills, though there was a shortage of ideas on how to handle the latter other than the strategies mentioned above. Potentially more could be done at the K-12 level to address character and attribute issues, and that it might be possible to develop a suite of cluster-specific workplace skills training units.
- Mobilize leaders. Some partners noted the importance of working with elected leaders to draw attention to funding needs and to increase awareness of existing training resource.
- Expand the role of Workforce Investment Boards to drive transformational change. Orange County persuasively asserted that WIBs are well-positioned to convene and advocate transformational change that drives integration of workforce and economic development.
- Work across jurisdictions for identified super-clusters. For *super-clusters* that reach across major economic regions and deliver wide-ranging benefits across counties and industries, it is recommended that special prioritization and cross-jurisdictional work be undertaken.

Each partner provided additional recommendations, strategies, and insights that were summarized in the body of the report. Full partner reports were included in the appendices.

Insights from other CIC WIRED projects. All CIC WIRED projects unearthed insights relevant for this analysis. Six points stand out due to commonalities across projects or relevance to this workforce skills analysis. First, California faces hiring difficulties across disciplines and educational levels. Second, workers need better skills in communication, teamwork, computers, analytical ability, and business. Third, employers need more cost-effective ways to drive experience and ongoing training. Fourth, there needs to be greater alignment and coordination of strategies and metrics across economic stakeholders. Fifth, we need common strategies for overarching identified needs. And sixth, a common assessment should be explored for certifying basic technology skill competencies.



Technology Workforce Issues and Opportunities In the California Innovation Corridor

Introduction

Significant changes are occurring in the composition of California industry—and related workforce demands by employers. Technology evolution, rising real estate rates, population growth, foreign competition, and other domestic and external pressures are changing the concentration of companies in various industries, the size of employment, wage rates, and employer expectations of the people they recruit.

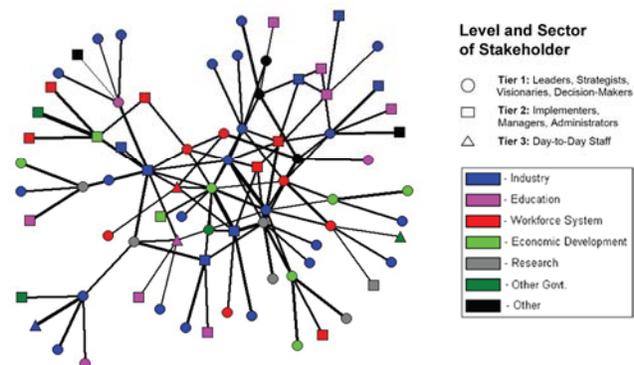
Under a grant to the California Innovation Corridor as part of the US Department of Labor WIRED Initiative, the California Space Authority partnered with thirteen workforce investment boards and economic development offices in seven counties to conduct a labor needs assessment of 200 employers. The purpose of the assessment was to gather information about required skills and workforce gaps for critical employment positions as reported by managers and supervisors and to identify actions to address future California Innovation Corridor employer needs.

The assessment was designed to focus on key space and information technology companies, manufacturers, government employers, and entrepreneurial and small business enterprises in aerospace. In completing their respective assessments, the partners worked to identify workforce composition, current and future skill needs, as well as education and training gaps.

The Challenge of Interconnection

A key challenge facing workforce and economic development officials in undertaking this project and executing their mission is the increasing complexity of interconnection between stakeholders—and between levels of responsibility within organizations.

California Innovation Corridor
Complex, Diffuse Interconnection of Workforce Stakeholders
Line thickness denotes frequency of contact



Source: Berkeley Policy Associates / UC San Diego Evaluation Team site visit interviews formatted for CIC WIRED usage by Oliva Global Communications

Figure 1: California Innovation Corridor Network Diagram

The network diagram shown in Figure 1, produced by Berkeley Policy Associates and the UC San Diego extension² shows the complexity of interaction among industry employers, representatives of educational institutions, workforce officials, economic development officials, members of the research community, and others. Interactions cut across geographies, sectors, and levels of responsibility among individuals.

The complexity is a two-edged sword. It represents the delivery framework for WIRED, and potentially enables great foresight, responsiveness and effectiveness of delivery. However, complexity increases the management and analytical demands placed upon economic development and workforce officials.

Partners and Geographic Scope

While the California Innovation Corridor spans 13 counties, this project focused on a subset of seven counties in Southern California. The following table lists the partners and their respective county jurisdictions.

Counties	Entities	Abbreviations
Kern	Kern Economic Development Corporation	KEDC
Los Angeles	Los Angeles County Economic Development Corporation (LAEDC) and the Los Angeles City Workforce Investment Board (WIB)	LAEDC / LAWIB
Los Angeles and Kern	Greater Antelope Valley Economic Alliance	GAVEA
Orange	The Orange County Workforce Investment Board (OCWIB) and Orange County Business Council (OCBC)	OCWIB / OCBC
Riverside	Riverside County Economic Development Agency	RCEDA
San Bernardino	San Bernardino Workforce Investment Board	SBerWIB
San Luis Obispo	San Luis Obispo County Economic Vitality Corporation and Private Industry Council	SLOEVC / SLOPIC
South LA County	South Bay Economic Development Partnership and South Bay Workforce Investment Board	SBEDP / SBWIB
Ventura	Ventura County Workforce Investment Board	VCWIB

Figure 2: Partners and counties

² Berkeley Policy Associates and UC San Diego Extension. 2008. *Early Implementation of Generation I of the Workforce Innovation in Regional Economic Development (WIRED) Initiative 2007 Interim Evaluation Report*. Rev May 20, 2008, 89.

Methodology

Within the seven-county geographic area, this study sought to identify critical skills for essential occupations, identify workforce gaps, and offer direction on strategy to address these needs.

The research was based around the analytical approach recommended by the California Economic Strategy Panel's California Regional Economies Project, which produced an *Industry Clusters of Opportunity User Guide*. The *Clusters of Opportunity* approach is aligned with and in some instances identical to the WIRED Project 1.1 Innovation-driven Economic Development Model. While the approach outlined in the guide is more comprehensive and aimed at answering a somewhat different set of questions, the underlying analytical approach was useful.

Working with the California Employment Development Department, Labor Market Information Division (LMID), all partners received a set of county-level data compiled by 3-digit NAICS code (North America Industry Classification Standard) that detailed employment, wage, and other size, growth, and industry concentration data. The datasets were used to identify employment trends in each county and determine a set of NAICS codes to be used to target companies for survey work that would represent innovation industries and clusters.

Separately, a survey instrument was designed to collect employer data on critical occupations, skillsets, and employee performance. An initial survey instrument was designed in 2006 by the partners. Some partners fielded it in an initial survey in Q4 2006 and Q1 2007, but it was ultimately deemed too complex. After this initial effort, a new survey instrument was created for the 3.1 project in September 2007 by utilizing an LMID survey development process. The resultant survey instrument was utilized by all the partners in 2008. In some instances, companies that responded to the initial survey were re-interviewed with the final survey instrument.

The survey pool was not intended to be sufficiently large to provide a representative sample at the three-digit NAICS level. As a result, the data cannot be projected across the entire population of companies in the industry throughout the Corridor. However, in some industries in individual counties the sample size may be sufficient to be representative, particularly with data from large employers that represent a significant share of county and/or industry employment. Individual county partners should be consulted about the specific results in their jurisdiction.

Responses were collected by each partner into a standardized spreadsheet template, aggregated, and various calculations applied. Data from each partner's spreadsheets was aggregated into a single, combined set of worksheets. This final aggregation process included some normalization of the data and

refinements of various calculations.³ In particular, the skills gap calculation was refined to highlight performance issues more clearly.

Each partner was then required to submit a narrative report that provided overall conclusions and suggestions on a regional strategy to address future workforce needs. These narratives were also compiled, and key findings are included in this report. The bodies of individual partner reports are available in Appendix G, and they provide important insights into specific county trends. They should be reviewed in consultation with their respective authors.

It should be noted that the *Clusters of Opportunity* methodology recommends considering clusters within an *economic region*. This concept looks at geographic distribution of an industry, supply chain corridors, commute-sheds, and other factors to delineate a geographic area in which a particular industry and its related workforce are concentrated. Given the nature of the data collection, compilation, and project scope, we were not able to identify and define economic regions. However, it would be a valuable subsequent step to do so, along with pursuing economic development planning using the WIRED 1.1 Innovation-driven Economic Development Model.

This report approaches the analysis of all this data as follows:

- Highlight key NAICS codes / clusters / industry trends for the Corridor overall and for specific counties based on the LMID datasets
- Summarize data representing the range of surveyed respondents
- Present and discuss the major skill gaps uncovered in the surveys
- Provide strategy options and recommendations

As feasible, comparisons and commentary will be made regarding the companion CIC WIRED projects examining workforce needs, particularly WIRED Project 1.2.

LMID Datasets: The Changing Face of Employment in the California Innovation Corridor

California's Labor Market Information Division provided labor market datasets by three-digit NAICS code. NAICS stands for North American Industry Classification System, and it is the current standard for classifying economic activities by type of activity or production.

³ For instance, there were differences in the level of data detail submitted by partners, in part due to differences in handling of the first and second survey instruments. To name one example, NAICS codes at the four- or even seven-digit level were normalized into three-digit categories. As a result, the way aggregated data is presented in this report does not always match the way in which a given partner may have presented data at the county level.

LMID provided one dataset for each of the 13 counties in the California Innovation Corridor, as well as an aggregated dataset for the CIC as a whole. In compiling this report, we also aggregated the figures into a dataset for the seven counties covered by partner survey activities.

Each of these LMID datasets covered the following data⁴ for the 92 three-digit NAICS codes:

- County Employment 2006
- Percent of County Employment 2006
- Absolute Change in Employment 2001-2006
- Percent Change in County Employment 2001-2006
- County Average Annual Growth Rate 2001-2006
- Location Quotient 2006 (CA) Base
- Change in Location Quotient 2001-2006
- Number of Employers 2006
- Industry Total Payroll 2006
- Average Weekly Wage Per Employee 2006

There are many ways to evaluate such data in sophisticated ways. Since the purpose of WIRED Project 3.1 was to focus on the critical skills and performance gaps reported by employers in selected innovation industries, the principal usage of these datasets by the partners was to establish which NAICS codes to use for development of a survey pool. In addition, as noted above, the most recent data year is 2006, and there were not project resources or a compelling need to update the datasets for 2007, the most recent year.

However, to provide a snapshot of some of the changing employment trends, we offer a few slices of the data to answer the following questions:

What NAICS categories employ the greatest number of workers at relatively high weekly compensation?

Of these, which are increasing their employment, and which are contracting?

Which have relatively strong concentrations in the region, suggesting the region enjoys a particular competitive advantage?

What NAICS categories not listed above are large and growing rapidly enough to be of potential strategic importance?

⁴ Explanations of data and their significance may be found in the *Industry Clusters of Opportunity User Guide*, California Regional Economies Project, California Economic Strategy Panel, September 2008. Some specific explanations and analysis are provided in the clusters of opportunity section of this report, below.

Before displaying the data, it is important to note that in most instances the three-digit NAICS level of analysis is too broad to be especially useful in many categories. Technology industries such as biotechnology or biofuels may range from 541711 (R&D in biotechnology) to 325414 (biological product manufacturing) to 3251 (basic organic and inorganic chemical manufacturing), let alone the allied commercial activities that would be included in a biotechnology cluster (such as clinical laboratories). A proper technology clustering analysis would collect data at the six-digit level and aggregate analysis around appropriate groupings of NAICS that represent technology clusters.

That said, and despite the broadness of the three-digit NAICS level, for the purposes of finding cluster-related trends we found it useful to combine some of the three-digit categories into larger groupings. For instance, it was interesting to look at the entire set of industry classifications related to the production and distribution of energy. Similarly, the finance-related industries of financial services, insurance, and real estate were useful to combine.

California Innovation Corridor Dataset

Economic Change Among Large, High-Wage Industry Clusters

The chart that follows shows the largest industry clusters by employment in the 13-county California Innovation Corridor that employ more than 200,000 people and with average weekly compensation greater than \$600. The chart also indicates whether the employment in those industries expanded or contracted between 2001 and 2006, and the relative average weekly compensation rate in that cluster. Bubbles to the upper right represent large employers with growing employment. The larger the bubble, the higher the average weekly compensation.

Major employment growth categories in the 2001-2006 period included, in order by amount of employees, the business management and support services cluster; wholesale and retail establishments; recreation, travel and tourism services; healthcare and pharmaceuticals (including non-pharmaceutical chemical manufacturing); construction; the financial services, insurance and real estate cluster; and the energy production and distribution cluster. The remaining three clusters contracted, including chemical and material manufacturing; computers, electrical and electronic equipment; and all manufacturing.⁵

It should be noted that the time series used in these datasets is affected by the start and end years due to cyclical and other market forces that may not reflect long-term trends. The start year, 2001, was the height of employment in the state in several industries, and those that showed employment losses following the burst of the dot-com bubble, such as telecommunications, had not necessarily returned to their 2001 levels by 2006. Conversely, other industries, particularly construction, were approaching a peak in 2006 from which employment may have since contracted.

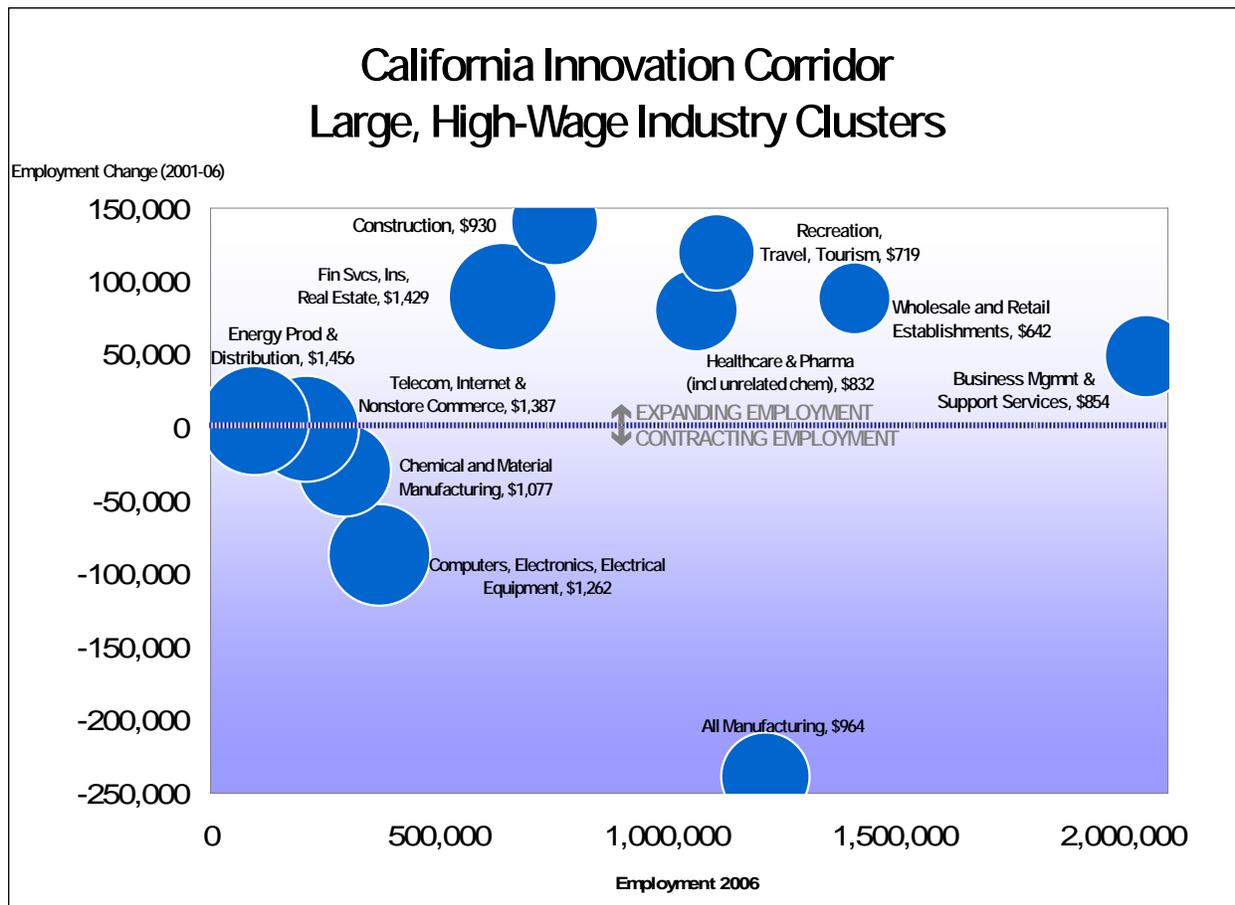


Figure 3: CIC Large, High-Wage Industry Clusters

⁵ It must be emphasized that the clustering analysis placed some NAICS categories into multiple clusters. For instance, chemical manufacturing fell within the healthcare and pharmaceutical cluster due to its importance for pharma and biotech, within the chemical and material manufacturing cluster, and within the category of all manufacturing.

Clusters of Opportunity⁶

The Orange County Workforce Investment Board identified CIC clusters of opportunity for this report using the LMID datasets combined with an IMPLAN Input-Output System⁷ as provided by the Orange County Business Council under the model provided by the 2005 California Regional Economies Project. The resulting CIC clusters of opportunity are as follows:

CIC Clusters of Opportunity Name of cluster	Average annual growth rate (2001-2006)	Concentration Relative to CA	Employment (2006)	SAM Multiplier	Average Annual Wage
Food and Agriculture	4.20%	1.06	532,708	1.73	\$ 30,803
Energy Prod & Distribution	1.91%	0.48	97,943	1.58	\$ 75,725
Construction	3.81%	0.90	755,223	1.70	\$ 48,340
Transportation and Logistics	8.98%	0.77	298,608	1.80	\$ 49,457
Environmental and Waste Management	1.25%	0.92	27,060	1.73	\$ 49,124
Education	3.07%	1.02	178,418	1.86	\$ 41,049
Personal Services and Education	3.60%	1.67	546,618	1.85	\$ 27,243
Business management and support services	9.09%	0.97	2,052,758	1.81	\$ 44,416

Figure 4: CIC Clusters of Opportunity

Source: Industry Analysis, California Innovation Corridor 2001-2006, State of California Employment Development Department

OCWIB used the following criteria to determine the CIC clusters of opportunity:

- *Average Annual Growth Rate:* This measures employment growth rate averaged across the 13-county economic region of the CIC. The clusters of opportunity presented demonstrate growth rates of 3% or higher, except in Energy Production (1.91%) and Environmental/Waste Management (1.25%). For these two clusters, the lower *past* growth rate is offset by the high wages offered in Energy Production, and high multiplier effect offered by Environmental/Waste Management, as well as the ascendant nature of these industries in which California has played a significant role in nurturing.⁸
- *Location Quotient:* Also known as *export orientation*, this calculation compares the percentage of employment in the CIC to the percentage of employment in its national counterpart. A ratio

⁶ This subsection adapted from Scholl, Connie. Orange County Workforce Investment Board. 2008. Monograph: WIRED Clusters of Opportunity. See Appendix for complete text.

⁷ IMPLAN® is a software-based economic modeling system developed by the Minnesota IMPLAN Group that is used to create complete, extremely detailed social accounting matrices and multiplier models of local economies.

⁸ Through state resources such as the California Energy Commission, natural resources (sunshine, wind, geothermal, water), and policy requirements such as AB 32 mandated reductions in greenhouse gas emissions. The job growth opportunities are dramatic. According to "Harvesting California's Renewable Energy Resources: A Green Jobs Business Plan," if 20 percent of California's energy were from renewable sources by 2010, Orange County alone could gain between 8,000 and 22,000 new jobs in companies emerging to address the new business opportunities with this energy target. Kern County could gain up to 30,000 jobs if all of the county's wind energy were to be harnessed for power.

greater than one signifies that employment is more concentrated in the region than it is nationally—a potential indicator of outward orientation and comparative advantage.

- *High Employment:* This measures the absolute value of employment in numbers of jobs. This value, combined with the multiplier of that cluster described below, identifies clusters that offer both employment opportunities *within* the cluster and additional employment opportunities *beyond* the cluster. The clusters of opportunity presented above show absolute employment over 100,000 in the corridor, except in Energy Production (97,943) and Environmental (27,060). For these two emerging clusters, the lower absolute current employment is offset by the high wages offered in Energy Production, and high multiplier effect offered by Environmental/Waste Management.
- *High Multiplier Effect:* Economic impact is identified by creating numerical values that summarize how investment spent in a given sector produces an economic impact throughout the rest of the local economy. A higher value multiplier indicates a higher degree of interaction in the regional economy. For example, if the manufacturing cluster is said to have a multiplier of 1.7, then for every ten employees hired in manufacturing, a total of 17 jobs will be generated throughout the entire CIC. Spending in clusters with higher value multipliers will likely produce more benefit to the economy as a whole. CIC Clusters have multipliers greater than 1.7, and combined with absolute employment, measures the real impact to the corridor economy.

Seven-County Survey Dataset

Turning to the seven-county region covered in this project, we provide a detailed table view of selected three-digit NAICS categories. The table that follows shows data aggregated across the seven-county region. It includes only three-digit NAICS categories that have greater than 18,000 employees in the region. Of those, the table only shows NAICS industries that represent weekly wages greater than \$900 and/or employment growth greater than 20,000.

There are two additional facts to keep in mind while reviewing the table. The first is that although there have been significant manufacturing declines across the California Innovation Corridor, reflected in the manufacturing categories in the table, manufacturing still represents a very high volume of jobs. The city of Los Angeles, for instance, is the largest manufacturing center in the US. Second, as pointed out previously, aerospace, bioscience, and other emerging technologies are spread out among many NAICS and are thus hard to define and measure.

Figure 5: NAICS Aggregate Data and Survey Tallies, 7-County Project Area

NAICS Industry Title	Regional Employment 2006		Employment Change 2007-2006		Intensity (Location Quotient, CA Base)		Employers 2006		Payroll Data 2006		3.1 Survey Pool	
	Quantity	Percent	Absolute Change	% Change	Aggregated AAGR	Aggregated Intensity	% Change	# Firms	Total Payroll	Median Weekly Employee Wage	# Firms Surveyed	% of Employers
10 TOTAL ALL INDUSTRIES (Private)	6,627,136		478,494	7.8%	1.5%	1.5%	566,194	\$59,943,011,757	\$665	182	0.03%	
561 Administrative and support services	525,079	7.9%	59,617	12.8%	2.4%	0.99	20,696	\$3,616,945,857	\$467	1	0.00%	
541 Professional and technical services	446,626	6.7%	45,708	11.4%	2.2%	0.72	55,755	\$7,179,773,188	\$964	49	0.09%	
238 Specialty trade contractors	312,056	4.7%	72,053	30.0%	5.4%	1.30	21,681	\$3,184,548,607	\$741	6	0.03%	
621 Ambulatory health care services	287,191	4.3%	49,500	20.8%	3.9%	1.10	34,917	\$3,499,814,118	\$920	6	0.02%	
423 Merchant wholesalers: durable goods	202,688	3.1%	-4,300	-2.1%	-0.4%	0.94	14,745	\$2,795,944,724	\$988	6	0.04%	
622 Hospitals	178,103	2.7%	8,696	5.1%	1.0%	0.83	417	\$2,484,324,960	\$1,011			
522 Credit intermediation and related activities	167,665	2.5%	38,002	29.3%	5.3%	0.97	10,495	\$2,641,982,128	\$1,007			
424 Merchant wholesalers, nondurable goods	133,256	2.0%	10,056	8.2%	1.6%	0.87	11,365	\$1,562,670,873	\$853			
611 Educational services	117,799	1.8%	16,566	16.4%	3.1%	0.63	4,627	\$1,108,867,019	\$614			
334 Computer and electronic product manufacturing	116,470	1.8%	-17,627	-13.1%	-2.8%	0.55	7,796	\$2,207,155,558	\$1,202	30	1.67%	
551 Management of companies and enterprises	111,217	1.7%	-31,147	-21.9%	-4.8%	0.85	1,900	\$1,959,416,483	\$1,022			
524 Insurance carriers and related activities	109,891	1.7%	5,709	5.5%	1.1%	0.92	8,135	\$1,961,912,902	\$1,047			
531 Real estate	109,133	1.6%	19,161	21.3%	3.9%	0.93	19,556	\$1,324,458,773	\$759			
441 Motor vehicle and parts dealers	109,014	1.6%	6,904	6.8%	1.3%	1.22	5,349	\$1,277,443,903	\$862	2	0.04%	
236 Construction of buildings	96,329	1.5%	23,926	33.0%	5.9%	1.07	10,540	\$1,221,778,661	\$887	1	0.01%	
332 Fabricated metal product manufacturing	95,097	1.4%	-9,195	-8.8%	-1.8%	1.17	4,198	\$1,030,706,852	\$796	17	0.40%	
336 Transportation equipment manufacturing	84,979	1.3%	-17,230	-16.9%	-3.6%	0.98	1,240	\$1,398,256,248	\$1,079	12	0.97%	
484 Truck transportation	61,869	0.9%	3,646	6.3%	1.2%	1.32	4,271	\$645,675,682	\$786	6	0.14%	
425 Electronic markets and agents and brokers	51,391	0.8%	20,524	66.5%	10.7%	0.81	8,427	\$653,365,440	\$946			
488 Support activities for transportation	51,383	0.8%	2,994	6.2%	1.2%	0.73	2,600	\$711,934,712	\$711	6	0.23%	
339 Miscellaneous manufacturing	50,091	0.8%	-5,151	-9.3%	-1.9%	1.05	2,398	\$566,525,275	\$784	1	0.04%	
325 Chemical manufacturing	48,148	0.7%	250	0.5%	0.1%	1.38	999	\$752,367,425	\$1,297	6	0.60%	
517 Telecommunications	46,499	0.7%	-17,794	-27.7%	-6.3%	0.77	2,101	\$708,652,134	\$1,746	2	0.10%	
237 Heavy and civil engineering construction	42,341	0.6%	3,946	10.3%	2.0%	1.34	1,920	\$711,873,439	\$1,211			
333 Machinery manufacturing	41,889	0.6%	-8,016	-16.1%	-3.4%	1.21	1,709	\$563,986,536	\$1,014	12	0.70%	
523 Securities, commodity contracts, investments	40,741	0.6%	3,631	9.8%	1.9%	0.57	5,292	\$1,858,590,117	\$1,501			
451 Sporting goods, hobby, book and music stores	40,074	0.6%	-1,205	-2.9%	-0.6%	1.13	3,313	\$206,359,330	\$351	1	0.03%	
511 Publishing industries, except Internet	35,142	0.5%	-6,741	-16.1%	-3.4%	0.67	1,551	\$618,866,283	\$857	1	0.06%	
515 Broadcasting, except Internet	22,972	0.3%	313	1.4%	0.3%	0.67	497	\$517,292,573	\$1,049	1	0.20%	
335 Electrical equipment and appliance mfg.	21,873	0.3%	-6,149	-21.9%	-4.8%	1.39	596	\$244,782,426	\$839	2	0.34%	
518 ISPs, search portals, and data processing	19,288	0.3%	-3,563	-15.6%	-3.3%	0.45	1,041	\$352,987,153	\$1,049			
562 Waste management and remediation services	18,205	0.3%	821	4.7%	0.9%	1.05	711	\$219,161,692	\$935	1	0.14%	
AAGR = Annual Average Growth Rate	Highlighted Data:	≥2.9%	>10,000	≥10%	>5%	≥1.1	≥10,000	≥\$2bn	>\$1000			

This aggregated data draws from county datasets that may have included data that were suppressed and/or were unavailable for computations. The publication of unemployment insurance-covered employment and wage data for any industry is withheld when it is necessary to protect the identity of cooperating employers. The data will be suppressed if there are fewer than three establishments, or if a single employer makes up more than 50 percent of the employment in that industry.

Colored cells in the table indicate the highest impact values for that column. Note that the table does not include the 20 companies surveyed by Kern EDC in September or 2019.

As with the Corridor overall, the data for the seven counties paints a picture of change. Ten of the 32 categories displayed show strong growth in employment. However, of the strong growth categories, only one—credit intermediation and related services—shows a weekly wage per employee of greater than \$1000. An additional three strong growth NAICS show wage rates of greater than \$900 per week (professional and technical services; ambulatory healthcare services; and electronic markets, agents and brokers). No strong-growth, top-wage jobs were in manufacturing industries.

The top 20 largest NAICS sectors showed good growth overall, adding over 300,000 jobs in the 2001-2006 period. In fact, three-quarters of the top 20 NAICS sectors turned in employment growth rates averaging greater than 1% per year. Four of the 20 expanded employment at over 5% per year. Perhaps the most important sector for the seven-county region—professional and technical services—reported impressive numbers across the board. This one category represents almost 450,000 workers with an average weekly wage of \$964, totaling more than \$7.2 billion of payroll for the region, adding nearly 46,000 new jobs and increasing employment intensity in the region versus other regions.

However, there were some notable areas of employment contraction. Among the top 20, the most severe job losses were, in order of greatest to least, management of companies and enterprises (-31,147); computer and electronic product manufacturing (-17,627); transportation equipment manufacturing (-17,230); fabricated metal product manufacturing (-9,195); and merchant wholesalers of durable goods (-4,300). Telecommunications was another major loss (-17,794). Certainly construction would also show contraction if more recent data were used.

What is troubling about these losses is that they represent some of the sectors in which California innovation is transformed into commercial products. Further, the transportation equipment sector is where the region's aerospace companies reside. On the other hand, the intensity measure suggests that these are sectors in which the survey region may not have a strong comparative advantage.⁹ It is an essential responsibility for economic and workforce officials to assess the implication of growth and contraction trends and to formulate strategies to maintain well-paying jobs that retain California and US leadership in innovation. Still, economic development officials, workforce programs, and elected leaders are cautioned

⁹ The intensity columns show a measure called a *location quotient*. The location quotient was explained briefly in the Clusters of Opportunity section, but some additional remarks are in order. According to LMID, location quotients allow categorization of local industries based on their degree of concentration in the region and whether that concentration is growing. A location quotient uses concentration of workers to measure the relative importance of an activity in a given region in relation to a larger benchmark region (the larger benchmark region is statewide California data in the case of the county datasets, and the United States in the case of the California Innovation Corridor dataset). LMID states that a location quotient greater than one implies that the industry is producing more goods and services than are consumed locally, though this is not necessarily true in all instances due, for instance, to differences in productivity or local consumption. In LMID's reasoning, the industry is supporting a higher concentration of workers because it must be exporting the goods or services out of the area and, in the process, bringing new dollars into the area. Industries that bring dollars into the area help the local economy grow. A location quotient less than 1 implies that the industry's share of local employment is smaller than its share of the benchmark region employment (state or national). For example, if a location quotient is less than one in a service or retail industry, it may mean that residents and businesses purchase services and retail goods they require from outside the area. See the background briefing paper, "California Innovation Corridor 2006: An Example of How to Interpret Data and Results Employment, Location Quotients, Payroll and High Tech Industries" with excerpts taken from *Understanding Your Industries*, University of Minnesota (LMID, California Labor and Workforce Development Agency: 2007).

to consider both potential negative and positive dimensions of job losses: for instance, productivity gains and expansion of a company outside a region can lead to job losses within a region and yet represent a long-term healthy trend for California as a whole.

To understand potential workforce quality concerns behind job growth and loss trends is a key objective of this report. For that, we turn to the survey data.

Survey Data

As the NAICS table above shows, 182 firms were surveyed by the partners.¹⁰ Some firms declined to provide a NAICS code, and a few others provided multiple codes. The primary codes for each are listed in the NAICS table, along with the percentage of firms surveyed in each NAICS category compared to the number of firms in that category.

Target Companies and Survey Fielding

The largest number of firms surveyed included the top five NAICS categories by employment. The largest single category was professional and technical services with a pool of 49 companies. Despite the large number in this one category, the percentage of firms this represents is only .09% due to the nearly 56,000 such firms in the seven-county region. The other large survey categories included areas with troubling job losses and represented a larger percentage of firms. These included computer and electronic manufacturing (30 companies surveyed, 1.7% of the region's firms), fabricated metal product manufacturing (17 surveyed, 0.4% of firms), transportation equipment manufacturing (12 surveyed, 1.0% of firms), and machinery manufacturing (12 surveyed, 0.7% of firms).

Figure 6: Partner Survey Notes

Notes on Partner Surveys		
Partner	Companies Surveyed	Target Company and Survey Notes
GAVEA	22	Out of 91 employers contacted, GAVEA was successful in securing surveys from 22 Greater Antelope Valley employers. To collect the data, GAVEA revised the original WIRED 3.1 survey instrument to allow for greater detail for rating specific skills. Four groups of employees were broken out into separate sections: Current Employees, New Hires, Future Employees and High-Performance Incumbents. The geographic region spanned from Lancaster and Palmdale to Mojave, Tehachapi and Ridgecrest. The region's economies are intertwined, derived predominantly from business related to aerospace, defense contractors and companies supporting Edwards Air Force Base, China Lake, and the Mojave Air and Space Port. There were also a number of non-aerospace high-tech companies, plus three hospitals, included in

¹⁰ Kern EDC surveyed an additional 20 companies in valued-added agriculture, energy (petroleum and renewables), logistics/warehousing, and biomedical, but the results were not available in time to incorporate them into this report. NAICS spanned a wide range: 115 (agricultural support activities), 211 (petroleum and natural gas extraction), 213 (support activities for oil, gas and other extractives), 237 (heavy and civil engineering construction), 253 (NA), 311 (food manufacturing), 323 (printing services), 324 (petroleum manufacturing), 333 (general purpose machinery manufacturing), 337 (furniture manufacturing), 339 (miscellaneous manufacturing), 423 (wholesalers), 447 (gasoline stations), 511 (publishers), 621 (medical services).

		<p>the survey.</p> <p>The three largest companies surveyed in terms of number of employees were NASA, Northrop Grumman and Boeing. One of the three largest aerospace employers in the region declined to participate because of their company policy against sharing proprietary data. Many of the respondents had multiple NAICS designations.</p> <p>The companies surveyed were fairly equally divided between manufacturing and service, with the larger aerospace/government contractors doing both. Some listed more than one company type, most often listing both service and manufacturing or manufacturing and R & D. The average number of full-time employees was 254.</p>
KEDC	0 / 20	<p>The Kern Economic Development Corporation researched companies in Kern County and attempted to field the survey instrument in 2008. However, due to the relatively small number of innovation companies in the county's NAICS categories that were the focus of this project, and the extensive outreach by GAVEA within Kern, KEDC did not successfully complete any surveys in time for the production of this report.</p> <p>In September 2008, as this report was being prepared, CSA and KEDC agreed to investigate additional industries that potentially represented clusters of opportunity within the Corridor: valued-added agriculture, energy (petroleum and renewables), logistics/warehousing, and biomedical. KEDC fielded the same, more detailed survey instrument as GAVEA. Out of 76 employers contacted in the county, Kern EDC received 20 completed surveys.</p> <p>Kern's respondents included six energy companies, two logistics / distribution companies, two biomedical firms, three enterprises in value-added manufacturing, and seven companies in other industries. Compared to the other partners, KEDC's companies skewed heavily toward larger employers, with only five of the 20 employing fewer than 100 people. Six of the 20 employed over 500 people. The largest companies included Occidental Petroleum, Chevron, and Giumarra Vineyards, each with over 1000 employees.</p>
LAEDC / LAWIB		<p>The Los Angeles County Economic Development Corporation and the Los Angeles City Workforce Investment Board collected data from 30 employers in the City of Los Angeles. The survey was fielded from May 2008 through July 2008. In addition to this survey, other relevant information was collected and utilized. The 30 targeted companies were drawn from the fields of high technology, aerospace, environmental, biotech, manufacturing, and transportation, which represent the innovation and economic diversity of the City of Los Angeles. The associated NAICS codes were 325, 332, 334, 336, 483, 488, 515, 517, 541, and 561. Although the sample size was not statistically significant, the survey accurately reflects the diversity of the high-tech communities within the City of Los Angeles and gives voice to common themes and workforce concerns.</p> <p>Los Angeles County is the largest manufacturing center in the country, based on the number employed within the region. In addition, Los Angeles International Airport (LAX) is the largest "origin and destination" airport in the world and the fifth largest in terms of total passenger volume. LA County is also home to the nation's largest port complex. The ports of Los Angeles and Long Beach are responsible for 45% of all consumer products shipped into the US. A number of transportation-based and other support companies are located in the City that support major enterprises located in the County.</p> <p>The survey area also includes biotech/pharmaceutical, manufacturing, engineering, environmental design, and high precision machining. The typical growing clusters in Los Angeles County (e.g. entertainment and hospitality, retail, aerospace, and healthcare) were excluded as target industries because of their lower connection to technical innovation.</p> <p>Of the 30 companies surveyed, 40% indicated R&D as their primary classification, 23% transportation, 17% manufacturing, 7% service, 10% other, and 3% telecommunication. Although many of the responding companies could be characterized within several</p>

		<p>classifications, the individuals responding to the survey did not select multiple classifications, which may reflect their single focus on the critical occupations described in the survey.</p> <p>Although the average number of employees of those companies surveyed was 190, it is more accurate to view them in categories: small (under 20) is 53%; small to mid (20-99) is 17%; mid to large (100-499) 23% and large (+1000) is 7%. Overall, 70% of the responding companies have less than 100 employees. This percentage is reflective of the business base of Los Angeles County, as a whole, which is predominantly made of small and medium-sized businesses.</p>
OCWIB / OCBC	20	<p>The Orange County Workforce Investment Board and Orange County Business Council collected data from twenty Orange County employers during January and February 2008. In addition to the survey data, other relevant industry information was collected and utilized in this report.</p> <p>While Orange County is not widely known for its manufacturing base, the County does in fact have a vibrant manufacturing sector, which includes many firms that are directly or indirectly related to aerospace and defense. Most of the manufacturing firms surveyed were directly involved in space/aerospace activities as their primary business. A good cross section of small, medium, and large firms were surveyed in order to understand the needs of the region on a broad basis. Respondents were primarily human resource directors, directly responsible for assessing workforce skills of incumbent workers and new jobseekers on a daily basis. For incumbent employees, Orange County spoke with supervisors who have direct contact and who evaluate existing employees on a regular basis.</p> <p>There was a broad range of companies in terms of size. The most numerous category was small businesses with 11-19 employees, but there were four companies with over 100 employees, and one company with over 1000 employees. This diversity in terms of size provided a good cross-section of Orange County companies, which tend to congregate in the small to medium size range, especially in these industry clusters.</p>
RCEDA	20	<p>The Riverside County Economic Development Agency's Workforce Division collected data from 20 Riverside County employers in March and April 2008. In addition to this survey, other relevant information was collected and utilized in RCEDA's report. The Riverside County economy is diverse, but not known for having a significant number of space and information technology companies. For the purposes of this survey, RCEDA studied other innovative industries that are growing segments in the county's developing economy: NAICS 238, 541 and 621. These industries are specialty trade contractors; professional, scientific and technical service companies; and ambulatory health care companies. Specialty trade contractors segment are part of the area's expanding green building sector. Ambulatory health care is of particular interest due to the proposed medical school at the University of California, Riverside. The professional services sector continues to expand, mirroring Riverside County's population growth and rising income levels.</p>
SBEDP / SBWIB	30	<p>The South Bay Economic Development Partnership conducted surveys of 20 local South Bay (Southern Los Angeles County) employers in the 332, 334, and 541 NAICS codes. The South Bay Workforce Investment Board conducted surveys of 10 local South Bay employers in the 334, 336, and 541 NAICS codes.</p>
SBerWIB	20	<p>The San Bernardino County Workforce Investment Board fielded the survey with 20 employers representing innovation drivers and referral entities. The county's Workforce Development Department (WDD) developed a preliminary list of industries to be surveyed. The workforce board and representatives of organized labor and economic development reviewed this list, and adjusted the final list based upon the input received. To narrow the list, four criteria were applied: substantial employment base in the county, a high Location Quotient, a significant number of projected job openings, and strong potential for earning capacity.</p> <p>The 3 NAICS chosen were truck transportation (484); professional, scientific, and technical</p>

		<p>services (541); and merchant wholesalers of durable goods (423). In San Bernardino County, truck transportation represents 17,938 employees and 672 employers. Its location quotient is 3.74, with a payroll of \$198 million. The professional and technical services industry employs 20,256 people at 2,513 employers in the county. The location quotient was only 0.48; however, LQ was up 25% 2001-2006 and its payroll topped the list at \$226 million. Merchant wholesalers represent 21,578 employees at 1,140 employers in the county. The industry's location quotient is 1.4 and has a payroll of \$242 million.</p> <p>The majority of the companies surveyed described their business types as service, and company size was nearly equally split between those with 50-99 employees (5) and 100-249 employees (4).</p> <p>Freight is an important part of the transportation sector, and the transportation sector is itself a major component of the county's economy. Six of the companies surveyed were in the trucking business. The occupations employed by the trucking employers included packers, truck drivers, material movers, expeditors, managers and supervisors.</p> <p>Employees of engineering companies were the next most represented employees. Four of the employers were engineering firms. More than one-fourth of their workforce is professional and technical workers, with such occupations as engineers (aerospace, mechanical, chemical, industrial, computer, electrical), engineering technicians, system analysts, and computer programmers. Product assembly and material handler occupations (e.g., precision inspectors and testers, aircraft mechanics, tool and die makers, machinists, aircraft structure assemblers, electrical assemblers, machine tool operators, and general assemblers) garner a significant share of the engineering workforce.</p>
SLOEVC/S LOPIC	10	<p>The Economic Vitality Corporation and Private Industry Council collected data from ten San Luis Obispo County employers representing space and innovative companies. Two survey instruments were utilized for data collection in San Luis Obispo County. The initially agreed-upon survey instrument was fielded December 2006-January 2007 with ten targeted employers. The second survey instrument was fielded by SLOEVC and SLOPIC from April-May 2008 with the same ten companies.</p> <p>These employers were selected from the 541, 32x, 33x, and 517 NAICS codes. Although San Luis Obispo County is not known for manufacturing, a number of smaller sized companies (20-49 FTE) that support the space industry reside in the county. The companies targeted are adept at high precision machining, satellite telecommunication manufacturing, engineering design, software development, silicone component manufacturing, and pharmaceutical manufacturing. The typical growing clusters in San Luis Obispo County (e.g. utilities, real estate, builders and contractors, hospitality, and retail) were excluded as target industries because of their lack of connection with the space industry.</p> <p>The majority of the companies surveyed were manufacturing companies, most of which perform direct work for space and other governmental contracting companies. The surveyed companies tended to be of medium size in general (20-99 FTE), which was expected since most of the targeted companies were manufacturers of some sort. Because San Luis Obispo County tends to be tightly knit, feedback was obtained directly from upper management that either directly observe or discuss with supervisors their employee performance. It should be noted that a few companies did not feel comfortable rating their current employees' performance, so that data was not included in the analysis.</p>
VCWIB	30	<p>The Ventura County Workforce Investment Board surveyed 30 Ventura County companies in chemical manufacturing, machinery and machine tool manufacturing, and computer and electronic product manufacturing.</p>

Company size. The companies surveyed represent a good range of sizes, with an emphasis on small and medium-sized enterprises (SMEs). A total 94% of the companies employed fewer than 500 people, and 68% employed fewer than 100 people.¹¹ Six percent employed 500 or greater.¹²

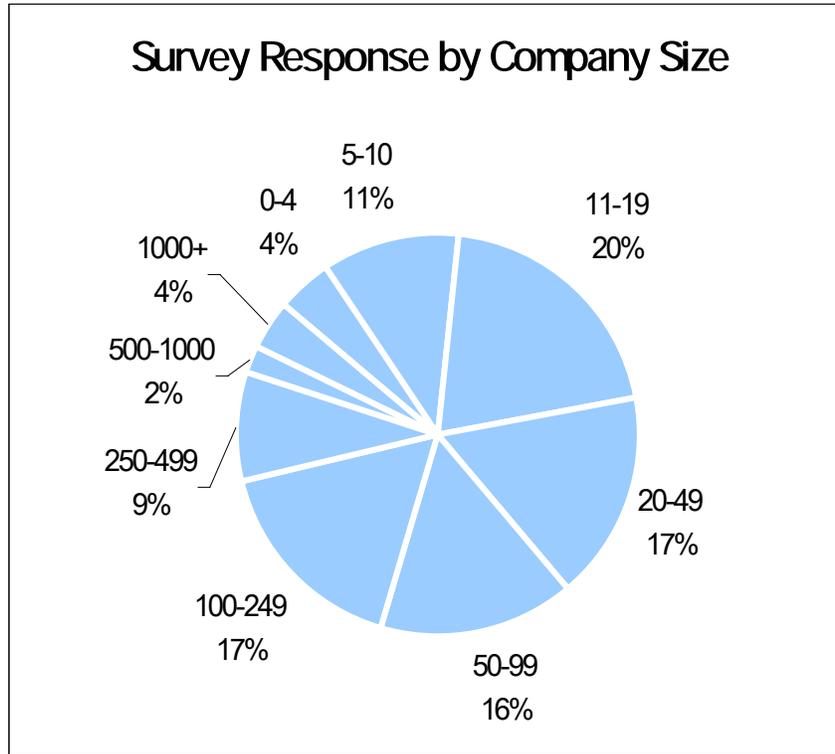


Figure 7: Survey Response by Company Size

Respondent position. The survey requested data on both the position of the respondent and their role with respect to hiring and supervising employees. Respondents were asked to choose between four standard position descriptions, including human resource director and President/CEO/Director. A role question asked for choice of the description that would best define the respondent's role relating to employees at their company:

- A. I directly supervise or am able to closely observe the job performance and/or work results of employees.
- B. I periodically (at least once a month) observe the job performance or see the work results of employees.

¹¹ The US Small Business Administration size standard for small business is 500 employees or fewer in manufacturing industries and 100 employees or fewer in wholesale trade.

¹² Kern County's respondents are not included in these tallies or in the graph due to late availability of their data. However, it should be noted that KEDC respondents skewed toward larger employers, with only five of the 20 employing fewer than 100 people. Six of KEDC's 20 surveyed companies employed over 500 people.

- C. In my position I discuss with direct supervisors, managers and/or management personnel, the job performances of employees as part of my role with the company.
- D. OR complete the following statement. “My opinions and perceptions of the current workforce are based on

As shown below, 180 out of 182 respondents were in a position to speak knowledgeably about the hiring needs of their company. The remaining two were likely in a position to do so but provided ambiguous answers. Two respondents did not provide position information but provided role information. More than 80% of respondents were a senior executive, human resource director or a supervisor / manager.¹³

Respondent Position	Role	Total
HR Director – 38%	Directly supervise / track	13
	Regularly observe	4
	Responsible for reviewing performance	51
	Other basis for workforce opinion	1
	HR Dir. Total	69
President/CEO/Director – 29%	Directly supervise / track	29
	Regularly observe	4
	Responsible for reviewing performance	18
	Other basis for workforce opinion	2
	President/CEO/Director Total	53
Supervisor/Manager – 14%	Directly supervise / track	19
	Responsible for reviewing performance	6
	Other basis for workforce opinion	1
Supervisor/Manager Total		26
Other / NA – 19%	Directly supervise / track	12
	Regularly observe	4
	Responsible for reviewing performance	16
	Other basis for workforce opinion	2
	Other Total	
Grand Total		182

Figure 8: Survey Response by Respondent Position

Core Critical Occupations

As a first step for identifying workforce needs, respondents were asked to list their critical core occupations. The analysis and presentation of this data varied somewhat by partner, partly due to variances in detail in how they fielded the survey, and partly due to additional data partners incorporated into their narrative reports.¹⁴

¹³ Kern EDC's data is not included here, however, the distribution of respondent positions among their surveyed companies is roughly similar to the rest of the survey pool

¹⁴ For instance, Riverside mapped the survey responses to specific occupation codes, 2007 median wages for each occupation, as well as the education or training requirements. Los Angeles prepared a useful matrix of positions by NAICS code. GAVEA and KEDC prepared a detailed list of occupations from which respondents could select.

The partners originally intended to collect data on multiple critical occupations for each company and then to ask about performance and satisfaction with each occupation in an iterative set of questions. That would have given a more accurate and detailed view of employer opinions within specific critical occupations. Ultimately, however, this proved too difficult a task given the resource constraints of the project. As a result, the bulk of the data collected and aggregated for this report included listings of multiple occupations but without iterative rating details for each occupation named by a given respondent. Thus, all the satisfaction and performance ratings of a given survey respondent were applied across all of the critical occupations they may have mentioned.

Readers of this report are encouraged to consult with each county partner for more specific details than can be provided in this report.

To consolidate the verbatim responses across a wide variety of occupations, this report developed standardized categories, tallied the number of companies mentioning an occupation in each of the categories, and grouped the occupation descriptions into the standard categories. It should be noted that many companies mentioned more than one occupation, so the total number of occupations mentioned (205) exceeds the total of surveys completed (182).¹⁵

Unfortunately, the lines between engineers, technicians, scientists, R&D, and other activities are blurred with this type of survey and are compounded by lack of specificity in respondent answers. Some occupations were described by discipline (aeronautical engineering), some by sub-discipline (physical systems dynamics and control), and some by functional job title (flight test engineer). Due to the clear occupational categories of machinists and programmers, these were listed separately. In several instances it was deemed appropriate to list a particular occupation in more than one category and to count that as multiple mentions (*see footnote to the occupations table, below*).

What is overwhelmingly clear about the top critical occupations for the innovation industries is that 164 out of 205 mentions of occupations require a core level of science, technology, engineering, or mathematics (STEM) education or training. That is, roughly eight out of ten times an innovation company in the survey pool mentioned a critical occupation or role, that role would fall within engineering, technical, scientific / R&D, mechanical, or computer science-related functions at the company.

The nature of companies and target industries in the survey region tended to drive an overwhelming emphasis on engineering. In Antelope Valley, for instance, the three largest employers are NASA, Northrop Grumman and Boeing. Unsurprisingly, the top four positions reported in Antelope Valley were engineering, which spanned 11 different engineering specialties. Engineering was a critical occupation for 73% of the responding companies in Antelope Valley.

¹⁵ Does not include Kern EDC responses.

Respondent-Defined Top Critical Occupations ¹⁶		
# Firms Mentioning, +/- 10% ¹⁷		Consolidated and normalized verbatim responses on critical occupations
Engineering	70 (34%)	Engineers: systems, process, aeronautical, rocket, flight test, avionics/navigational, firmware/software, structural & civil, electrical, mechanical, geoscience, metrology, environmental, telecommunications, overhaul/maintenance facility. Also include in this category: architects, surveying; land use planning, material science, composites, fiber optic manufacturing; physical systems dynamics and control.
Technician	48 (23%)	Includes technicians, installers, inspectors, equipment operators, and workers or laborers requiring precision or technical skills: airport and aircraft maintenance; information tech; lab tech; analysts; composite materials; machinery manufacturing and maintenance; overhaul & maintenance facility; electronics and navigation manufacturing and repair; telecommunications and fiber optics; vehicle maintenance; computer graphics; interior design; computer / telecommunications networks; medical and dental support and radiology; solar electric installers; CNC (computerized network controlled) machines. Also included due to respondent emphasis on precision or advanced skills or unclear responses: metalworking; line services / machinery operators; truck/tractor operators and drivers; ground & material handlers; plumbers; plasterer; lathe operator; sewing
Operations / Other Professional or Support	41 (20%)	Category includes a wide range of management and support positions. Due to responses, it was not possible to quantitatively separate management from lower-level support services. Category includes: management; strategy; legal; project mgmt.; business development and sales; operations mgmt (supervisors & managers); marketing/advertising/PR; finance analysts; HR; fundraising. Occupations with lower educational requirements: customer service; purchasing; clerical, back office, & admin support; construction; demolition; warehousing, shipping, fleet, and logistics management and support; security screeners. One respondent also stated "unskilled labor" which was placed in this category due to its presumed support role.
Scientist / R&D / MD	23 (11%)	PhD and lower level for R&D in research, material science, engineering, composites, product development, chemistry, biology, electric vehicles, clinical science, geology, environmental, avionics/navigation, telecom, chemistry, computer science, biomedical, physics, mathematics
Machinist	14 (7%)	Composite materials, fabrication & machinery mfg; overhaul/maintenance facility machinists; CNC & conventional machinists; surface mount & through-hole operators
Programmer	9 (4%)	CNC programming; CMM programming; website developers; computer graphic design; firmware/software programming; computer science

Figure 9: Respondent-Defined Critical Occupations

¹⁶ Does not include Kern EDC responses. KEDC received 37 responses on this question from their 20 companies. Of the 37 responses, the ranking was engineering (22%), computer/programmer (19%), sales professionals (16%), logistics / warehousing (10%), and electricians (5%).

¹⁷ Percentages due not total 100 due to rounding. The estimated percentage error is due to the subjectivity of placing a critical occupation within one of the standard categories, as well as sometimes broad language used by respondents in describing occupations (such as "aerospace composite materials and machinery manufacturing and consulting"). In some instances, occupations were placed in more than one category. For example, several companies described the critical need for PhD-level and lower-level employees in material science, composites, electrical or mechanical engineering and manufacturing. This set of occupations is listed in both the *engineering* category and the *scientist / R&D / MD* category. There might be individuals in this set of occupations that would be considered more at a technician level, thus showing the inherent subjectivity of the categorization in many instances.

Typical Education

Five of the partners¹⁸ evaluated educational experience when preparing their narrative reports. In some instances their data was driven by respondents when the 2006 version of the survey tool was used. In others, the partners obtained data from research references and professional knowledge. Some partners inquired about post-graduate degrees, others did not.

"Because of the surveyed companies' broad range of occupations from engineers to agricultural tractor operators," reports RCEDA, "a wide spectrum of educational experience" was required for the listed critical occupation. San Bernardino WIB echoed this comment. Thus, the conclusions that may be drawn from responses to this survey question are limited. Some examples within each category:

- Bachelor of Science or Bachelor of Arts degree: Required minimum for architects, all engineering and scientific professions and land use planners
- Associate or Bachelor degree, or some specialized college-level coursework: Computer network technicians and web site programmers college-level courses in specialized fields.
- Vocational training certificate or Associate degree: Radiology technicians and medical assistants
- Certificate or Associate of Applied Science degree: dental assistants
- High school diploma / up to 12 months on-the-job (OTJ) training: Plumbers, plasterers, solar installers, network line installers, computer product sales, and machine and tractor operators

GAVEA used a more detailed rating system that compared the educational background of current employees with new hires and future needs.¹⁹ BA/BS was the most important educational attainment for current employees, scoring 2.7, followed by MA/MS (2.0) and AA/AS (1.8). However, the rankings changed moving to new hires and then to future needs. Advanced degrees (MA/MS and PhD) were expected to remain at the same level of importance, scoring 2.0 and 1.3, respectively across the current/new/future categories. However, all other educational categories were expected to increase in importance, with BA/BS rising to 3.0, AA/AS jumping to 2.0 alongside MA/MS, and Certificates leaping in importance from 0 to 2.0.

Orange County WIB and SLOPIC reported similar responses. They noted that all of the engineering occupations require a Bachelor degree and that surveyed companies reported increasingly higher education levels for the future. Commented Orange County, "Some of the sales, drafting, warehousing, and technician jobs would only require a high school diploma or Associate degree, but even in these occupational categories the trend was toward more education rather than less."

¹⁸ Six, counting Kern EDC.

¹⁹ Scores were on a four-point scale, with 4 being very important and 1 not important. KEDC used this approach, as well, but their results are not included here.

Typical Job Experience

Four partners provided data on typical job experience for new hires. Due to the range of occupation types and differences between counties, it is difficult to make overarching statements.

Riverside reported that all but three of the companies surveyed hire employees with no job experience, ranging from architectural firms hiring college graduates straight out of college to plumbing contractors and network installation companies that hire high school graduates. Of the three companies seeking experienced hires, an engineering firm preferred experienced engineers, a site preparation company hires tractor operators with two years' experience, and a medical x-ray laboratory said they only hire licensed technicians with at least one year's experience.

San Bernardino WIB also found that a majority of the companies they surveyed hire employees with no job experience. The jobs requiring the minimum education were more inclined to hire without experience. Two architectural firms hire from the pool of recent college graduates. One engineering firm hires only engineers with at least five years of experience in their specialty. A company employing garment workers require that they speak English and can prove their right to work in this country.

On the other hand, experience was strongly sought in two other counties. The overwhelming majority of San Luis Obispo companies reported that greater than two years of experience in a related field is necessary for the technical person to be effective for their companies, however the relevant number of years beyond two was not asked.

Experienced engineers are sought in Orange County, however OCWIB emphasized that experienced talent is in short supply. Employers reported that not enough students went into engineering 10-15 years ago, especially in the civil engineering and mechanical engineering fields. Experienced engineers with 10-15 years of experience are in especially short supply, and these are most critical as they typically perform project management duties. With this shortage, engineers with even a few years of experience are considered "experienced".

Typical Wages

The wage data for this project came from two different types of sources.

At the three-digit NAICS level, LMID provided average weekly wage per employee. This data is shown in the LMID dataset section of this report, above, for both the seven-county survey area as well as for clusters in the California Innovation Corridor. The wage data in the datasets is useful for ranking NAICS categories by average wage, and as a proxy for the degree of value-added or competitively advantaged activity (i.e., the higher the average wage, the greater the value-add and/or the more advantaged the local region is versus other regions). However, the LMID NAICS datasets are not useful for making statements about specific occupations.

The more salient wage data was for key critical occupations identified in the survey, and collection of this data relied on the partners. As with the preceding sections on typical education and job experience, only a few partners provided data. The following paragraphs summarize what these partners found.

A difficulty with the critical occupation and wage analysis was that unless respondents were clear in their responses on critical occupations, it was difficult in all instances to assess whether a category was more at the professional or at the unskilled / laborer level. Some responses on *critical occupation*, for instance, were "trucking," "logistics" or "construction." Such responses are nearly useful, as they could encompass both supervisory levels and less educated and trained positions in these occupational groups.

Riverside. Eight surveyed companies were in construction-related businesses. These ranged from firms that employ architects, civil engineers and land use planners to specialized contactors that employ plumbers, plasterers and tractor operators for site preparation services. Other specialty trade contractors interviewed hire sheet metal manufacturing machine operators and solar installers. Key employees in the health care industry were radiology technicians, medical assistants and dental assistants. The professional service companies surveyed employ computer network technicians, computer consultants (sales representatives), web site developers and computer/telecommunications line installers.

The highest wage for the surveyed occupations in Riverside County is a regional planner with a master's degree, at a median hourly wage of \$44.86. Engineers and architects have median hourly wages of \$34.73 and \$32.41, respectively. Radiology technicians with an AA degree earn a median hourly wage of \$29.13. Some other technical trades also have good earning potential with median hourly wages of \$18.92 for plasterers, \$18.72 for sheet metal workers and \$17.82 for plumbers. At the lower end of the earning spectrum are medical assistants who earned a median hourly wage of \$12.00, and dental assistants at \$13.93. Registered dental assistants earn a higher wage because of more rigorous training standards. RCEDA reports that wages in Riverside County are typically lower than neighboring counties.

Orange County. OCWIB provides some data for comparison. Median hourly rates for engineers in the county are \$35 to \$45. There is variation between specialties: civil engineers (\$34.55 per hour), environmental engineers (\$38.98), industrial engineers (\$34.99), materials engineers (\$32.42), and mechanical engineers (\$34.96). Experienced engineers with project management experience would command \$45-\$55 per hour, and executive/management engineering positions would go up from there.

San Luis Obispo. The "Entry Level" and "Some Experience" categories yielded typical salaries expected of the technical level in San Luis Obispo County, which were \$45,327 (\$21.79/hr) and \$63,040 (\$30.31/hr), respectively. The top-level, however, was higher than expected because two of the surveyed companies pay their top employees unusually well. When these companies were excluded from the sample, the average "Top Level" salary was \$87,400 (\$42.02/hr) instead of the initially reported \$130,400

(\$62.69/hr). Average salaries tend to be lower than other counties because there is a perceived trade-off between salary and higher quality of life in San Luis Obispo County.

Sample range of wages in specific critical occupations. The following table indicates the range of occupations and their wages provide by two of the counties. What is important to note, in addition to the specific relative wages and training requirements, is how difficult it is to associate a general survey response such as "operations" or "trucking" with a specific occupational category.

Sample Critical Occupations and Wages in San Bernardino and Riverside Counties		
Occupational Title	Median Hourly Wage (1)	Education/Training Minimum Requirement
Operations Manager	\$45.55	BA/BS Degree
Urban and Regional Planners	\$44.86	MA/MS Degree
Aeronautical Engineering	\$40.41	BA/BS Degree
Electrical Engineer	\$39.47	BA/BS Degree
Transportation, Storage, Distribution Managers	\$37.80	Work experience (in related work)
Mechanical Engineer	\$36.17	BA/BS Degree
Civil Engineers	\$37.50 (1) \$34.73 (2)	BA/BS Degree
Sales Representatives, Wholesale and Manufacturing, Technical	35.07	Mod. term on-the-job trning (OJT) 1-12mo
Sales and Related Workers, All Other	(3)	Moderate-term OJT
Quality Control Inspectors	\$33.73	Moderate-term OJT
Architects, Except Landscape and Naval	\$32.41	BA/BS Degree
Radiologic Technologists and Technicians	\$29.13 (2)	AA Degree
Researchers	\$26.88	BA/BS Degree
1 st Line Supervisor Material Movers	\$22.30	12 month OJT
Computer Programmers (includes web site programmers)	\$22.25	BA/BS Degree
Network and Computer Systems Administrators	(4)	BA/BS Degree
Truck Driver Heavy	\$21.10	Moderate-term OJT
Heating, Air Conditioning, and Refrigeration Mechanics and Installers ⁽⁵⁾	\$20.89	12 month OJT
Telecommunications Line Installers and Repairers	\$20.40	12 month OJT
Plasterers and Stucco Masons	\$18.92	12 month OJT
Sheet Metal Workers	\$18.72	Moderate-term OJT
Bio technicians	\$17.93	AA Degree
Plumbers, Pipefitters, and Steamfitters	\$17.82	12-Month OJT
Machinist	\$16.96	
Machine Tool Operators	\$16.61	Moderate-term OJT
Dental Assistants	\$13.93	Moderate-term OJT
Truck Driver Light	\$13.88	Moderate-term OJT
Industrial Truck and Tractor Operators	\$13.32	30 day OJT
Medical Assistants	\$12.00 (2)	1-12 Month OJT, Cert. 1 year; AA
Seamstress	\$10.53	30 day OJT
Laborers and Freight, Stock, and Material Movers, Hand	\$10.19	30 day OJT

Figure 10: Wages and Education for Critical Occupations in San Bernardino and Riverside

- (1) Unless otherwise noted, this column displays San Bernardino data
- (2) Occupational wages for Riverside-San Bernardino-Ontario MSA
- (3) Workers may not work full-time all year-round, so not feasible to calculate hourly wage
- (4) An estimate of wage could not be provided due to confidentiality
- (5) Solar installers' earnings are in line with Heating, Ventilation and Air Conditioning wages

Skillset Analysis

Although partners provided varying detail in their survey and analysis of skills, there was sufficient data and commonality among the partners to provide an aggregate view of skills across the seven-county survey area.

Respondent-provided critical skills.²⁰ To begin the evaluation of critical skills, respondents were asked to share their unprompted, top-of-mind opinions on the essential skills necessary for the critical occupations they had stated.

The verbatim responses were collected, and then combined into standard categories. Some of the responses fell into skills that were specific to the industry or occupation: specific technical skills, educational credentials, industry experience, and the like. As the table below indicates, the most important area of response was industry-specific technical skills—including prior work experience and specific training directly related to the specific occupation in the industry.

Respondent-Defined Critical Skills: Industry- or Occupation-Specific <small>(Combined 3.6 value on 1 - 4 scale)</small>	# Companies Mentioning <small>(out of 125 mentions)</small>
Industry-specific technical skills <small>(Employer assumption is that the skill was acquired via education and/or prior experience)</small>	69 <small>(55%)</small>
Good basic education in field / Degree or certificate <small>(If specifically mentioned)</small>	30 <small>(24%)</small>
Prior experience in field <small>(If specifically mentioned)</small>	18 <small>(14%)</small>
Advanced degree <small>(If specifically mentioned)</small>	8 <small>(6%)</small>

Figure 11: Industry- or Occupation-Specific Critical Skills (Respondent-Defined)

Other responses fell into more general categories not related specifically to industry or occupation. There were 185 different mentions of these types of skills by respondents—many more than the 125 mentions of industry specific skills. Further, there was a much smoother distribution across the top responses—the top three categories of problem solving, workplace skills, and communication skills each garnered roughly 20% of the mentions and together represented over 60 percent of the skills mentioned.

²⁰ This section does not include data from Kern EDC. Please see their narrative report.

Respondent-Defined Critical Skills: General or Cross-Industry	# Companies Mentioning (out of 185 mentions)
Problem solving & creative thinking	40 (22%)
Basic workplace skills (time management, reliability, follow directions, social skills)	39 (21%)
Communications skills (verbal, reading, writing)	35 (19%)
Mention of math	20 (11%)
Computer skills	19 (10%)
Customer service	15 (8%)
Mention of science	10 (5%)
Project management & troubleshooting	7 (4%)

Figure 12: General or Cross-Industry Critical Skills (Respondent-Defined)

Standardized skillset questions. To validate and provide a consistent basis for calculating priorities among critical skillsets, respondents were also prompted about standard survey-defined sets of skills. In the final survey instrument used for this aggregated analysis, the surveys probed key skills by asking for two different types of responses across a standardized set of skillset descriptions, listed below.

First, a set of questions asked respondents to rate the *importance* of specific skillsets for new hires as Very important (4), Important (3), Somewhat Important (2), Not Important (1).

For the same skillsets, respondents were also asked to rate the *ability* of new hires to meet performance / competency expectations as Exceeding entry-level expectations (4), Meeting entry-level expectations (3), Nearly meeting entry level expectations (2), Does not meet entry level expectations (1), and (0) Does not apply.²¹

²¹ A more detailed initial version of the survey instrument asked these same questions iteratively for incumbent employees, new hires, and future employees. Some partners used this more detailed approach. See the individual partner reports.

The standard skillsets respondents were asked to rate consisted of five technical skillsets and two social skillsets:

Technical Skills

- *Problem-solving skills*
- *Workplace skills* (judgment, decision making, resource and time management)
- *Technical knowledge* related to the job
- *Technical skills* (the ability to use/operate equipment, tools, materials, software, information systems, or more than one specific technology when hired)
- *Computer skills* (using spreadsheets, databases, word processing, graphics, Internet or giving presentations)

Social Skills

- *Team-work* (coordination, instructing, relationship-building, cross-cultural understanding, negotiation, persuasion)
- *Work ethics* (initiative, dependability, reliability)

► *It must be noted that due to an inconsistency in the survey tool, the technical skills category was only rated for importance and did not collect data on performance.*²²

In addition, respondents were asked to name any other skills, and any other social skills, that were important for their future employees. There were few responses on these two questions due to the broad nature of the other skillsets queried and the respondents' opportunity to name critical skills at the beginning of the survey.

Asking respondents about both employee performance in specific skills and the importance of those skills allowed the development of a prioritized list of skill development categories. By comparing the reported performance of employees against the top end of the range, it is possible to evaluate performance gaps.²³

A performance gap is a greater concern for a high importance skillset than for a low importance skillset. To produce this comparative measure, we established a *Problem Index* that multiplies the reported performance gap by the reported importance measure and applies an indexing value. Problem Index scores show the priority of a skillset gap on a 200 point scale, in which exceeding performance for a very important skillset generates a 0 score (no problem whatsoever), while entirely failing to meet performance for a very important skillset generates a score of 200.²⁴

²² In the context of the survey, technical knowledge and technical skill were two distinct concepts. Technical knowledge refers to comprehensiveness of subject matter expertise and tends to be related to study. Technical skill refers to how knowledge is applied to achieve a particular result and tends to be related to practice and experience. It is possible to be good in knowledge and poor in skill.

²³ In doing so, we compared the reported score against the *4.0 Exceeds expectations* level. It is, by definition, acceptable for employees to score *3.0 Meets expectations* in performance. However, it is an operating assumption California workers will regularly need to exceed expectations to maintain the state's competitive edge against the performance of other countries. Therefore, the degree to which performance scores significantly below 4.0 highlights potential areas of concern.

²⁴ To understand the Problem Index, consider a company that reports employee performance in a particular category is a 2 and the importance of that skill is a 2. We would subtract the reported performance score (2 in this example) from the ideal score (4)

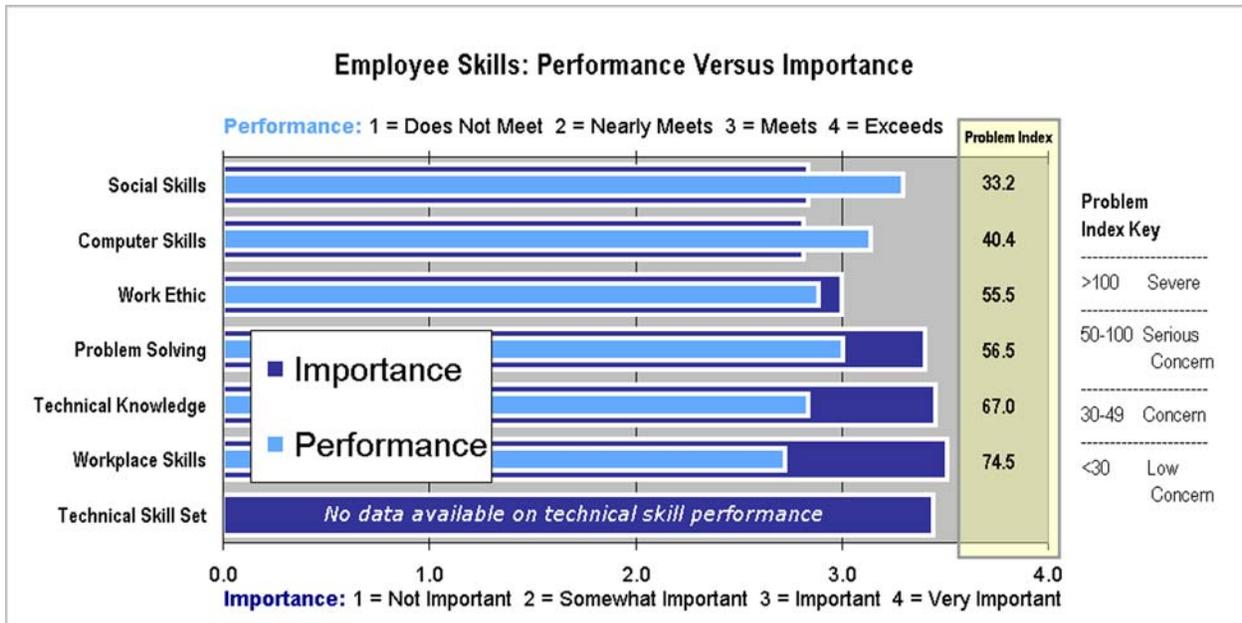


Figure 13: Critical Skills Gaps - Employee Performance Versus Importance

A score greater than 100 on the Problem Index indicates a severe problem in failure of employees to meet performance in an important skillset. A score of 50-100 is a serious concern, 30-49 a concern, and less than 30 is a low-to-nonexistent concern.

Comparing open-ended responses on skills to the responses in these standardized categories validated the results, though ratings for social skills and computer skills suggest should be particularly reviewed in context of the occupations surveyed and the verbatim responses.²⁵ Industry-specific skills and knowledge were a top mention by respondents, and they rated very highly in the standardized section, generating a score of 3.4 out of 4 in importance of skills for entry-level employees and 3.5 out of 4 in the importance of occupational knowledge for all employees. Among the more generalized skills mentioned by respondents, four were specifically tested in the standardized categories. These four skills—and their scores of importance on a four-point scale—were problem solving skills (3.4), general workplace skills (3.5), social skills (3.3), and information technology use and management (3.1).

Here is what we found.

- **No severe issues in overall performance.** Surveyed companies generally reported both performance and importance scores of between 2.5 and 3.5, so no skillsets rose to the severe end of the Problem Index, and there were no massive skills gaps. However, there were clear areas of concern, and these were resoundingly amplified by the comments received from

and multiply that difference by the importance (2) to generate an appropriately weighted indicator of underperformance. We then multiply the result by an index number of 16.67 to place the score on a 200-point indexing scale. This indexing value does not change the relative ranking of multiple scores, but it increases the numeric separation between the scores and establishes specific benchmark ranges of 0-30, 30-49, 50-100 and 100+.

²⁵ See bullets on social and computers skills below. Kern EDC responses not included; see their narrative report in the appendices.

respondents, along with the shortage issues in engineering disciplines mentioned by Orange County and Kern County.

- **Workplace skills were the top concern.** The greatest area of concern was in workplace skills, with a Problem Index of 74.5. Aggregate performance in this skillset was the lowest at 2.73, yet it received the highest importance score at 3.51, emphasizing the criticality of the performance gap. We will revisit this topic when we review the verbatim responses.
- **Technical knowledge was also an issue.** Technical knowledge was the next highest area of concern (Problem Index 67.0), with aggregate performance at 2.84 and importance at a critical 3.45.
- **Problem solving and work ethic skills need attention, but are lower priority.** Problem solving and work ethic skills were very similar concerns, with Index scores of 56.5 and 55.5, respectively. Problem solving inched into a potential area of concern because employee performance was *just meeting* expectations, but it received a very high 3.41 importance score—nearly identical to technical knowledge.

Work ethic was somewhat different. Importance fell directly into the *Important* category at 3.0; however, performance was *below* expectation at 2.89, which pushed work ethic issues alongside problem solving into the "serious concern" portion of the index. The verbatim responses provide good clarity as to why both of these areas are issues for respondents, and how in many ways the problem-solving and work ethic skills are two sides of the same coin.²⁶

- **Computer skills and social skills were lowest in concern.** Computer skills and social skills somewhat surprisingly ranked fairly low in the Problem Index, 40.4 and 33.2, respectively. Computer skills showed performance slightly above expectations, and the important score was surprisingly below Important, at 2.82. This may be entirely explained by the sizeable number of critical technician occupations mentioned by respondents that are not reliant so directly on serious computer skills—occupations such as construction, truck transportation, machining, dental assisting, and aerospace overhaul and repair. If so, it underscores that lumping a variety of industries and critical occupations together creates a survey methodology problem. Computer skill gaps have shown up more strongly in other WIRED projects, such as 1.2 and 2.2.

Similarly, social skills scored high in performance (3.30) and lower in importance (2.84). What was clear from the verbatim responses was that while there were issues with social skills, they were not nearly as pronounced as the more specific issues that got much higher Index scores in workplace skills, problem solving skills, and work ethic.

Other skillsets. Respondents were asked a yes/no question about whether there were additional skillsets that they look for but were not mentioned.²⁷ About 60% answered yes to this question.

²⁶ An employee with good work ethics faced with a hurdle would take action to solve the problem creatively, while one with poor work ethics would not choose to solve the problem even if they possessed the knowledge and intelligence to do so.

²⁷ Some partners, including Kern EDC, asked and collected open-ended responses to this question rather than the less useful yes/no.

Subsequently, respondents were asked more specifically about other social skills that they look for but were not mentioned. About a third responded to this question, with some responses falling into multiple categories.

The answers closely mapped to the social skills queried in the standardized portion and the critical skills already named by respondents in the unaided portion. What is important to note is that while *social skills* scored relatively lower in the standardized portion, there are clearly areas of concern for a cross-section of companies, particularly when the respondents are able to articulate specific skills in their own words.

The social skills named consisted of the following tallies, in order of mention:

Other Skillsets Are there any social skills not mentioned which you include in entry level expectations, now, or will in the future	# Companies Mentioning out of 75 mentions
Interpersonal workstyle (easygoing, adaptable, tactful, sensitive, good with people, good attitude, good instincts, sense of humor, able to take instruction)	20
Communication and customer service skills	11
Team player and teamwork skills	10
Cross-cultural skills, bilingual and/or better English ability	9
Workplace skills (ethical behavior, honesty, integrity, accountability, punctuality, good work habits, tidiness, grooming, and related "soft skills")	7
Problem-solving (out-of-the-box thinking and problem-solving, conceptualization, design and analytical skills)	5
Self-motivation, eagerness to learn	3
Common sense and general life skills	1
Ability to manage up and across organization	1
Math skills	1
Ability to work under pressure	1
Leadership in development of research programs	1
Ability to raise funds for philanthropy	1
Public speaking, presentation skills	1
Computer skills	1
Better work experience / work preparedness for entry-level scientists at all educational levels through PhD	1
Drug-free / okay with drug testing	1

Figure 14: Other Skillsets Mentioned

"Ideal" technical employee. Respondents were then asked to name the characteristics which best describe their most effective, reliable technical employees in terms of technical abilities and organizational fit for each critical occupation.

Again, the respondent comments were typically general and could only be attributed across all the occupations they mentioned rather than for each specific occupation. A further challenge is uncertainty about the respondent's interpretation of the term "technical employee." As with other questions, the initial survey tool probed on the subject at various levels, while the simpler final survey tool addressed the questions more simply. For those that asked for answers at different levels, the partners provided some explanation in their narratives. For others, it may have been unclear to the respondent if the question was asking solely about non-managerial technicians or anyone with responsibilities for dealing with technical issues at any level. Selected comments from the partners are included below.

It is interesting to note that of the ideal attributes, technical skill and analytical ability are very important; however, social skills dominate the list.

Figure 15: "Ideal" Technical Employee

The 'Ideal Technical Employee' In terms of technical abilities and organizational fit, please identify the characteristics which best describe your most effective, reliable technical employees for each critical occupation	# Companies Mentioning out of 280 mentions
Good communications skills (inc. reading & writing, speaking, presenting, customer service)	33
Technically-skilled	32
Adaptable, learns easily, goes out of way to learn	28
Motivated, works hard	25
Problem solver, project manager	21
Teamwork	20
Reliable	18
Takes initiative, able to act independently	17
Attention to detail	16
Able to meet deadlines, time management	13
Experienced	12
Excellent leader, teacher	9
Broad range of skills, knowledge	8
Multi-tasker	7
Computer skills	5
Ethical	5

Highly-educated	5
Applies education	3
Work within budget	2
Bilingual	1

Riverside County and San Bernardino County were two of those that explored the question explicitly for various levels of employees. They found, unsurprisingly, that excellent technical knowledge is key for the best employees in higher-level positions, while a solid foundation in “the basics” is essential for lower level positions. Good communications skills were very important, cutting across all types of occupations from computer network technicians, engineers, and architects to plumbers and truck drivers. Riverside noted that even solar heating companies look for installers who have public speaking skills so they can attend trade shows. Teamwork is also highly valued for Riverside companies in the three disciplines of specialty contractors, health care, and professional services. This was also true for San Bernardino engineering and trucking firms. Six Riverside County employers said it is extremely important to have “employees who are teachable,” both for college graduates who “think they know it all” as well as for high school graduates. San Bernardino said that thinking critically and acting logically to evaluate situations, solve problems and make decisions ranks high for best employees among their respondents.

For Los Angeles, the top category of attributes characterizing the “best employees” included excellent communication skills, attention to detail, and reliability. Attention to detail was mentioned within the context of laboratory and research work environments. The next highest-ranked set of attributes included problem-solving, teamwork and a science background.

Orange County found the ideal characteristics were surprisingly diverse in. Among their respondents, “Experienced” came up as the most desired trait. “Willing to learn” was second, indicating great opportunities for education and training institutions to partner with employers on targeted training. Conversely, Orange County found it likely that some skills are very company/workplace specific and can only be taught at the workplace by the employer. The need for “Workplace Skills” also shows up in the qualitative responses of “Independent,” “Trouble-shooting,” “Team Player,” and “Time Management.” Finally, soft-skills such as “Customer Service” and “Communicator” were deemed important primarily by those companies who see customers at their workplace on a regular basis.

San Luis Obispo also commented about the importance of excellent technical knowledge and ability to solve problems. A few companies reported that they liked independent workers, ones that are able to work with little direction. A couple of companies stated that they liked employees with good communication skills. SLOPIC felt that the best employee would arguably be highly skilled technically, able to solve complex problems on their own, and be able to explain how they solved the problem.

Satisfaction in Education

After getting details on critical skills, it was important to understand how employers felt more generally about the educational preparation of their workforce. The survey asked respondents how satisfied they were with the education of today's worker. This question helps to separate issues in expectations of educational institutions from issues that are more societal.

No level of education showed high levels of satisfaction. Technical level education showed a base level of satisfaction, but employers were less than satisfied in both entry-level education and professional.

Satisfaction in Educational Preparation In general, how satisfied are you with the education of today's worker?	Average (1 - 4 Scale)
Entry level education	2.7
Technical level education	3.0
Professional level education	2.9

Figure 16: Satisfaction in Educational Preparation

Satisfaction ratings
 4 = Very satisfied
 3 = Satisfied
 2 = Unsatisfied
 1 = Very unsatisfied

Critical Skills Shortage

As we have already seen, there are serious shortages in some professions, such as engineers in Orange County. Respondents were specifically asked whether they were seeing shortages at various levels of occupations.

Forty-one out of 182 companies said that they saw no shortages. This means that 141 companies—more than three-quarters—expressed some concern about critical skills shortages at the technical level, professional level, or both.²⁸

Critical Skills Shortages Is there a critical skills shortage, if so, is it more at the:	# Companies Mentioning	% Companies With Concerns
Technical level	90	49%
Professional level	70	38%
No shortage	41	23%

Figure 17: Critical Skills Shortages

²⁸ Does not include KEDC data, though narrative information on shortages from KEDC is provided in the ensuing text.

In Riverside County, ninety percent of those surveyed reported that there is a critical skills shortage at the professional or technical level. One company remarked that the reason for shortages is that Riverside County is not perceived as dynamic enough to attract these highly skilled workers. Another employer noted that the shortage of professionals is at the middle-manager level, stating "There are plenty of entry-level candidates and highly experienced executives, but we can't find mid-manager professionals who are crucial for the success of our business." Riverside noted that this type of comment underscores the importance of organizational succession planning as older, more experienced leaders reach retirement age.

San Bernardino was another problem area. They found that all twenty of their companies surveyed indicated a critical shortage at the professional or technical level. The majority stated more of a shortage of technicians. Across the transportation, warehousing and durable wholesale sectors in San Bernardino County, nearly 13,000 jobs require a high school diploma or less, helping explain why professional shortages are not as great, relatively. However, they noted there has been a recent surge in the county's office construction, which they felt would attract more professionals and change the trend in the coming years.

Orange County employers reported that not enough students went into engineering 10-15 years ago, especially in the civil engineering and mechanical engineering fields. Experienced engineers with 10-15 years of experience are in especially short supply, and these are most critical as they typically perform project management duties. With this shortage, engineers with even a few years of experience are considered "experienced".

Kern EDC found that the oil and gas industry in the county is currently experiencing a shortage of qualified engineers, similar to the shortages reported by Orange County. They note, "Local businesses must recruit from outside of the area for qualified applications. California State University, Bakersfield, does not currently offer an engineering program; therefore, companies must go to Fresno or out-of-state to find engineers possessing a bachelor's degree [or] beyond." For their agricultural sector employers, KEDC found that shortages of individuals with basic English language skills continue to pose a problem. There were lower rates of shortages reported by LAEDC, Orange County, and San Luis Obispo County among their respondents.

Identification of Future Skills

Respondents were asked to identify any new skill sets that might be required of future workers in their companies. As can be seen from the table, topping the list was information technology (IT) and skills related to new technology. Many companies also saw the need for industry-specific new skills. The remaining categories were very low.

Future Skills Are there any new skills sets that may be required of future workers in this industry?	# Companies Mentioning
IT (computer-related) / new technology	48
Industry-specific skill	22
Continuing education (classes & certification)	4
Interdisciplinary science & technology	3
Legal	2
Project management	1
Environmental	1
Bilingual	1

Figure 18: Future Skills Needed

Riverside County explained that their respondents were principally referring to constantly changing technology that affects the key elements of their business or trade, such as digital x-radiology, three-dimensional modeling, and merging technologies such as telephone integration with high-tech surveillance systems. Their employers commented that technology changes are often computer-related, and several noted it will be critical for employees to easily learn new software programs and new equipment. They also found that new skillsets will emerge from the developing green building sector.

San Bernardino employers also commented on increasing need for technically skilled employees. More and more companies—including the trucking industries—are using computers. For instance, truck loads and drivers are now being tracked by GPS systems, and San Bernardino notes that technology will dominate learning environments in the future. More and more learning will be done by distance learning classes, thereby making basic computer knowledge skills a must for nearly all employees.

All San Luis Obispo companies saw future growth of their technical occupations, reported by some as 10%-20% growth of these occupations. SLOPIC commented that workers would need to evolve toward more interdisciplinary skills, along with improvement in social skills. One company discussed the issue of “entitlement” of the most recent graduates. SLOPIC felt that although only one company brought this up, they foresaw a potential growing issue that deserves further study.

In Los Angeles and Kern Counties, GAVEA put the qualitative and quantitative data together to suggest four central themes: (1) Importance of advanced engineering degrees, (2) Need for computer literacy for all positions, (3) Need for on-the-job experience and overall job understanding, (4) Importance of work ethic and problem solving. GAVEA and Kern EDC noted that because of the way the questionnaire was designed, CAAD and CAM (computer-aided architectural design and manufacturing) do not appear to be important, but that is because not all of the responding companies listed them, and the survey calculated

the average. Of the twelve companies that listed CAAD and CAM in GAVEA, they listed it this skillset as a 3.5 in importance—higher than most respondents rated general computer skills.

In Orange County and the City of Los Angeles, respondents had difficulty with this question. In LA, slightly fewer than half of the companies were able to report specific future skill needs differing from their current needs. Those that could do so mentioned a broad spectrum, with nothing solidifying into top priorities. LA respondents mentioned artistry and imagination, insurance, legal processes, project management, reliability/follow-through, social/human skills, basic programming, green environmental practices, information technology, moral ethics/integrity, regulations, RFID technology, and writing and communication.

Orange County felt that the difficulty with this question was because technology and global competitive forces are changing the workplace and the nature of work so rapidly that employers do not believe they can accurately forecast future skills with any certainty. Of those respondents who did answer, “computer skills” was by far the most frequent. Two companies cited “technical skills” as future skill needs, and one employer cited basic “reading and writing”.

Supply Chain Companies

Respondents were asked to describe their supply chains. This was done for a variety of reasons, including comparison of responses against WIRED supply chain investigations and as a basis for evaluating the upstream impact of respondent companies.

The extent respondent companies rely on high wage occupations among their suppliers is important in terms of employment within California and for efficiency and effectiveness of supply channels across California borders and internationally.

This survey's responses, however, can only be used for basic insights and require further analysis to glean more strategic findings. It is impossible to know to what degree respondents' supply chains are located within California, the US or abroad. Further, responses were collected without standard categories and would require significant effort to place them into NAICS or other classification system for proper analysis. Finally, the nature of some responses suggested that a variety of respondents did not understand the concept of a supply chain and had answered the question based on their distribution chain and/or customers rather than on their suppliers.

A total of 152 respondents out of 182 provided answers to this question, of which 306 valid specific supply chain company types were mentioned. Responses consisting of "don't know" or "all kinds" were not included in the tally. The significant number of computer and electronics manufacturers, transportation equipment (aerospace) manufacturers, fabricated metal product manufacturers, and machinery manufacturers in the respondent pool is reflected in the types of supply chain companies mentioned.

Supply Chain Companies	# Mentions
What types of companies are involved in your supply chain? (152 companies responding)	
Raw/semifinished mat'ls: metals (industrial and precious), rubber, plastics, ceramics, other except composites	46
Electronics, incl. power generation electronics, solar panels, inspection equip., semiconductor-related, and lighting	22
Freight logistics, transportation, distribution, customs brokers, warehousing	19
Aerospace and defense contractors, including avionics, aerospace parts and finished/semifinished materials	15
Chemical manufacturers	15
Laboratory and medical supply and equipment, drug supply / pharmaceuticals, tissue banks	14
General and contract manufacturing and assembly	12
Surfacing/painting/coating: brazing, painting, grinding, finish coat, anodizing, plating, heat treatment	11
Office supply	10
Building materials, interior design products, hardware	9
Government	9
Construction	9
Composite materials, both structural and for electronics use	8
Machine shops and metal machining / tooling	7
Software	7
Vehicle parts and tires, including motorcycle and bicycle, no aerospace	7
Other equipment and tools, including maintenance equipment	7
Drafting / engineering	6
Universities, research institutions, research data supply (e.g. clinical trial databases)	5
Packaging and paper	4
Computers and computing products except software	4
Safety and security services and equipment, including firefighting equipment	4
Hospitals and medical offices	4
Broadcast, online and print media / publishers	3
Pipes, hose and fittings	3
Real estate agencies, land and property management	3
Education and training	3
Retailers and consumer goods not specified	3
Electrical and electromechanical products, including motors	3
Utilities (power and water)	3
Petroleum products	2
Insurance and risk management	2
Specialized apparel	2
Networking and telecommunications products	2
Marketing / advertising	2
Food service	2
Reproduction, printing, copying services	2
Fabrics	2
Agriculture-related, including insect control and supply, growers/nurseries	2
Optics	1
Pollution or environmental controls, including air products	1
Entertainment	1
Residential resort communities	1
Airlines and travel	1
Laboratories	1
IT support	1
Professional businesses, not specified	1
Biologist and environmental specialists	1
Traffic and urban planning	1
Foundations	1
Hobby supply	1
Battery supply	1

Figure 19: Supply Chain Companies

Desired High School or Community College Training Programs

The project team particularly wanted to investigate the prioritization of training programs at the high school and community college levels. Much concern in the educational and workforce communities has been directed toward the effectiveness of K-12 and career technical education.

In general, respondents expressed similar interest in training related to mechanical, trades, electronics, and industry-specific technical skills as opposed to workplace skills and communication / teamwork. The specific ranking is provided below.

Interestingly, despite the wording of the question, two companies mentioned "More PhD offerings," which aligns with concerns voiced by several partners and heard in other WIRED projects about issues in the supply and quality of baccalaureate through post-doctoral level talent.

Desired Secondary and Community College Training Are there any classes or training programs you would like to see covered during high school years or offered by the local community college that would better prepare potential employees for employment by your company?	# Companies Mentioning
General mechanical & trades; basic electronics	25
Math & science	24
General workplace skills & ethics	22
Communication, teamwork, leadership	20
Industry-Specific technical skills	18
Computer & programming	15
Reading & writing	13
Internship coordination	7
Project management	5
Life skills	4
Consumer behavior / customer relations	3
More PhD offerings	2
Medical terminology	2
Typing	1
Retirement planning	1

Figure 20: Desired Secondary and Community College Training

Some partners provided specific commentary. What became clear was that restricting the question to the high school and community college level might not have best addressed the concerns of some employers. Some of these findings are immediately below. However, several partners provided thoughtful

observations and resulting training strategy priorities that are included in the next section rather than here.

Riverside County. In Riverside County at the community college level, three employers asked for specialized computer training in Revit architecture building design software and AutoCAD. Other types of desired computer training included web site programming, graphic design software, and Microsoft Office system software courses. Four employers requested communications classes in public speaking and business writing. Allied healthcare employers suggested medical terminology classes and an introduction to patient care.

At the high school level in Riverside, some companies would like to see more computer classes so new employees will have “more knowledge than just computer games and email.” One employer suggested that high schools provide vocational courses such as interior design, AutoCAD drafting, electronic documentation and general design, stating that vocational trade tech schools are not very effective. Also mentioned as crucial are basic workplace skills that involve teaching soft skills like workplace etiquette, how to dress for an interview, and team building. While difficult to teach a work ethic, this is clearly an issue for many of the companies surveyed. Two Riverside County employers’ comments: “Our high turnover rate is because of a poor work ethic” and “Our biggest problem is the entry-level employee’s work ethic.”

Orange County. Among Orange County employers who had highly ranked the importance of workplace skills, their desired emphasized in training is clear, particularly the high desire for leadership and personal training. However, the relatively low levels of desired training in technical skills and computer skills need to be further examined.

While technical skills and even computer skills can be relatively company specific, especially in these industries, leadership and personal training overarches almost every industry and company. Survey analysis indicates that these types of courses may be proxies for experience—in other words, grooming perhaps the executive team for the future when experienced workers are in short supply. It also speaks to the very nature of current workplaces where those experienced workers are in high demand, and therefore, every perk and benefit necessary to keep those employees vital and engaged is important, as keeping any experienced worker is vital.

In keeping with this trend toward the need for better trained employees at the middle and upper level (rather than entry level), companies primarily stated their desire was for college and university training. An even better example of this is the company that mentioned “Ethics”, a new need critical to very high functioning companies in the wake of Enron, WorldCom, and Sarbanes-Oxley.

OCWIB felt the relatively low scores for technical and computer skills training were at first puzzling. In several other portions of the survey, these were reported as both important and lacking in current

employees / jobseekers. OCWIB speculated that perhaps employers do not believe that training available in these areas is up-to-date or valuable. Conversely, these skills may be very company-specific and therefore the solution may be to utilize Employment Training Panel (ETP) funding or community college training geared very specifically to that company’s unique training needs.

San Bernardino County. San Bernardino employers stressed the need for more training in the high school setting. The needs most often stated were math and vocational classes.

San Luis Obispo County. Much of the commentary in San Luis Obispo centered on postsecondary education. Several San Luis Obispo companies utilize Cal Poly graduates for their technical resource, while others believe that the lack of a doctorate program makes Cal Poly graduates unqualified for their higher technical occupations. A few companies expressed their desire to improve the masters program at Cal Poly or create a PhD program there (though as a California State University, it will be difficult to implement a PhD program at Cal Poly). It was suggested that improvements to the engineering programs could include more business experience (e.g., business writing, business presentation) for technology students.

At the community college and high school levels, some companies would like to see more computer training courses implemented, specific to their industry, such as robotics and ladder logic controller training. Some respondents felt secondary education is failing to offer technical courses such as drafting, woodworking, and metal shop, and that early experiences with these skills would help groom future employees to be more “hands on.” This would also integrate well with Cal Poly’s “learn by doing” approach to education. Lastly, it was suggested by one company that high school science should be made more interesting, to guide students towards the sciences and technology fields in college.

Other Comments

Respondents were asked to make any further comments. Forty-three companies chose to comment. These comments helped to elucidate some of the overall findings. We have included a selected few here.

Figure 21: Selected Concluding Respondent Comments

Selected Concluding Comments by Respondents
Are there any further comments you would like to make?
Company hires high school graduates and trains them. High turnover rate because of poor work ethic.
Engineers and architects need technical skills as a foundation, but liberal arts education is also very important. Most new hires are loners - lack ability to work in a team. Global focus is crucial - project teams have members all over the world. If an employee doesn't work out, it is because of social skills, not technical skills. New hires typically don't have time management skills. State colleges prepare students with practical skills versus the more "prestige" colleges.
Company offers extensive in-house training and other continuing education. Company has offered job shadowing to high school and community college students to encourage careers in engineering.
Would like high schools to provide vocational courses, such as Interior Design, AutoCAD drafting, electronic

documentation and general design. Vocational trade techs are not very effective.
New employees typically do not meet expectations - most take awhile to adapt to fast work pace. 90% of tech job is computer work (must have computer skills). Entry-level CRT's need more confidence - they still expect an instructor to make the final decision.
Company hires high school graduates for installers. Basic computer skills are sorely lacking - only know games and e-mail. Biggest problem is work ethic. Entry level employees don't want to put in a full day's work. Teamwork and customer service skills are lacking.
Critical shortage of professionals is at the middle manager level. There are plenty of entry-level candidates and very experienced high-level executives, but not mid-level employees. Entry-level employees must be teachable. The college degree is just the beginning and knowledge is acquired on-the-job.
Local schools need more advanced degrees
Need more engineering students with strong math skills
More bilingual employees that have right to work in US
We have a very small pool to draw from for these type of workers. We hire good technical professionals by jumping on them even without an opening. Housing is too expensive for technical positions, so the labor pool is small. Not a good pool to draw from.
I think the technical capabilities are strong with incoming employees, but the largest thing lacking is the communication skills/attitudes of current graduating technical students. Nowadays students have an entitlement attitude and communication skills are not good.
Cal Poly has proved to be an excellent source of technical talent, from interns to new hires. We rarely transfer people into this area.
Very difficult to find employees, we use Monster.com, Career Builder, Craig's List and LA Times
There are great opportunities in the future for life science majors at bachelor, master, and doctoral levels. This includes positions in grant administration for MBA candidates, research administrators and computer programmers.
Due to the high cost of living in this area (combined with high gas price), the lack of public transportation has paralyzed the company. They are unable to get vital workers, like engineers, to come work at their company. Something is highly needed to bring the workforce to their location.
I find it very hard to find people to fill our company needs. I feel that people lack common sense, work ethic and just basic customer service skills. Manner skills and professional manner are becoming harder to find in people as well.
Practical life lessons/skills need to be thought. Social and communication skills. Support opinion effectively. Team building. Ability to ask the right questions.
Manufacturing jobs and machinery should be emphasized and valued more in school- more available.
The company has been able to hire great people who are displaced from existing manufacturers. Housing prices and increasing commute costs are perceived as the most serious threats to workforce availability.
Finding hard working people with appropriate language and teamwork skills is difficult at the salaries required in order to maintain company profitability.
[Company] Hire[s] from military Also, Security clearance imp.; youth need to watch behavior
Extremely disappointed in lack of English comprehension from high school all the way through college grad. Also lack of practical experience in college grads. Also experiencing problems with basic bus. success skills even among the degreed, such as coming to work on time, work ethic, honesty, reliability. Encounters attitude of entitlement.

Recommendations for Moving Forward: Regional Training Resources and Strategies

The partners were asked to comment on regional training resources and recommend strategies for training investments. They produced a range of recommendations:

Recommendation 1. Improve on-the-job training (OJT) opportunities.

- Expand WIB OJT.
- Expand WIB relationships with the Building Trades Apprenticeship program and similar.
- Develop a more formalized internship or practical training program between employers and educational institutions to deal with workplace fundamentals.
- Make better use of Employer Training Panel funds to create tailored curricula for employer training needs for hands-on-experience, especially in light of reduced federal funding for OJT programs. Extend the reach of ETP through marketing and outreach, and use survey results to create curricula that better meet needs of innovation companies.
- Look at the Building Industry Technology Academy and High School Inc. models in Orange County for potentially expandable and replicable models for cluster-relevant education involving project-based learning, internships, and partnerships with business.
- Enlist the assistance of the California Department of Education to support community-based efforts, establishing a platform for programs designed to reduce dropout rates via cooperative education/training programs and apprenticeships.

Recommendation 2. Expand business-education collaboration for curricula and training programs and outreach.

- Apply a cluster approach to key industry-specific training partnerships, such as Orange County's Healthcare Collaborative and the C3 project (Computer Cluster Collaborative).
- Use further in-depth study and/or regional advisory boards to expand collaboration between community colleges, university extensions, and businesses that creates classes and certificate programs most valuable for supporting innovation cluster growth.
- Better utilize or expand community college curricula for basic courses in occupational knowledge (computer skills, communications, math, English, science) and the types of comprehensive workplace skills requested by respondents. This could be reviewed with top employers for feedback, followed by a comprehensive marketing and community outreach program to ensure saturation and implementation.
- Explore expanding WIB roles to work with employers on succession planning and talent optimization.

Recommendation 3. Improve business, educator, student, employee, and parent understanding of training resources and employment prospects.

- Create a comprehensive training resource guide with offerings and prerequisites for employers and employees, utilizing a task force or community advisory councils that integrate information from key stakeholders, including business owners, residents, educators, and skills trainers. The guide would outline the sequence from basic requirements through each step of the certification or degree process. The first step would be to focus on engineering and technical programs, and then develop for other key vertical markets such as healthcare.
- Familiarize educators with industry growth trends to promote student interest in growth industries; use community forums with parents to spread the word on employment opportunities and related educational requirements.

Recommendation 4. Be aware of and responsive to generational issues and the difference between teachable practical skills and skills related to individual character.

- Employ different training strategies for skills and attributes. LAEDC made an extremely important distinction between practical skills that can be taught and skills closely related to personal attributes, qualities and abilities—such as creativity, integrity, reliability, and accountability. Both are important, but they likely need to be addressed differently.
- Address character issues at the K-12 level. Some respondents and partners strongly noted generational issues in the workforce that related to problems with younger workers and issues of personal character described above. More needs to be done at the K-12 level to address these types of character and attribute issues.
- Develop a suite of cluster-specific workplace skills training units.

Recommendation 5. Mobilize leaders.

- Work closely with and mobilize county, state, and national elected officials to understand and spread the word about issues and effective resources available, and to promote funding of education-to-work programs. The WIBs can and should play a central role in doing so as described immediately below.

Recommendation 6. Expand the role of Workforce Investment Boards to drive transformational change.²⁹

- Orange County persuasively asserts that Workforce Investment Boards are well-positioned to seize the opportunity to convene and advocate transformational change that drives integration of workforce development and economic development:
 - Industry and labor representatives on the WIB are able to provide access to leaders within their communities.

²⁹ Adapted from Scholl, Connie. Orange County Workforce Investment Board. 2008. Monograph: Workforce Transformational Opportunities. And from McKinney, Malia. Greater Antelope Valley Economic Alliance. 2008. Monograph: Strategic Collaboration with Antelope Valley Stakeholders to Develop and Implement WIRED 3.1 Initiatives.

- Education representatives on the WIB are able to provide continuous input from the entire education/training lattice.
 - Community representatives can bring channels of access for the WIB to local community circles.
 - Board members bring individual relational networks to the board.
- WIBs should take on two transformational roles: advocate and inform support in the Legislature to grow regional economies, and act as a neutral, trusted convener of stakeholders.
- WIB members can bring industry, education, labor, and community leaders to the same table, to build cluster-based stakeholder groups that will drive demand-side workforce development policies and strategies, including:
 - Assessing and determining the root cause(s) of labor market issues, shortages, or disconnects
 - Developing strategies to leverage, increase, and build capacities of the regional education/training infrastructure, both to meet an immediate need, and to plan for meeting future needs
 - Monitoring and responding to changing expectations in the community
 - Addressing workforce support (e.g., adequate transportation across the labor-shed, affordable housing at every income range, access to healthcare for workers and their families)
- The WIRED 1.1 Innovation-driven Economic Development Model provides approaches and tools to convene and drive such transformational change.
- GAVEA has already embarked on such an initiative, and has made important progress that can serve as a case study. They have already convened a process, established task forces, identified initiatives, and recruited community leaders as initiative champions. See Appendix F for a description of their work.

Recommendation 7. Work across jurisdictions for identified super-clusters.³⁰

- Orange County also argues for collaborative work on "super-clusters:" a cluster that reaches across a major economic region like the California Innovation Corridor. Investment in a super-cluster's economic and workforce assets promulgates benefits, leverages resources, and lowers the risks of investments across the entire region.
- An example of such a super-cluster is transportation and logistics. In Southern California, this cluster stretches from the ports of Los Angeles and Long Beach, across the intermediary support regions of Orange County and Riverside, and onward to the rest of the Inland Empire, before transshipment with the rest of the United States. A similar network exists in Northern California, and these transportation networks in Southern and Northern California are interlinked. For every ten jobs created in the Corridor alone in this super-cluster, 18 are created in other supporting

³⁰ Adapted from Scholl, Connie. Orange County Workforce Investment Board. 2008. Monograph: Beyond the Workforce Investment Area Borders. See Appendix E.

industries, with average wages above \$49,000/year. This cluster offers one of the top wages in the Corridor, and presents significant career opportunities for workers without college degrees. To continue supporting the growth of this industry, critical resources must be maintained: infrastructure upon which the goods travel, availability of business development resources for smaller companies to grow within the industry and hire new workers, and skilled workers must be available on every rung of the career ladder.

- As a result, super-clusters require special prioritization and cross-jurisdictional work. To maintain the critical resources, significant investments must be made in economic and workforce investment dollars, time, and human ingenuity. Significant investments naturally bring risk commensurate with benefit. By spreading the investments across jurisdictions, so that all economic development, educational, and workforce investment stakeholders take ownership in supporting the super-cluster, risks are reduced and benefits are shared, and more people can work in more businesses that all contribute to the larger region's economic health.

Jurisdiction-Specific Comments

More detailed commentary from various partners is included below and in the full reports included in the appendices.

GAVEA. The Greater Antelope Valley Economic Alliance stated, "Greater cooperation and synergies are required between employers and educational stakeholders to develop and modify curricula to anticipate future needs and meet present needs." When GAVEA first prepared their narrative, they noted there were some provisions for local follow-up to enhance the dialogue between the stakeholders, but they found the Antelope Valley region lacked an oversight function from which to build future initiatives. Since then, GAVEA embarked on an effort to lead transformational change, and this is described in detail in Appendix F. Additional comments from GAVEA are below.

Engineering. Because this survey targeted innovative/high-tech companies, the Antelope Valley emphasis was clearly engineering, and the predominant hiring need was employees with engineering degrees. The greater Antelope Valley region does not currently have a local college offering a four-year engineering degree. There are out-of-the-area colleges including Purdue, Cal State Fresno, Pepperdine and DeVry, which either offer or plan to offer specific engineering courses or certifications.

Based on stakeholder feedback regarding advanced degrees, a main problem facing both employers and degree-granting institutions is the communication gap between them. Several educational stakeholders such as Purdue are willing and able to provide customized, project-specific training and certification for individual companies and work groups. As Purdue notes, however, there has not been evidence of sufficient interest or demand to make their offering in this region viable.

This may be due to an information gap. It is difficult to get timely information about available courses to individual department managers who are directly involved with the specific required technical training and certification. When training needs are dictated by specific projects, there is not sufficient lead time to design and implement appropriate training courses. The traditional channel for interaction is the human resources department, but this does not work well for a variety of reasons noted in GAVEA's report.

GAVEA recommended creating a comprehensive resource guide for employers and potential employees, which was noted in the overall recommendations.

Hands-on Experience. Even with the desired educational experience, many responding companies report that lack of practical, hands-on experience is a problem with the current work forces. For this reason, some companies strongly prefer to hire individuals with previous military experience who possess practical experience, self-discipline and a positive work ethic.

Several companies state the importance of internship programs to introduce prospective employees to workplace fundamentals. A challenge with this recommendation is that internship programs require extensive time commitments and offer more of a long-term benefit for the company, as opposed to an immediate one. Some companies even go so far as to advocate that an on-the-job type of internship should be *required* in order to graduate with a certification or degree.

Basic Skills. Antelope Valley College has a highly respected curriculum offering basic courses in business, computer skills, communications, math, English and science, as well as practical vocational courses.

Soft Skills. Antelope Valley College has developed and is promoting a comprehensive workplace skills training course, in response to feedback from all types of businesses, including innovators as well as service-related businesses. The program is affordable and highly flexible and can be adapted for specific companies or groups of companies. This program should be reviewed with top employers for feedback, followed by a comprehensive marketing and community outreach program to ensure saturation and implementation.

Kern EDC. Kern found that the areas of concern were similar across their diverse respondent pool. They found that lack of customer service, communication and computer skills continue to plague area businesses and that insufficient English language skills are a deterrent to hiring labor. More specifically, KEDC found that rapid energy industry growth nationally and in Kern County means that the sector's companies cannot find enough skilled labor to fill key positions in oil, gas, wind, and solar growth sectors. "The most common complaint is that there are not enough prospects that understand electricity, earth sciences or math," KEDC reports. There are currently training programs available at Cerro Coso College (Ridgecrest) and Taft College that provide specific energy industry training; however, they are not producing graduates at a fast enough rate to fill vacant positions.

Engineering. KEDC finds that engineering skills are in demand and will remain so, along with shortages of qualified engineers in the oil and gas industry, forcing employers to recruit applicants from outside the area. Improvement in the supply of mechanical engineers was specifically mentioned. California State University, Bakersfield, does not offer an engineering program, so companies must go to Fresno or out-of-state to find engineers possessing a bachelor or higher degree.

Basic Skills. Kern reported that their businesses have difficulty finding candidates with a firm grasp of English, particularly for agricultural employers. The Bakersfield Adult School (BAS) offers evening ESL classes; it is unknown if there is lack of enrollment in the program or lack of capacity.

Soft Skills. As reported by many partners, customer service and other soft skills are a primary source of concern. KEDC reports, "One company commented that both high school and college students no longer possess customer service or office skills upon graduation. Local business will spend training dollars sending employees to classes in an effort to improve upon these skills."

City of Los Angeles. LAEDC also provided extensive commentary on specific technical training and other skills.

Traditionally, companies use the employee benefit of tuition reimbursement to encourage employee education and help attract and retain self-motivated employees. In contrast with very general tuition reimbursement programs, companies could retool these programs to address specific needs. If they do not already do so, employers could offer credits on annual performance reviews for successfully completing selected courses that are directly relevant to advancement within the organization.

Engineering and Technical Training. Within Los Angeles, 55% of the respondents have engineering-related, scientific or technical core critical occupations. There is a wide variety of choices for obtaining advanced degrees in engineering as well as technical certification, both within the City of Los Angeles and Los Angeles County. One of the key issues for success is ensuring that the educational providers stay in tune with the changing needs of the area innovators so that programs do not become outdated or irrelevant. This can be secured through continuous dialogue between companies and those educational institutions that develop the technology-related curricula.

Basic Training. Nearly all of the companies surveyed identified the need for strengthening basic skills training in the areas of communication (written and verbal), math, and science. Although most professionals believe in the value of mastering basic skills, there is evidence of a growing generational disconnect among members of the younger generation of people entering the workforce as far as the perceived relevance of these skills. One of the challenges our educators face, in addition to ensuring the quality and accessibility of basic skills education, is conveying the relevance of these subjects as they relate to lifestyle and material success.

Soft Skills Training. Based on LA survey results, “soft skills” fall into two categories: practical skills, such as problem solving, communication and teamwork, which can be taught, and items which are more closely related to personal attributes, qualities and abilities. These attributes, such as creativity, integrity, reliability and accountability, are harder to teach. The LAEDC report discusses training needs at greater length and concludes that “an unprecedented, concerted effort and multifaceted approach” is needed

Hands-on Experience. Many LA employers are reporting that prospective employees lack the overall job knowledge and the practical foundation required to effectively learn on-the-job, despite possessing a college degree or technical certification. In general, companies do not have sufficient in-house training programs, and on-the-job (OJT) training programs through the LA County WIB have experienced a sharp decline in federal funding. Because of a lack of funding, many companies no longer consider OJT as a viable strategy for employee development and attraction. LAEDC points out that greater use of the state-funded Employer Training Panel (ETP) program would allow companies to work with a consultant or educational institution to create a tailored curriculum for their training needs, while the state pays for a portion of the training.

Overall Strategies. LA suggests extending the reach of ETP through cross-promotion to expand awareness and outreach of programs and funding opportunities. Survey results could be used to help create curricula that would meet the needs of innovative companies within industry clusters and geographic regions, which could be replicated and extended throughout the Innovation Corridor. LA also suggests that companies work with local educational stakeholders to expand practical internships though it recognizes the requisite investment of time, resources, and top-down commitment to long-term workforce development.

Orange County. Based upon the survey and documented by extensive OCWIB and OCBC workforce research in Orange County, the skills needed in innovation businesses are constantly evolving upwards in terms of both technical and computer skills.

Technical and Computer Training. The majority of the companies reported that they must use a combination of “on the job” and “outside” training (seminars, course reimbursement) as their means for keeping their employees current with technology and workplace skills. For technical skills and computer skills that are very company specific, Orange County concurs with LA that the solution may be to utilize Employment Training Panel (ETP) funding or community college resources to address customized needs. For technical skills and cluster-specific education at the K-12 level, programs such as BITA (Building Industry Technology Academy) and High School Inc. in Santa Ana appear promising. Cluster-relevant education involving project-based learning, internships, and partnerships with business are the only way to make the workforce and economic base sustainable in the modern environment.

Soft Skills. A new finding is the increased importance of workplace skills, including project management, time management, team building, leadership, and ethics. Sector-specific courses in these areas would be an excellent addition to Orange County's education and workforce training system.

Hands-on Experience. The trend toward project-based learning is starting to take root in some charter and magnet schools, but for the incumbent workforce and retraining of jobseekers, these kinds of courses could easily be developed by the County's four community college districts or university extension programs through the University of California, Irvine; California State University, Fullerton; and Chapman University. University extensions are particularly suited to this type of training due to a greater degree of flexibility and agility in curricula development.

Overall Strategies. Experienced workers cannot just be "created"; however, the OCWIB and partners can continue to play a key role in a couple of ways—the simplest of which is being a matchmaker between employers and employees. This report will help further refine skills training and workforce development policies on the WIB level to meet local need in combination with the cluster concept and the Demand Occupation List information provided by LMID. OCWIB and OCBC are jointly revising and updating the Orange County clusters, and results from the survey will be incorporated into this decision making process.

OCWIB also details various components of cluster-specific training and retraining programs they are considering or have expanded including Science, Technology, Engineering, and Math (STEM) programs and the Leadership and Management Program (LAMP). The OCWIB has been especially proactive in applying the cluster approach to targeted, industry-specific training partnerships, such as the Healthcare Collaborative, the C3 project (Computer Cluster Collaborative), and several other public-private partnerships that pay immediate dividends for both jobseekers and the business community. OCBC, community colleges, and university extension programs have been especially good at identifying needs of the workplace, designing relevant training programs, and providing the institutional capacity and infrastructure to see these programs to fruition.

Based upon this survey and related research projects, OCWIB is also looking at industry specific computer skills training, including in the ancillary healthcare industry collaboration, and a suite of cluster-specific workplace skills training, encompassing leadership, project and time management, communication, team building, and ethics.

Riverside County. RCEDA and RCWIB offered these comments.

Technical and Computer Training. The majority of the surveyed companies reported that they use on-the-job training as their means for keeping their employees current with technology. One employer has a mandated continuing education program, one specialty contractor uses its union for training, and one business uses certificate programs through Microsoft and Cisco Systems to maintain high technical

standards. Cal Poly Pomona; the University of California, Riverside; USC; and UCLA were specifically mentioned as resources for Riverside County's technical workforce. Riverside Community College, Mt. San Jacinto College, and College of the Desert already offer many of the computer, communications and healthcare courses requested by the companies surveyed.

Vocational and Soft Skills. Riverside County's Regional Occupation Programs offer many of the vocational classes requested. Agencies such as the Workforce Development Centers of Riverside County and the Coachella Valley Economic Partnership provide training in soft skills such as customer service, workplace etiquette, and keeping a job.

Overall Strategies. One of the top goals of Riverside County's Workforce Development Board is to link resources, people, business and education together to help form a globally competitive workforce. In support of this mission, one of the top goals of the Board is to strengthen the bridge between education and business. Two objectives include building the relationship with the Building Trades Apprenticeship program and placing more emphasis on on-the-job training. These types of programs and training will have a favorable impact in creating the ideal worker stated by Riverside County respondents. Continued collaboration between community colleges and businesses through regional Advisory Boards will help create the types of classes and certificate programs most valuable for continued employee education.

San Bernardino County. Most of the trucking companies surveyed rely upon on-the-job training rather than outside training. The engineering and research companies have tuition reimbursements for their employees as well as continuing education and training by outside trainers.

The San Bernardino County Workforce Investment Board is beginning to engage other community leaders in crafting strategies to identify and build competitive advantages within each of the major regions in the county. These strategies will capitalize on industries that already exist, help broker innovative workforce solutions between the public and private sectors, engage business in the strategies needed for long-term workforce solutions, and in general, change the paradigm in regards to business investment in employment development.

San Luis Obispo County. Specific training classes cannot be identified from this small sampling of employers, but the findings show that there may be a need for OJT contracts to fill gaps in the San Luis Obispo County workforce. A more in-depth study may need to be performed to understand the true demand for such an approach.

The majority of the companies reported that they use a combination of "on the job" and "outside" (seminars, conferences) training as their means for keeping their employees current with technology. Some companies have a mandated training program, but most do not. Systems of well-organized and managed on-the-job training and other real-world situations devised in a training setting can help develop the ideal worker. The PIC has operated programs of this nature in San Luis Obispo County, in which the

agency and the employer cooperatively negotiate OJT contracts that suit the needs of the employer, the trainee, and the training organization. Success depends on clear, common understanding of respective needs and expectations.

Cal Poly will continue to be a resource for San Luis Obispo County's technical workforce, as well as Cuesta Community College. An improved Masters program that focuses on interdisciplinary education (e.g. business, other engineering and science fields) would be a valuable resource to a number of the surveyed companies.

South Bay Area of Los Angeles County. The SBEDP recommends a strategy involving regional resources working in tandem to educate local companies about resources available to them. Although this has been a cornerstone of SBEDP programs for nearly a dozen years, there need to be more coordinated efforts that bring local jurisdictions into play with information distributed with business licenses. In addition, the SBEDP recommends working with trade associations to help companies better understand the value of funded education and training programs available to association members.

The SBEDP also recommends placing greater emphasis on communication with elected officials at all levels to get their assistance leveraging resources. It is also important for leaders to carry the message to Innovation Corridor companies that assistance exists. Resulting success stories will help generate support for current programs and resources to develop others that fill existing gaps.

Regional resources should be convened to develop recommendations for educators to promote student interest in growth industries. This economic region is home to several robust knowledge-based industries that rely on well-educated and skilled workers. It is estimated that 55% or more of regional technology workers employed in manufacturing companies commute to the South Bay from throughout the Los Angeles five-county region.

It is likely that another US Department of Defense Base Realignment and Closure (BRAC) round will be forthcoming in the next few years, and the SBEDP suggests that a regional effort by the Los Angeles Air Force Base Regional Alliance include focus on workforce development. The prominence of the LA AFB in California's economy may provide regional workforce efforts an effective platform for delivering an important message across the state.

South Bay WIB also recommends reaching out to business to help them identify efficient methods to remedy skills gaps, including an understanding of training organizations and funding sources. Secondary approaches include the following recommendations:

- Advise the thirteen school districts in the region, especially career counselors, on what student minimum requirements exist for employment in high paying jobs within the community.
- Conduct community forums for parents of current students to discuss employment opportunities and the requirements for each.

- Develop community advisory councils comprised of business owners, residents, educators, and skills trainers to determine the best methods for developing curricula necessary for educating those students wishing to enter the workforce after high school.
- Enlist the assistance of the California Department of Education to support community-based efforts, establishing a platform for programs designed to reduce dropout rates via cooperative education/training programs and apprenticeships.
- Work closely with county, state and national elected officials to promote funding of education-to-work programs.

Insights From Other CIC WIRED Projects

In one way or another, all CIC WIRED projects unearthed insights that were relevant for this workforce skills analysis. It would neither be feasible nor within the scope of this report to provide a comprehensive view of these cross-cutting insights. However, six points stand out due to the commonality seen across projects or their relevance for future action to address the findings described herein.³¹

- **California faces hiring difficulties in a broad range of disciplines and a variety of educational levels.** To some extent these difficulties are due to lack of students entering certain career tracks (a problem of supply), to some extent they result from a lack of recruitment and training resources at employers (an HR problem), and still further they may be due to students dropping out of programs, making other career choices, or moving out of the state (a problem of attrition). Some employers reporting these issues comment that the problems will drive outsourcing, offshoring, or relocation decisions. This finding cuts across several projects.
- **California workers across the board need better communication skills, team skills, computer/analytical skills, and broad business skills.** This was one of the most consistent findings across WIRED projects and applied to workers at *all* occupational levels, *including* CEOs and senior executives. The economy and employers are changing, becoming more service-oriented, more globally challenged and connected, and more driven by technology demands. This is placing greater demands on both workers and executives. The Department of Labor has been developing an aerospace industry competency model, which can help conceptualize and build training programs around the hierarchy of skills needed in innovation industries.
- **Employers seek more cost-effective ways to drive experience and ongoing training.** The growth of smaller companies, tighter profitability demands, and rapid evolution of technology create an urgent training dynamic. Trends in manufacturing and R&D supply chains exacerbate

³¹ These common insights are particularly tied to work under the Innovation-Driven Economic Development Model (Project 1.1), the 21st Century Workforce (Project 1.2), Joint University Innovation Model supply chain findings (Project 1.5), and the California Aerospace Supplier Transformation Requirements (Project 2.2).

these trends by driving speed, reliance on technology, and a proliferation of a greater number of smaller, more nimble companies—companies that ironically are more resource-constrained to provide initial and ongoing training.

- **Workforce leaders, economic development officials, employers, educational institutions, and elected leaders need to align their strategies and metrics with each other and with the needs of growing innovation industries.** The Innovation-driven Economic Development Model of WIRED Project 1.1 helps to point the way and should be implemented by all jurisdictions seeking to support innovation industries.
- **A common development model should be explored for all levels of education that addresses the overarching identified needs.** The commonality of issues at the high school, associate, bachelor, and postgraduate study levels suggests the potential utility of a model that integrates industry and academic mentorship, experiential learning (with real world objectives and success metrics), and formal learning (traditional education).
- **A common state level assessment and certification program for basic fundamental technology skill competency should be explored.** One model of this is the ACT Career Readiness Certificate Program. It assesses basic mechanical, thermal, fluid and electrical knowledge, coupled with problem-solving and workplace scenarios. In addition, it is aligned with college entrance assessment, and 15 states recognize it. California is fragmented, with eight separate initiatives to address this issue.

Conclusions

This survey and partner analysis delivered insights on workforce composition, current and future skill needs, and education and training gaps among innovation industries in the seven-county region.

The various counties had differing profiles. Compared to its neighboring counties, for instance, Riverside County has a lower portion of its workforce in the professional, scientific and technical services sector. However, partners in such counties were able to reach out to growing segments such as specialty trade contractors, professional services, and ambulatory health care services. The low education level of some occupations does not necessarily mean those occupations are not critical for innovation. For instance, consider plumbers and electricians alongside the focus on green techniques in all commercial and residential construction in California and across the nation. These skilled laborers are highly paid blue-collar workers who will need to learn, apply, and refine sustainable building techniques and technologies.

To sum up this report, first we must state that the overall issues facing employers and workers in the California Innovation Corridor seem abundantly clear. We must improve basic math, writing, communication, comprehension, and computer skills and reinforce excellent work ethics to raise the

quality of the area's workforce. We must give students and parents a better, clearer view of job opportunities, requirements, and career paths to show the relevancy of education and to attract workers into critical careers. We must bring together employers and educational institutions to refine curricula, guide development of soft skills training, and develop internships and on-the-job training opportunities.

Second, we need to look creatively beyond training to address the difficulties represented by the culture of entitlement and other work ethic issues voiced as serious concerns about the workforce.

Third, global high-tech markets are intensely competitive, and the combination of globalization and demographic change is "changing the fundamental nature of employment and the workplace."³² Companies can and will source workers elsewhere, outsource, offshore, and relocate. We must demand of our leaders and ourselves a sense of urgency to develop solutions that retain the best jobs here.

Fourth, an overriding theme highlighted by OCWIB and running through many partners' survey data, is that experience is the most valuable, critical, and sought characteristic that most employers report trouble finding. While "experienced workers cannot just be "created," the recommendations span a range of opportunities, from the simple to transformational: undertake more effective matchmaking between employers and employees, increase on-the-job training, expand continuing education at community colleges, and make better use of the California Employment Training Panel. However, all activities must be well integrated with employer needs and made much more understandable, accessible, and attractive.

Finally, some jurisdictions face a broader challenge. For instance, San Bernardino County faces difficulties growing professional, scientific and technical services unless more educational facilities supply more workers in this field. Riverside County is "not perceived as dynamic enough to attract highly skilled workers." These issues go beyond workforce development to economic development.

Innovation is a chicken-and-egg game. You need innovative employers to hire innovative workers, but employers do not materialize without the workers and other fundamentals.

As OCWIB points out, a "*leitmotif* of the WIRED project is transformational change." WIRED's new Innovation-driven Economic Development Model encompasses the work needed to transform local economies for innovation industries. The model brings together many elements discussed in this report: assessment of clusters of opportunity, development of cluster strategies, mobilization and alignment of stakeholders, and realignment of success metrics with what matters.

Ultimately, WIBs and other partners in WIRED should seize the opportunity to convene and advocate transformational change, to drive the integration of workforce development with economic development, and to serve both the supply side and demand side of the labor market.



³² OCWIB.

Appendix A

SAMPLE 2007 SURVEY INSTRUMENT

WIRED 3.1 Interview Format for Employer Questionnaire

Introduction

Part One: Demographics

Name of Employer _____

Industry (NAICS): _____

Type of Business: Service _____ Manufacturing _____ Government _____ Other _____

Size of Business:

0 -4 Full-time employees or full-time equivalents (FTE) ____ 5 - 9 FTE ____ 10 - 19 FTE ____ 20 - 49 FTE ____ 50 - 99 FTE ____ 100 – 249 FTE ____ 250 – 499 FTE ____ 1000+FTE ____

Interviewee's Title/Position

Pres./CEO/Dir. ____ HR Dir. ____ Supv./Mgr. ____ Other _____

Primary Site of Business _____

Part Two: Background Description

Please indicate which one of the following descriptions best defines your role relating to employees at your company?

____ A. I directly supervise or am able to closely observe the job performance and/or work results of employees.

____ B. I periodically (at least once a month) observe the job performance or see the work results of employees.

____ C. In my position I discuss with direct supervisors, managers and/or management personnel, the job performances of employees as part of my role with the company.

____ D. OR complete the following statement. "My opinions and perceptions of the current workforce are based on

Do you have any questions or concerns before we continue?

(Note comments or observations as needed)

Part Three: Directions for Interview Questions

The purpose of this interview is to gather information about the skills required for positions at your firm and any gaps between your expectations and what is available in the current workforce.

While you are recalling recent new hires in your business, please give an evaluation of how well they meet your *performance expectations*.

Specific skills are grouped in three broad areas:

- A. Basic Skills, i.e., math, language, writing, reading
- B. Technical Skills i.e., skills specific to the occupation
- C. Social Skills, i.e., communication, coordination, team building
- D. Workplace Skills, i.e., reliability, dependability, etc.

First, I will name specific skills and ask that you discuss the skills of the new hire in terms of *performance/competency expectations*:

- 4 = Exceeding** your entry-level expectations (E)
- 3 = Meeting** your entry-level expectations (M)
- 2 = Nearly Meeting** your entry-level expectations (NM)
- 1 = Does Not Meet** your entry-level expectations (DNM)
- 0 = Does not apply (NA)**

Secondly, I will ask you to rate how *important* each attribute is for employees you will hire in the future. Please rate each attribute using one of the following, which best applies.

- A. 4 = Very Important** in future entry level employees (VI)
- B. 3 = Important** (I)
- C. 2 = Somewhat Important** (SI)
- D. 1 = Not Important** (NI)

You are encouraged to briefly elaborate on your response with any specific examples related to a particular occupation.

Part Four: Interview Questions

Critical Occupations and their Basic Skills

1. What are some of the core critical occupations that drive your company or make your company able to perform?

- 1.a. For each occupation, what are the most critical skills of these occupations?

For each critical occupation, please answer the following:

How *important* is it that employees meet your expectations in those skills when hired?

Rating_____

2. How do you rate their problem solving skills *performance/competency*?

Rating_____

Please rate the *importance* of problem-solving skills for future entry-level employees?

Rating_____

3. How would you rate typical new-hire *performance/competency* in workplace skills such as; judgment and decision making, management of resources and time management?

Rating_____

How *important* will these skills be for future employees?

Rating_____

Technical Skills

4. In your company, how well does the new employee typically meet *performance/competency* expectations set for entry-level workers in terms of technical knowledge related to the job s/he will perform?

Rating_____

5. Please rate the future *importance* of occupational knowledge for employees

Rating_____

6. In the area of technical skills, how *important* will it be for entry-level employees to be adept in the use/operation of equipment, tools, materials, software, information systems, or more than one specific technology when hired?

Rating _____

7. What is the *importance* of these skills and/or abilities for future entry-level employees?

Rating _____

8. In terms of specific computer skills such as using spreadsheets, databases, word processing, graphics, Internet or giving presentations, etc., how well does the new hire meet entry-level *performance* expectations?

Rating _____

9. How would you rate the *importance* of information technology use and management for future entry-level employees?

Rating _____

10. Do you look for any other skills that are among your entry-level expectations for present and future employees which I have not mentioned? Please discuss them.

Social Skills

11. In the area of social skills, how well does the employee meet entry level *performance* expectations for team-work, coordination, instructing, relationship-building, cross-cultural understanding, negotiation, persuasion, etc.?

Rating _____

What level of future *importance* will social skills have for your entry level employees?

Rating _____

12. Are there any social skills not mentioned which you include in entry level expectations, now, or will in the future? Please discuss.

13. In demonstrating good work ethics (initiative, dependability, reliability), how well does the employee meet entry-level expectations?

Rating _____

13.b In terms of technical abilities and organizational fit, please identify the characteristics, which best describe your most effective, reliable technical employees for each critical occupation:

Overall Perception of today's workforce

14. In general, how satisfied are you with the education of today's worker?

Entry level:

4 = Very satisfied _____ 3 = Satisfied _____ 2 = Unsatisfied _____ 1 = Very Unsatisfied _____

Technical:

4 = Very satisfied _____ 3 = Satisfied _____ 2 = Unsatisfied _____ 1 = Very Unsatisfied _____

Professional

4 = Very satisfied ____ 3 = Satisfied ____ 2 = Unsatisfied ____ 1 = Very Unsatisfied ____

We appreciate the time you have taken to share your perceptions. We value your feedback. There are a few final questions that I would like to ask regarding the labor pool from which you have to choose future employees.

15. Is there a critical skills shortage, if so, is it more at the:

1. Technician level
2. Professional Level

16. Are there any new skills sets that may be required of future workers in this industry?

17. Are there any classes or training programs you would like to see covered during high school years or offered by the local community college that would better prepare potential employees for employment by your company?

18. What types of companies are involved in your supply chain?

19. Are there any further comments you would like to make?

Date _____

Location of Interview _____

Person conducting Interview _____

Duration of Interview _____

Recording Interview Responses

Part One: Demographics

Check response given or record information given under "other".

Part Two: Background description

Check response given or record information given "Complete this statement..."

Part Three: Directions for interview

Please note any need for clarification or concerns expressed.

Part Four: Interview Questions

Suggested abbreviations for ratings:

4 = EX = Exceeds expectations	4= VI=Very Important
3 = M = Meets expectations	3 = I = Important

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2 = NM = Nearly meets expectations	2 = SI = Somewhat Important
1 = DNM = Does not meet expectations	1 = NI = Not Important
0 = NA = Does not apply	

Please transcribe your notes of lengthy responses, with appropriate interview question numbers.

Appendix B

Sample 2006 Survey Instrument

CSA/WIRED 3.1 - Employer Survey Questionnaire 2006

Purpose: As a partner of the California Space Authority WIRED program, I am *[name]* representing the *[partner]* and I am contacting aerospace related businesses in the area to ask a few questions about your company as a member of the industry. Specifically, I would greatly appreciate having 10 – 15 minutes of your time to inquire as to the top occupations within your company and their relative prospects for evolution they may experience in the future.

Your responses to this survey will provide the California Space Authority with a regional snapshot of the future workforce and the types of experience and training needed that may help you secure future employees.

The survey has been commissioned by the California Space Authority WIRED program, which is committed to developing the space corridor's workforce in thirteen CA counties. The survey is being conducted by the Private Industry Council, the solution to your local business and workforce development needs.

Definition of an Aerospace Company: The aerospace industry cluster includes companies that produce products and systems for commercial, military and space applications. This industry cluster includes companies that manufacture guided missiles and space vehicles, satellite telecommunications and search detection instruments. The aerospace industry also produces planetary spacecraft, space launch systems, ground systems, antennas, satellites and electro-optic instruments.

Questions 1 – 6 are a loop to be repeated for each of the occupations.

Occupation - Related Questions

1. What are your top aerospace related occupations you consider critical to your business operations?

- A. Occupation 1 - _____ NAICS/SOC # _____
- B. Occupation 2 - _____ NAICS/SOC # _____
- C. Occupation 3 - _____ NAICS/SOC # _____
- D. Occupation 4 - _____ NAICS/SOC # _____
- E. Occupation 5 - _____ NAICS/SOC # _____

2. How many individuals are currently employed in each occupation?

- A. Occupation 1 - # of employees - _____
- B. Occupation 2 - # of employees - _____
- C. Occupation 3 - # of employees - _____
- D. Occupation 4 - # of employees - _____
- E. Occupation 5 - # of employees - _____

3. What is the **typical** education-level required within each occupation?

- Completion of high school or equivalency = 1
- Certification or Associates Degree = 2
- Bachelor's Degree (B.A., B.S.) = 3
- Professional or Graduate Degree

(M.S, Ph.D., J.D., MBA, P.E.) = 4
 Combination = 5

Education Requirements 1 2 3 4 5					
A. Occupation 1	1	2	3	4	5
B. Occupation 2	1	2	3	4	5
C. Occupation 3	1	2	3	4	5
D. Occupation 4	1	2	3	4	5
E. Occupation 5	1	2	3	4	5

List as appropriate:

Certificate _____
 Degrees _____

4. What are the **typical** levels of “on the job” work experience within each occupation?

- < (less than) 2 years of work experience in the specific occupation = 1
- < 2 years of work experience in a related occupation = 2
- > (more than) 2 years of work experience in the specific occupation = 3
- > 2 years of work experience in a related occupation = 4

Work Experience 1 2 3 4				
A. Occupation 1	1	2	3	4
B. Occupation 2	1	2	3	4
C. Occupation 3	1	2	3	4
D. Occupation 4	1	2	3	4
E. Occupation 5	1	2	3	4

5. Which of these skills are **most important** when considering applicants?

- A. Technical competence specific to the position = 1
- B. Interpersonal communication skills = 2
- C. Written communication skills = 3
- D. Ability to work independently = 4
- E. Ability to follow directions = 5
- F. Creative problem-solving skills = 6

Important Skills 1 2 3 4 5 6						
A. Occupation 1	1	2	3	4	5	6
B. Occupation 2	1	2	3	4	5	6
C. Occupation 3	1	2	3	4	5	6
D. Occupation 4	1	2	3	4	5	6
E. Occupation 5	1	2	3	4	5	6

6. What is the typical annual pay range for each occupation, from entry level to most experienced employees in that occupation?

- A. Entry level = 1
- B. Some Experience = 2
- C. Top level experience = 3

Annual Pay Range 1 2 3			
A. Occupation 1	1 \$ _____	2 \$ _____	3 \$ _____
B. Occupation 2	1 \$ _____	2 \$ _____	3 \$ _____
C. Occupation 3	1 \$ _____	2 \$ _____	3 \$ _____
D. Occupation 4	1 \$ _____	2 \$ _____	3 \$ _____
E. Occupation 5	1 \$ _____	2 \$ _____	3 \$ _____

Questions 7-10 are open ended questions related to future growth.

- 7. Based upon your experience in the industry, how would you forecast the future growth of these occupations?
- 8. How do you envision these skills evolving?
- 9. As changes will inevitably occur in the industry, where or how do you foresee your employees continuing their education and adaptability to the future?
- 10. Does your business and/or your employees belong to any professional/trade or business associations?

List as appropriate:

11. How familiar are you with the partner name and their complementary services?

In closing; please verify your company Information.

- 12. Company name: _____
- 13. Company address: _____
- 14. City: _____
- 15. Zip: _____
- 16. Web address: _____
- 17. Fax number: _____

Appendix C

Selected Consolidated Verbatim Responses to Open-Ended Questions

13b. In terms of technical abilities and organizational fit, please identify the characteristics, which best describe your most effective, reliable technical employees for each critical occupation:

Selected responses

- Strong technical knowledge because customer is getting more technical
- Problem solver, independent worker
- Technical is very important, as well as problem solving skills
- Top 5% technically, willing to learn other disciplines
- Interpersonal communication skills
- Independent, can do attitude, able to solve problems
- Willingness to work hard
- All engineers need the best technical knowledge and the ability to solve problems
- Our business needs creative problem solvers
- Nice personality, equipment knowledge, safety knowledge
- Good driver, good physical health
- Good communication skills, able to locate problems and diagnose the cause.
- Initiative, ability to learn, leadership, English
- Competent, good attitude, motivated
- Computer literate, able to work independently with minimal supervision
- Work independently, manage more than one task at a time
- Able to multi-task
- Leadership skills, accurate, self motivated
- Flexibility, think on their feet, make quick decisions
- Good work ethics always learning, is a problem solver, looks for ways to better themselves and company
- Dependable, responsible contributor with commitment to excellence
- Values the end product of their work
- Passion for knowledge, attention to detail
- Initiative, ethical, problem-solver, good communication skills, team-player, negotiator, reliable, food analytical skills
- Precision is key in the success of working in a laboratory setting where clinical trials research is conducted. Attention to detail ability to document/record work and findings
- Confidence in solving problems cost effectively. This is true for both operations and support staff
- Research & Development, technical competencies in biology and chemist, teamwork
- Easily adaptable to proprietary systems, good w/information-tech. Train specific job knowledge, so good employees are mostly professional, not necessarily technical
- Communication, soft-skills and ability to work with others
- Professional competence and activity; Excellence in ability to contribute to administrative and academic activities such as research, education, and teaching, at JWCI and in public service and fundraising
- Application of education. Dealing w/construction, design, so there's environmental liabilities
- On-time, able to read and stick to schedules and maps, both electronic and paper, able to communicate professionally in front of client
- Collaborative, cooperative, open to other's views, able to take constructive criticism, open to mentoring, time management skills, able to convey ideas, self-initiative

- Good quality control skills, able to read drawings
- Broad knowledge of commercial construction, trained in design theory, produce technical documents with software, open-minded, team spirit, willing to learn
- Understand technical fundamentals
- Two+ years of experience; show initiative without supervisor onsite
- Good education (BA or BS in planning), ability to grow and apply theory learned in college

15. Is there a critical skills shortage, if so, is it more at the Professional Level or Technical Level?

Selected responses

- Professional Level: pay scales are not in line with larger metro areas
- We recruit nationally and therefore compete nationally to attract best candidates
- I think the technicals are continuing to be taught in school at the technical capabilities are strong.
- Just not enough people going into the field
- Conceptualization and design skills are still not adequately covered in most undergraduate engineering degree programs.
- We don't employ what is considered to be professionals so the shortage is in the Technical level
- Professional. More difficult to find engineers with the right background who are eligible for high level clearances
- Professional. Drivers need to be trained on how to communicate with others, behave properly in the workplace as well as on the road, these two skills don't seem to be inherent in today's employees despite years of experience in the position.
- Riverside County is not perceived as dynamic enough for most graduates in architecture, so there is a critical skills shortage at the technical and professional level
- Critical shortage of professionals at the middle manager level. There are plenty of entry-level candidates and plenty of high-level executives, but not many mid-level employees, which is a concern.

16. Are there any new skills sets that may be required of future workers in this industry?

Selected responses

- Willingness to learn technology
- Independent working and creative problem solving
- Chemists interacting with Biologists, interdisciplinary studies
- The best Cal Poly Grads (top 5%-15%) in Computer Science and software engineering are just fine. We could use more that are willing to settle down permanently in SLO County; also more interdisciplinary work
- Robotic Systems, programming of automated or robotic systems; more diversification in jobs, crossover, interpersonal communication skills becoming more important
- Systems integration, multi-disciplinary impacts on each other
- Teamwork skills in a technical environment could be increased. More aerospace vs. aeronautical
- More social skills, better writing and oral communication ability; more technology, more CAD, more design with Engineering Systems
- More computer intelligence development skills
- Math skills without depending on technology to do it
- Programming skills, mechanical aptitude, technical math
- Artistry and imagination
- Project management
- Basic human skill set, gaining trust by keeping promises, good follow through, reliable
- Courses in social soft-skills, good business practices and moral ethics, integrity

- RFID technology, and oddly - regulatory affairs working skills - FDA is expecting that all technical persons have a good knowledge - something new which used to be more isolated to QA and RA types
- Information Technology
- Broader background. Insurance, legal
- More green knowledge. Environmental trend knowledge. Insurance, litigation
- Writing and communication
- Basic programming (Filemaker Pro)
- Understanding of personalized medicine
- Web Advertising Knowledge
- Ability to adapt to software changes. *Revit* will be the new software standard for architects, replacing AutoCAD
- Program CNC (Computer Numerical Control) machinery (at this time the company outsources programming function)
- More computer skills will be required because of the paperless environment
- Adapt to merging technologies (phones, CCTB surveillance systems)
- Willing to participate in 24 hours of continuing education every two years
- Three-dimensional visioning/modeling, easily adapt to new technology, software
- Adapt to constantly changing technology
- Keep up with new laws, growth of green building and green technology, adapt to changing computer technology

17. Are there any classes or training programs you would like to see covered during high school years or offered by the local community college that would better prepare potential employees for employment by your company?

Selected responses

- Computer equipment
- Make science more fun in high school so more students are interested in entering the field in college
- PhD program at Cal Poly
- Drafting and Metal/Woodworking
- Business writing, executive summary, analysis, conclusion, and oral presentation
- More resources need to be put into Graduate Program at Cal Poly
- High School Geometry, Blue Print reading
- Business Software Applications
- Courses on not just training employees in one skill set but training on multiple skills but not at a specialized level so that an employee can be flexible and be work in different departments.
- Soft skills such as work ethics
- More Vocational classes in HS for students who are not going to attend college
- Need more science and math curriculum in the K-12 grades
- Coordinate Measure Machine Programming skills
- Project Management
- Math, physics, and chemistry
- Long term project managing
- Professionalism, collaboration, team & task management
- Perhaps more opportunities for students as interns during summer. They might benefit greatly in deciding on their career as well as becoming a responsible/reliable employees.
- Machine shop, CNC Programming
- Start earlier than High School level. Social and communication skills. Moral Ethics, integrity accountability and reliability training

- Every student should have a better grounding in basic anatomy. We deal with Biomaterials and tissues, and it would help communicate what we do better. Added benefit: a deeper understanding of family and personal medical issues
- Common sense type of training; desire to work (weak work ethic); interpersonal skills; writing and discussion skills - especially writing; valuable 'life skills' (e.g., balance a checkbook, learn how to cook, fix a flat tire on a car).
- Social skills, professional, social skills. What is appropriate and not.
- Machine shop
- Machining, engineering, manufacturing process (blue print reading/drawing, math skills)
- Trade skills - auto, welding
- Public speaking and communication
- Mostly in B.A. is where importance lies. Writing has improved.
- More critical writing programs. New grads have poor writing skills.
- More focus on skilled trades such as plumbers and electricians
- If there is a class on how to prepare a worker to conduct themselves when in a work setting, sex harassment for truck drivers. A course that they can take seriously, that would prevent some problems in the future.
- Teaching team approach to solve problems
- More legal secretary and bookkeeper training
- Focus in expanding Biology and Chemistry Science Programs to include: Immunohistochemistry and Molecular Diagnostics
- Most of our entry hires for sales are coming straight out of undergraduate communications, advertising or marketing programs and are getting academic exposure for the industry.
- Teach social skills and effective communication skills
- Teach Revit (versus AutoCAD) and BIM (Building Information Modeling)
- Offer basic training on programming CNC machines
- Soft skills training (such as workplace etiquette and how to dress for an interview)
- Incorporate team building, group project work and leadership training into coursework
- Basic introduction to medical terminology and patient care
- General design class or design courses specifically for architecture and training in CAD drafting and graphics programs
- High school – basic customer service skills and how to be a team player. College – medical terminology
- Courses in writing and public speaking, ethics and fundamental business skills
- Web site design classes at community college and university level
- X-ray technology courses
- Carpentry courses
- Offer only Registered Dental Assistant training (not just basic training)
- Extensive training in Microsoft programs (Excel, Access, Word), teach social skills, good work ethic, communications skills

18. What types of companies are involved in your supply chain?

- Plastics, metal fabrication
- Manufacturing companies
- Industrial coatings (anodized, plating, etc), raw materials, machining
- Electronics manufacturers, composite material suppliers
- Hobby supply manufacturers, battery suppliers, composite manufacturers, general hardware supplier, ie, McMaster Carr, etc.
- Top medical device companies, high tech raw material suppliers
- Most of our software products are funded by the military (DoD).
- Metal Supplier- Carbo and Stainless

Technology Workforce Issues and Opportunities
In the California Innovation Corridor
Appendices

- Food distribution freight haulers
- Manufactures, Distributors
- Large distributors, individuals
- Consumer Goods, Automotive
- Basic hardware companies, scientific companies and electronic equipment & supply co
- Hose hydraulics fittings pneumatics
- Foundations
- Restaurants, schools
- Fabric industry, paint and paint supply industry, electro-mechanical suppliers
- Metal suppliers, coatings and paint
- Retail, industrial manufacturing
- Security firms, uniform suppliers
- All types of business needing to get their products to customers
- Gov. Contractors Tool manufacturers
- Governments, Healthcare, Civic
- Hospital Research Universities
- Building materials, interior design products
- Aerospace and defense contractors
- Brazing, painting, grinding, finish coat, x-ray, inspection, anodizing, plating, heat treatment
- University and Research Institutions
- Material production, component production, completed PV module production
- Aerospace
- Pharmaceuticals and research institutions
- Cobalt-60 irradiators, specialized insulated packing, chemical companies, tissue banks
Surgeons(e.g. practices), machine shops
- Chemical companies; companies that supply technical equipment for bio medical and chemical research
- Aerospace/Airlines, distribution centers, transportation, entertainment, colleges, government, residential resort communities
- Office supply, lab supply
- Petroleum companies
- Petroleum providers, electronics and avionics, concessions
- Construction, office supplies
- Trucker, Airliner and Custom Brokers, Software, Govt.
- We deliver and pickup from all kinds of companies around the nation, anything that does not require cold storage.
- Insurance and risk management
- Trucking & Airline companies
- Interface with customs, brokers and truckers
- Supply vendors (office supplies)
- Clinical Lab Equipment and Reagent Manufacturers
- Cable Programmers primarily, Other Media news, On-line, Print media
- Material supply warehouses
- Raw materials, building materials and manufacturing companies
- Aluminum extruding, carton cardboard and packaging sheet metal companies
- 1,500 computer product manufacturers, schools and school districts
- Office supply, medical supply and drug supply companies
- Microsoft, HP, Cisco Systems, distributors of industry-specific software
- Hospitals, doctors' offices, medical laboratories
- Real estate developers, land management companies, government agencies

- Inverter and solar panel manufacturers, wire and electronic equipment companies, local utility companies
- Software, marketing and advertising companies, construction supply companies
- Companies that sell IV's and X-ray film and supplies, IT support companies
- Medical equipment companies, food service companies, drug companies
- Manufacturing and construction companies
- All types of professional businesses
- Medical supply companies, medical facilities
- Stucco, metal and sand companies
- Consulting engineers, technical reproduction firms, IT companies, construction firms
- Medical supply and office supply companies, pharmacology companies
- Electrical and building suppliers, safety and training companies, insurance and bonding companies, public schools
- Cities, counties, engineering firms, biologists, environmental specialists, utility companies, traffic specialists

19. Are there any further comments you would like to make?

- Technical support: I think the majority of it is us setting the expectations and creating a system. I have no doubt when those are set, they will be followed. Need to improve team building and communication within that department.
- We have a very small pool to draw from for these type of workers. We hire good technical professionals by jumping on them even without an opening. Housing is too expensive for technical positions, so the labor pool is small. Not a good pool to draw from.
- Little uncomfortable answering questions regarding the performance of our employees, even grouped. Will answer future employee answers only
- Local City & County Government make it very difficult to develop a piece of land into a manufacturing facility in a reasonable time frame.
- I think the technical capabilities are strong with incoming employees, but the largest thing lacking is the communication skills/attitudes of current graduating technical students. Nowadays students have a entitlement attitude and communication skills are not good.
- Cal Poly has proved to be an excellent source of technical talent, from interns to new hires. We rarely transfer people into this area.
- More bilingual employees that have right to work in US
- Emigration Laws need to be revised to allow more unskilled laborers to work in US
- County needs to attract more professional industries
- We are a young company with limited human resources (all of our G&A and manufacturing functions are outsourced), and we heavily rely on outside professionals (who are leaders in their own specific technical fields). We work from geographically separated locations on a daily basis relying on internet communications, telephone, etc.
- Some of our hands-on technical work is carried out in a Chicago suburb. Although I attempted to focus on our LA office experience - some of the Illinois situation has likely entered into my responses. Similar, though.
- LAEDC does good things. Thanks
- Security Clearance issues: Youth should watch their behavior!
- Employ multi-talented personnel, to use talents across disciplines and to keep them employed in the lean times.
- Future employees need basic skills and good English skills, without which a person could get killed. Other workplace skills require reliability as employees must rely on each other or people may die.
- Computer skills should start at very early grade level.

- There is a shortage of professional level employees due to geographic undesirability, aging boomers retiring and shrinking pool of available, qualified tech workers.
- The Valley should try to bring in manufacturing industries other than aircraft to diversify the economic base so it's not solely reliant on defense industry.
- Extremely disappointed in lack of English comprehension from high school all the way to college grad. Also lack of practical experience in college grads. Experiencing problems with basic business skills even among the degreed, such as coming to work on time, work ethic, honesty, reliability. Encountered attitude of entitlement. We hire high school graduates and train them. There is a high turnover rate because of a poor work ethic. We support immigration reform because immigrants generally have an excellent work ethic. Basic reading and math skills are important, while our employees (plumbers) do not need computer skills.
- Engineers and architects need technical skills as a foundation, but liberal arts education is also very important. Most new hires are loners, lacking the ability to work in a team. Global focus is crucial. Our project teams have members all over the world. If an employee doesn't work out, it is because of social skills, not technical skills. New hires typically don't have time management skills. State colleges prepare students with practical skills versus the more "prestige" colleges.
- For entry-level positions we are drawing from a very unskilled labor pool with no social skills. Applicants are looking for someone to train them. They switch jobs frequently for the money. Not many applicants have a sense of ownership for their career pathway.
- We offer extensive in-house training and other continuing education. We have offered job shadowing to high school and community college students to encourage careers in engineering.
- Would like high schools to provide vocational courses such as Interior Design, AutoCAD drafting, electronic documentation and general design. Vocational trade schools are not very effective.
- New employees typically do not meet expectations. Most take awhile to adapt to the fast work pace. Ninety percent of the technician's job (Radiology Technician) is computer work, so must have great computer skills. Entry-level employees need more confidence in their decision-making abilities. Wages for entry-level technicians start at \$20 per hour.
- Administrator was very reluctant to participate in the survey due to HIPAA regulations. Administrator does not want business name or address listed.
- We hire high school graduates for network line installers. Basic computer skills are sorely lacking in entry-level employees who only know games and e-mail. A poor work ethic is the biggest problem with new-hires. They don't want to put in a full day's work and lack teamwork and customer service skills. Our employees are trained through union programs as well as certificate programs through Microsoft and Cisco Systems.
- Entry-level employees must be teachable. The college degree is just the beginning and knowledge is acquired on-the-job. New hires must be open to learning and realize that they don't know it all and some don't want to admit that. We have had good success recruiting from Cal Poly Pomona, USC and UCLA.

Appendix D

California Innovation Corridor Clusters of Opportunity

Prepared by Connie Scholl, Orange County Workforce Investment Board

Introduction to Clusters: What are Clusters?³³

Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field that are present in a particular region or local economy. Clusters emerge because companies engaged in a similar industry recognize they can enhance their productivity through locating near each other, thus enhancing their ability to compete collectively and cooperatively.

Industry clusters typically possess four key characteristics that contribute to higher growth and generate higher wage occupations:

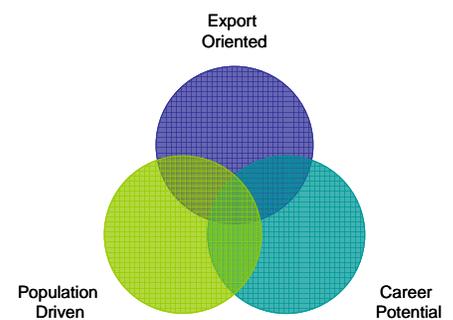
- **Critical mass/concentration:** in other words, more concentrated than average.
- **High Growth rates:** a tendency toward higher growth rates than other sectors.
- **High Multiplier effects:** not all jobs are equal in terms of their effect on other parts of the economy. For example, creating a job in an industry cluster typically creates two or three other jobs throughout the economy.
- Finally, and most importantly, some key reason, or some **locational competitive advantage** for the cluster to be here, today and in the future – Disney and Boeing are two examples of key reasons we have competitive advantage in their respective clusters, in Orange County.

2005 California Regional Economies Project³⁴

According to the California Regional Economies Project, outward oriented industry clusters are important for regions because they drive the vitality of support and local-serving industries—without competitive, outward-oriented industries, communities cannot enjoy sustained increases in standard of living. Economists from Alfred Marshall (1890) to Michael Porter (1990) point to several benefits to companies from participating in industry clusters:

- Access to a specialized workforce
- Access to specialized suppliers
- Access to business and technology networks

Clusters of opportunity are sectors of the economy identified by growth in one or more areas: value, jobs or wages. A cluster of opportunity elaborates on the concept of an economic cluster – traditionally seen as export-oriented, geographically-concentrated, and interdependent industry sector characterized by competing firms and buyer-supplier relationships, as well as shared labor pools and other specialized infrastructure – by linking it to the challenges of workforce development. The definition of a “cluster of opportunity” focuses not only on export-oriented sectors, but also population-driven sectors—as well as sectors that offer occupations with “career



³³ Orange County Workforce Indicators Report, 2008-2009

³⁴ http://www.labor.ca.gov/panel/pdf/Industry_Clusters_of_Opportunity_User_Guide_September_2008.pdf

potential.” Clusters of opportunity are a combination of related sectors that share one or more of these attributes.

Clusters of Opportunity within the California Innovation Corridor: A WIRED Project

The CIC Clusters of Opportunity were identified using economic data available from the California Employment Development Department (Labor Market Information Division) combined with the IMPLAN Input-Output System. Criteria used to determine the CIC clusters of opportunity are as follows:

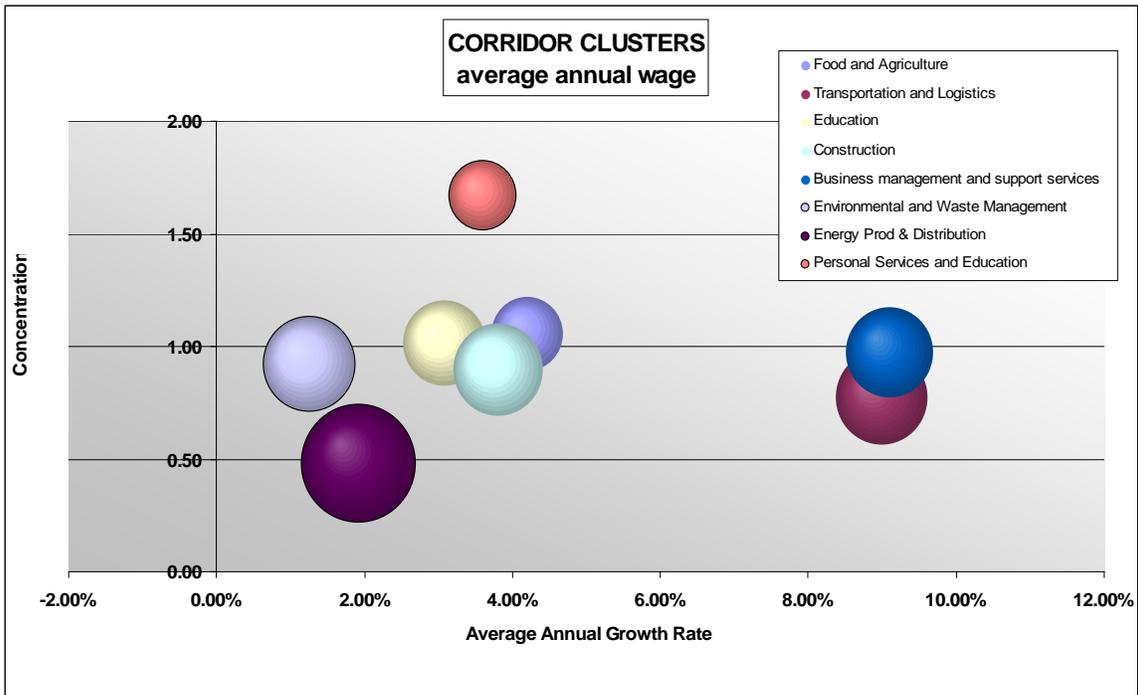
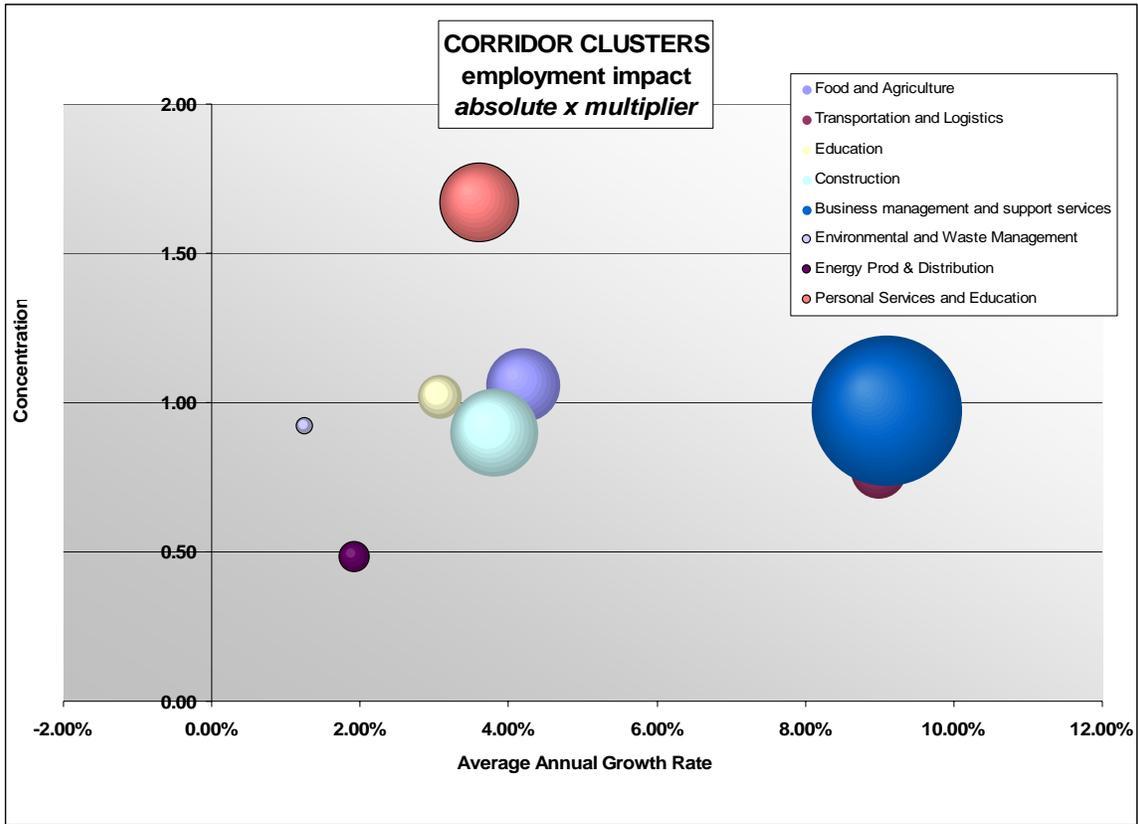
- ***Average Annual Growth Rate:*** Employment growth rate averaged across the 13-county economic region of the CIC. A Cluster of Opportunity demonstrates growth rate of 3% or higher, except in Energy Production (1.91%) and Environmental/Waste Management (1.25%). For these two clusters, the lower *past* growth rate is offset by the high wages offered in Energy Production, and high multiplier effect offered by Environmental/Waste Management, as well as the ascendant nature of these industries in which California has played a significant role in nurturing, through the state's resources, policy requirements such as AB 32 requiring reductions in greenhouse gas emissions. California's strength in this area is due to its natural resources in sunshine, geothermal energy and wind. According to "Harvesting California's Renewable Energy Resources: A Green Jobs Business Plan," if 20 percent of California's energy were from renewable sources by 2010, Orange County alone could gain between 8,000 and 22,000 new jobs in companies emerging to address the new business opportunities with this energy target. Other examples of this emergent industry include Kern County, where in if all of the county's wind energy were to be harnessed, the industry can generate up to 30,000 jobs.
- ***Location Quotient:*** Also known as *export orientation*, this is a calculation that compares the percentage of employment in the CIC to the percentage of employment in its national counterpart. A ratio greater than one signifies that employment is more concentrated in the region than it is nationally – an indication of outward orientation and a source of comparative advantage.
- ***High Employment:*** Absolute value of employment, different from growth rates in percentages. This value, combined with the multiplier of that cluster, identifies not only clusters offering employment opportunities for California workers in the cluster, but creates multitudes of additional employment opportunities beyond the cluster. CIC Clusters show absolute employment of over 100,000 in the corridor, except in Energy Production (97,943) and Environmental (27,060). For these two emerging clusters, the lower absolute current employment is offset by the high wages offered in Energy Production, and high multiplier effect offered by Environmental/Waste Management,
- ***High Multiplier Effect:*** The economic impact for economic sectors are identified through creating numerical values that summarize how investment spent in a sector produces an economic impact throughout the rest of the local economy. A higher value multiplier indicates a higher degree of interaction in the regional economy. For example, if the manufacturing cluster is said to have a multiplier of 1.7, then for every ten employees hired in manufacturing, a total of 17 jobs will be generated throughout the entire CIC. Spending in clusters with higher value multipliers will likely produce more benefit to the economy as a whole. CIC Clusters have multipliers greater than 1.7, and combined with absolute employment, measures the real impact to the corridor economy.

The CIC Clusters of Opportunity was determined and assessed using the above criteria and with the model provided by the 2005 California Regional Economies Project, and are as follows:

Name of cluster	Average annual growth rate (2001-2006)	Concentration Relative to CA	Employment (2006)	SAM Multiplier	Average Annual Wage
Food and Agriculture	4.20%	1.06	532,708	1.73	\$ 30,803
Energy Prod & Distribution	1.91%	0.48	97,943	1.58	\$ 75,725
Construction	3.81%	0.90	755,223	1.70	\$ 48,340
Transportation and Logistics	8.98%	0.77	298,608	1.80	\$ 49,457
Environmental and Waste Management	1.25%	0.92	27,060	1.73	\$ 49,124
Education	3.07%	1.02	178,418	1.86	\$ 41,049
Personal Services and Education	3.60%	1.67	546,618	1.85	\$ 27,243
Business management and support services	9.09%	0.97	2,052,758	1.81	\$ 44,416

Source: Industry Analysis, California Innovation Corridor 2001-2006, State of California Employment Development Department

The impact of these clusters on other sectors of the economy is demonstrated in the following charts.



Methodology of Multiplier Development

Aggregate Cluster Multipliers

An important step in developing a sustainable cluster-based economic and workforce strategy is identifying which business sectors produce the greatest impact relative to the investment made in them. The purpose of this analysis is to identify which economic sectors produce the most “bang for the buck”. Aggregate Cluster Multiplier Analysis tells policy makers “how” it should be done, in terms of where investments should be made in the economy.

Using IMPLAN software from MIG (*Minnesota IMPLAN Group*), aggregate cluster multipliers were produced by creating an aggregation scheme and applying it to the model. In other words, the economic impact for economic sectors are identified through creating numerical values that summarize how investment spent in a sector produces an economic impact throughout the rest of the local economy. These values are called “multipliers.”³⁵

Multipliers are a combination of these:

1. **Direct effects** are the changes in the industry used to describe the events being analyzed. In other words, direct multipliers reflect the direct impact of dollars spent in that particular economic sector (e.g. manufacturing). If fifty employees are laid-off by a manufacturing firm, then the direct effect is fifty employees reduced in manufacturing.
2. **Indirect effects** are the changes in inter-industry purchases as they respond to the new demands of the directly affected industries. In other words, indirect multipliers reflect how dollars spent in a particular economic sector create impacts in other economic sectors which have a benefit in the overall local economy. For example if a manufacturing firm lays off fifty employees, then all the companies that purchased materials from that manufacturing firm will also lose business and might end up having to lay off twenty-five employees (collectively) all across the local economy.
3. **Induced effects** reflect changes in spending from households as income/population increases or decreases due to the changes in production. Induced effects are the local economic effects created through the economic effect of that sector of the economy. In other words, if a manufacturing firm lays off fifty employees, those fifty employees will shop less from many other companies (grocery stores, gas stations, clothing stores) which may end up having to lay off workers from lower demand for their products (separate from manufacturing) and “downstream” in effect from the action of the analyzed sector (e.g. manufacturing).

³⁵ IMPLAN uses several multiplier options, the primary two being Type I and Type SAM. The difference is that Type SAM includes induced effects from household income and spending. Their formulas are as follows:

Type I= (direct effect + indirect effect)/direct effect

Type SAM= (direct effect + indirect effect + induced effect)/direct effect

Cluster Investment and Economic Development

The CIC Clusters were chosen to reflect both key economic drivers for the CIC economy and industries that are central to workforce development. Understanding employment trends in these clusters can and should influence workforce and economic development policy. In addition, understanding comparative salary levels and salary growth trends is vital for education and workforce development policy. This information, combined with information from the indicator on cluster employment growth trends, allows workforce development professionals and the business community to understand how the CIC economy is performing in terms of generating jobs at differing salary levels. For example, if growth of low wage jobs is not balanced by growth of high wage jobs, there will be problems — especially so in a high cost of living location like areas within the CIC – San Diego, Orange County, Santa Cruz, and Santa Barbara are strident examples³⁶.

In the case of lower-paying clusters, workforce development policy in those sectors should focus strongly on skills development to provide avenues for wage growth that otherwise might not exist. Workforce development policy should also attempt to identify skill ladders that can move employees from lower paying agricultural or food service jobs to jobs in the technology clusters that have higher wages and more rapid wage growth.

Why use clusters? The answer is easy – cluster analysis bring to the surface identifiable targets for investment, and it bring forth the opportunity to identify emerging clusters that replace traditional clusters, and for the economic developer to ride the wave front of the ascendancy, investing in growth-driving technologies and growth-supporting skilled workers. Identifying emerging clusters such as Energy Production and Environmental/Waste Management also brings into focus the direction of policy advocacy – if we want the potential for new jobs in these clusters to be realized – and for them to maximize their multiplier effects - in the California Innovative Corridor, then the implementation of legislation driving these clusters must be encouraged, observed, and supported within the Corridor and beyond.

Cluster investments are two-pronged; the approach include both workforce *and* economic development. Economic development must grow beyond, and pull ahead of, the hitherto practiced pursuit of property development and sales tax. Workforce development *is* economic development; the integrated approach focuses on retaining high value clusters and employment, followed by attraction of new players in both talent and capital investment. Clusters on a regional level are almost invaraiably different than clusters defined on a local (county or city) level; the economic drivers of a region are more diverse and less fluid than that of those found within smaller geographic tranches. Defnining and assessment clusters within the larger context of a California Innovation Corridor provides the economic decision makers an integrated tool, by which to focus increasingly limisted workforce investment funding, and by which economic development funds can be leveraged to maximize returns to the local economy.

³⁶ Orange County Workforce Indicators Report 2008-2009

Appendix E

Beyond the Workforce Investment Area Borders

Prepared by Connie Scholl, Orange County Workforce Investment Board

Workforce Investment Boards, especially those across the California Innovation Corridor, are positioned – both economically and geographically – to reach beyond the boundaries of local economic and workforce development efforts. Clusters of Opportunities are identifiable in cities, counties, or regions; when a cluster reaches across a major economic region like the Corridor, investment in that cluster’s economic and workforce assets promulgate benefit, leverage resources, and lower the risks of investments across the entire region.

An example of such a ‘super-cluster’ is one of Transportation/Logistics. This cluster stretches from the ports of Los Angeles and Long Beach, across the intermediary support regions of Orange County and Riverside, and onward to the rest of the Inland Empire, before the goods are distributed to the rest of the United States. Every step of the way in the movement of goods from sea to shining sea, there exist industries, workers, and communities that both support and depend upon it. For every ten jobs created in the Corridor alone in this ‘super-cluster’, 18 are created in other supporting industries³⁷, with average wages above \$49,000/year³⁸. This cluster offers one of the top wages in the corridor, and presents career opportunities for workers with sub-baccalaureate educational backgrounds; that is to say, significant opportunities exist in this cluster for workers without college degrees. To continue supporting the growth of this industry, critical resources must be maintained: infrastructure upon which the goods travel, availability of business development resources for smaller companies to grow within the industry and hire new workers, and skilled workers must be available on every rung of the career ladder.

To maintain the critical resources, significant investments must be made, in economic and workforce investment dollars, time, and human ingenuity. Significant investments naturally bring risk commensurate with benefit. By spreading the investments across the corridor, so that all economic development, educational, and workforce investment stakeholders take ownership in supporting the ‘super-cluster’, risks are reduced and benefits are shared, and more people can work in more businesses that all contribute to the larger region’s economic health.

³⁷ Orange County Workforce Indicators Report, 2008-2009

³⁸ Industry Analysis, California Innovation Corridor 2001-2006, State of California Employment Development Department

Appendix F

Strategic Collaboration with Antelope Valley Stakeholders to Develop and Implement WIRED 3.1 Initiatives

Prepared by Malia McKinney, Greater Antelope Valley Economic Alliance

November 2008

GAVEA is pleased to share this brief outline with CSA partners as an example of local synergies which developed in the Antelope Valley, supporting best practices to:

- a) Enhance and expand partnership between stakeholders
- b) Support outreach to local businesses; to engage them in a progressive dialogue
- c) Use the findings of the WIRED 3.1 Survey Summary Report to provide context for initiatives that will measurably impact the region's innovative companies by addressing their workforce needs

As interesting as the WIRED 3.1 Survey and Summary Report recommendations are, their greatest value can be measured by the extent to which they serve as a launching point for meaningful initiatives for economic change. Here is an excerpt from the WIRED 3.1 Summary Report for the Antelope Valley:

How skills will evolve:

Greater cooperation and synergies are required between employers and educational stakeholders to develop and modify curricula to anticipate future needs and meet present needs. There are some provisions for local follow-up to enhance the dialogue between the stakeholders, but our region currently lacks any major type of oversight from which to build future initiatives.

All of the partners face the similar challenge of implementing WIRED 3.1 initiatives to create positive momentum; to do so requires ongoing leadership, encouragement, active participation and consistent follow through. As GAVEA is demonstrating in the Antelope Valley, the key to our success is sharing the WIRED culture and deliverables with like-minded organizations to achieve sustainable improvements for our local workforce.

GAVEA has been actively involved with other Antelope Valley organizations in an outreach process which may be replicated by partners in other regions within the CIC. The process is summarized below as a series of steps:

Summary of Outreach Process:

- 1) Steering Committee formed of stakeholders
- 2) Survey of workforce issues effecting the general business community, using experience gained from the WIRED 3.1 Survey implementation
- 3) Findings compiled and presented, along with WIRED 3.1 Survey data and other pertinent local workforce information at "Meeting of the Minds" symposium
- 4) Feedback and initiatives developed during the symposium break-out sessions compiled and organized into two areas of focus: Pre-Workforce and Current Workforce
- 5) Form two Taskforce Committees (Pre and Current Workforce) to review and select one or two key initiatives for implementation

- 6) Taskforce Committee Chairs recruit community leaders with expertise needed to develop and execute targeted action plans to achieve selected initiatives

Antelope Valley Case Study

Local Partnerships:

GAVEA completed the WIRED 3.1 Survey and Summary Report early in the third quarter of 2008. During this process, GAVEA had begun working more closely with the LA County Workforce Investment Board, and had become part of a steering committee to develop and implement initiatives to make a real and lasting impact on the region's economic viability through workforce development.

The goals of WIRED 3.1 directly correlated with one of the primary goals set forth in the LA County WIB's 2008 Strategic Plan:

"Provide leadership on workforce issues by convening and facilitating public and private stakeholders to impact the economic health of the region, (the region identified for recommended action was the Antelope Valley).

Recommended Action:

- 3.1 Schedule meetings with community colleges and economic development agencies for the purpose of creating a strategy to address workforce needs, including adult schools, regional occupational programs and private vocational schools in the discussion/process."

Douglas Barr, President and CEO of Goodwill Southern California and LA County WIB Board Member, was assigned as "point person" to "engage stakeholders in planning and collaborative efforts.

Steering Committee:

The LA County WIB organized a consortium of economic development organizations, City economic development personnel, workforce service providers and educational stakeholders to form a steering committee. Steering committee member organizations include:

- City of Palmdale and City of Lancaster
- Antelope Valley Board of Trade (AVBOT)
- Greater Antelope Valley Economic Alliance (GAVEA)
- Antelope Valley College
- Antelope Valley and Palmdale WorkSource Centers
- Employment Development Department (EDD)
- Goodwill Southern California
- LA County Workforce Investment Board (LA WIB)

Workforce Survey:

The steering committee's first task was to gain a better understanding of the specific workforce needs of the Antelope Valley region. With assistance from GAVEA and the City of Lancaster the team developed a survey using elements from CSA's WIRED 3.1 survey, though simplified, to capture response from all sectors, including service, retail and healthcare. The survey instrument was accessed via user-friendly Survey Monkey, which allowed responses to be gathered and compiled online.

Meeting of the Minds:

The “Meeting of the Minds” symposium was held at Antelope Valley College on August 7, 2008. Invitations for this event were sent to Lancaster and Palmdale businesses of all types, as well as to all stakeholders. 64 companies attended.

Keynote speaker Jack Stewart, President of the CA Manufacturers and Technology Association, shared information about workforce trends and issues on a statewide level.

Survey Findings:

Presentations of findings from three recent business climate and workforce issue surveys were presented by the organizations which spear-headed them:

- 1) **WIRED 1.1 Business Climate Survey for LA County**: administered by the LAEDC, the survey was comprised of responses from 5,000 businesses throughout LA County, including 103 which were classified as high-tech or innovative companies.
- 2) **WIRED 3.1 Workforce Survey of High-Tech and Innovative Companies**: administered by GAVEA, the survey was comprised of responses from 22 companies in the greater Antelope Valley including Lancaster, Palmdale, Mojave, Ridgecrest and Tehachapi.
- 3) **Meeting of the Minds Survey**: administered by the Lancaster/Palmdale Steering Committee with responses from Lancaster and Palmdale businesses.

Interestingly, the results of the WIRED 3.1 Survey which were based exclusively on responses from innovative companies mirrored those of the general business community with the exception of engineering. All three surveys emphasized a comprehensive need for:

- Problem solving skills
- Basic skills such as math, science and English
- Workplace success skills

Feedback and Initiatives:

After findings from the three surveys were presented, a facilitator helped summarize the commonalities. Attendees formed topic-oriented groups to develop specific initiatives to address the skill gaps outlined. After the breakout sessions, the facilitator helped the group select the most important initiatives and rank them by relevance.

The steering committee made the commitment to keep the participants, as well as the AV business community in general, of progress made to implement these initiatives.

Taskforces Formed:

The initiatives from the feedback sessions were organized into two categories: those that primarily addressed the needs and issues pertaining to the Pre-Workforce and those pertaining to the Current Workforce. Some of the initiatives appeared on both lists.

The steering committee brainstormed to identify leaders in local business, government and education to lead the two taskforces. Chairs and co-chairs were suggested and members of the steering committee were assigned to facilitate the taskforce creation.

Initiatives Selected for Implementation:

Each taskforce reviewed the initiatives put forth from the symposium and selected the most compelling item for follow-up. Action plans are being developed and implementation is in the planning stage. In the Antelope Valley, both the Pre and Current Workforce Teams selected a similar initiative: To create a resource guide of all programs available to meet the workforce needs. In the taskforce discussions,

members expressed concern that we do not spend precious time, money and resources “re-inventing the wheel.”

One of the main problems perceived by both taskforces is lack of awareness of the various programs and resources that are already available in the Antelope Valley. For example, few members were aware that the Antelope Valley College makes its extensive job placement department available to non-students. Or that comprehensive curricula already exist for workplace success skills that could be shared between private and public educational districts.

For the *pre-workforce* initiatives, the resource guide will focus on delineating “pathways,” in some cases going as far back as middle school, to increase awareness of resources and skill requirements for certain careers. In addition to serving the population of new and future workers, the resource guide would serve businesses, identifying opportunities for partnerships with educational institutions and agencies such as ROP and the Aero Institute.

For the *current* workforce initiatives, the resource guide will focus on opportunities for job-specific certification and skill-upgrades. For example, in the Antelope Valley, Business Degrees are highly desirable in order to progress into advanced project management required for systems engineering. Another current workforce need that was identified was for training on multi-generational workplace collaboration. Purdue and Pepperdine both offer these programs, but like other educational stakeholders including AVC, they sometimes struggle with attempts to gain wide-spread awareness of the resources they offer. Information does not always get into the hands of the project leads within companies. For this reason, the taskforce teams will be including key business leaders, gaining commitment and involvement from the very top managers within organizations.

Current Status:

In the Antelope Valley, the outreach process is still evolving. GAVEA expects to be able to report tangible success, as these initiatives, which reflect the findings and recommendations from WIRED 3.1, are implemented. The target date for the completion of the resource guides and the detailed plan for a community awareness campaign to promote the guides is the end of first quarter, 2009.

Although the process is in its early development, here are the foundations that have been laid which predict success:

- The collaboration between like-minded organizations in the Antelope Valley has become focused on tangible, measurable and sustainable results.
- It has created a desire for greater networking and combined effort that will not only facilitate regional economic growth, but help link employers to academia and provide support for entrepreneurship.
- The ongoing dialogue and cooperation between agencies continues, as does the dynamic value of WIRED 3.1. GAVEA was asked to discuss the WIRED 3.1 Summary report at the LA County WIB Annual Board Retreat at the end of October. Moving forward, GAVEA will continue to support the process of implementing the taskforce initiatives, which mirror those of WIRED 3.1.

Appendix G

Project 3.1 Partner Narrative Reports

Note: Reproduction of survey instruments and complete listings of detailed verbatim responses were deleted from the reports due to space considerations and the incorporation of this items elsewhere in the main report. To obtain a complete report with all original appendices from a particular partner, please contact that partner.

Workforce Division Partner	Riverside County Economic Development Agency
Workforce Partner Contact	Mark Christiansen, Manager, (951) 955-3128
Date	July 22, 2008
Location	Riverside County
Number of Companies Surveyed	20

WIRED 3.1 Project Overview (Project Goal) Conduct a labor needs assessment of 200 entities, to include 100 key space and information technology companies and government employers, 50 space entrepreneurial and small business companies, and 50 manufacturing companies. Workforce composition, current and future skill needs, education and training gaps will be identified and included in the assessments.

Introduction

The purpose of the survey was to gather information about the skills required for critical positions and to identify future workforce gaps in order to develop a strategy to address future California Innovation Corridor employer needs. To collect the data, employers were asked to rate both the competency and importance of workforce skills. As a participant of the WIRED 3.1 project, the Riverside County Economic Development Agency's Workforce Division collected data from twenty Riverside County employers.

To complete this project, a survey instrument was created for the 3.1 project by utilizing a California Employment Development Department, Labor Market Information Division (LMID) survey development process. Company, occupation, and staffing pattern data were analyzed to help each county focus in on potential target companies. The resultant survey instrument was utilized by the Riverside County Economic Development Agency's Workforce Division in March 2008-April 2008 and conducted on the twenty targeted companies. In addition to this survey, other relevant information was collected and utilized in this report. This summary of the survey includes data from these targeted companies in Riverside County.

Target Companies

The Riverside County economy is diverse, but not known for having a significant number of space and information technology companies, so for the purposes of Goal 3.1, other innovative industries critical to the regional economy were studied. This flexibility allowed Riverside County Economic Development Agency's Workforce Division to conduct surveys of twenty Riverside County employers in the 238, 541 and 621 NAICS codes. The targeted industries are specialty trade contractors, professional, scientific and technical service companies and ambulatory health care companies. These industries represent growing segments in Riverside County's developing economy. Companies in the specialty trade contractor segment are part of the area's expanding green building sector. Ambulatory health care is of particular interest due to the proposed medical school at the University of California, Riverside. The professional

services sector continues to expand, mirroring Riverside County’s population growth and rising income levels.

The following table shows the self-identified profile of each surveyed firm.

Targeted Company NAICS Designations

NAICS	Self-Identified Business Description	FTE
238220	Plumbing Contractor for New Home Developers	50-99
541310	Architectural and Engineering Services	20-49
238220	Sheet Metal Manufacturer	50-99
541512	Computer Product Sales	20-49
621111	Multi-Subspecialty Orthopedic Practice	100-249
541519	Computer Network Design and Installation Services	11-19
621511	Medical X-Ray Services	20-49
541330	Engineering Consultants – Land Development	50-99
238220	Solar Heating Contractor	11-19
541310	Architectural and Interior Design Services	11-19
621111	Medical Imaging and Interpretation Services	20-49
621111	Physician Offices/Rehabilitation Center	100-249
238910	Site Preparation Services	5-10
541512	Web Site Design and Internet Services	11-19
621511	Medical Imaging and X-Ray Services	5-10
238310	Lathing, Plastering and Stucco Contractor	50-99
541310	Architectural, Planning and Construction Services	11-19
621210	Dental and Orthodontics Group	20-49
238290	Network Systems Consulting and Installation Services	100-249
541320	Land Use Planning and Development Services	20-49

Summary of Surveyed Respondents

Type	Service		Manufacturing			Government		Other	Not Stated
Count	14		1			0		5	0

FTE	0-4	5-10	11-19	20-49	50-99	100-249	250-499	500-999	1000+
Count	0	2	5	6	4	3	0	0	0

Respondent Position	HR Director	Supervisor/Manager	President/CEO	Other	Not Stated
Count	5	9	6	0	0

Background	A: Direct Observe	B: Periodically Observe	C: Discuss with Supervisors	D: Other	Not Stated
Count	10	1	9	0	0

The targeted industries were speciality trade contractors (25%), professional and health care services (70%) and one manufacturer (5%). Half of the surveyed companies were medium-sized (20–99 FTE) 35% small-sized (5–19 FTE) and 15% were larger companies (100-249 FTE). Feedback was obtained directly from upper management that either directly observes or discusses with supervisors their employees' performance.

Critical Employees

Number of WIRED 3.1 Survey Employers	NAICS	Self-Identified Business Description	SOC Code	Occupational Title	2007 Median Hourly Wage ¹	Education/Training Requirements
3	5413	Architectural, Interior Design, Planning & Construction Services	17-1011	Architects, Except Landscape and Naval	\$32.41	BA/BS Degree
3	6215	Medical Imaging and X-Ray Services	29-2034	Radiologic Technologists and Technicians	\$29.13	AA Degree
2	5413	Engineering Consultants; Land Development and Engineering Services	17-2051	Civil Engineers	\$34.73	BA/BS Degree
2	6211	Physicians' Offices and Rehabilitation Center; Orthopedic Practice	31-9092	Medical Assistants	\$12.00	1-12 Month OJT (10), Certificate 1 year; AA 2 years
1	2382	Plumbing Contractor for New Home Developer	47-2152	Plumbers, Pipefitters, and Steamfitters	\$17.82	12-Month OJT
1	2382	Sheet Metal Manufacturer	47-2211	Sheet Metal Workers	\$18.72	1-12 Month OJT
1	5415	Computer Product Sales	41-9099	Sales and Related Workers, All Other	²	1-12 Month OJT
1	5415	Computer Network Design and Installation Services	15-1071	Network and Computer Systems Administrators	³	BA/BS Degree
1	2382	Solar Heating Contractor	49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers ⁴	\$20.89	12-Month OJT
1	2389	Land Clearing Services	53-7051	Industrial Truck and Tractor Operators	\$13.32	30-Day OJT
1	5415	Web site Design and Internet Services	15-1021	Computer Programmers (includes web site programmers)	\$22.25	BA/BS Degree
1	2383	Lathing, Plastering and Stucco Contractor	47-2161	Plasterers and Stucco Masons	\$18.92	12-Month OJT
1	6212	Dental and Orthodontics Group	31-9091	Dental Assistants	\$13.93	1-12 Month OJT
1	2382	Network Systems Consulting and Installation Services	49-9052	Telecommunications Line Installers and Repairers	\$20.40	12-Month OJT
1	5413	Land Use Planning and Development Services	19-3051	Urban and Regional Planners	\$44.86	MA/MS Degree

Source: State of California Employment Development Department, Labor Market Information

(1) Data for Riverside County is not available. Occupational wages are for Riverside-San Bernardino-Ontario MSA

(2) Workers may not work full-time all year-round, so not feasible to calculate hourly wage

(3) An estimate of wage could not be provided due to confidentiality

(4) Solar installers' earnings are in line with Heating, Ventilation and Air Conditioning wages

Type of Employees

Since Riverside County still has available land to develop into industrial, retail and office space as well as residential housing, it is not surprising that eight of the surveyed companies are in construction-related businesses. These range from architectural and engineering firms that employ architects, civil engineers and land use planners to specialized contractors that employ plumbers, plasterers and tractor operators for site preparation services. The remaining specialty trade contractors interviewed were sheet metal manufacturing machine operators and solar installers. Key employees surveyed in the health care industry were radiology technicians (3), medical assistants (2) and dental assistants. The four other professional service companies surveyed employ computer network technicians, computer consultants (sales representatives), web site developers and computer/telecommunications line installers.

Number of Critical Employees

Only one employer identified more than one critical occupation, noting that both architects and engineers were essential to its operation.

Typical Education

Because of the surveyed companies' broad range of occupations from engineers to agricultural tractor operators, we found a wide spectrum of educational experience. A Bachelor of Science or Bachelor of Arts degree is required at a minimum for architects, civil engineers and land use planners. Computer network technicians and web site programmers need an associate's or bachelor's degree or at a minimum, college-level courses in specialized fields. Radiology technicians and medical assistants need an Associate of Arts degree or a certificate from a vocational training program. Dental assistants may have an Associate of Applied Science degree or graduate from a certificate program. The remaining occupations of plumbers, plasterers, solar installers, network line installers, computer product sales representatives and machine and tractor operators require a high school diploma and offer on-the-job training, usually for 12 months.

Typical Job Experience

All but three of the companies surveyed hire employees with no job experience, ranging from architectural firms hiring college graduates straight out of college to plumbing contractors and network installation companies that hire high school graduates. One engineering firm prefers to hire engineers with experience, the site preparation company hires tractor operators with two years' experience and a medical x-ray laboratory said they only hire licensed technicians with at least one year's experience.

Typical Wages

As shown in the table on the preceding page, the highest wage found for the surveyed occupations is the regional planner with a master's degree at a median hourly wage of \$44.86. Engineers and architects have median hourly wages of \$34.73 and \$32.41, respectively. Radiology technicians with an AA degree earn a median hourly wage of \$29.13. Some other technical trades also have good earning potential with median hourly wages of \$18.92 for plasterers, \$18.72 for sheet metal workers and \$17.82 for plumbers. At the lower end of the earning spectrum are medical assistants who earned a median hourly wage of \$12 and dental assistants at \$13.93. Registered dental assistants earn a higher wage because of more rigorous training standards. Wages in Riverside County typically tend to be lower than neighboring counties.

Major Skills Gaps

Quantitative Results Summary

WIRED 3.1 Survey					
Part IV Questions	Part IV Details	Total	Average	Gap Score	Rank Skills Gap Priority Here
2	Rating of Problem-Solving Skills	60.5	3.0	0.10	5
Importance	Importance of Problem-Solving Skills	62.5	3.1		
3	Rating of Workplace Skills	54.0	2.7	0.70	4
Importance	Importance of Workplace Skills	68.0	3.4		
4	Rating of Occupational Technical Skills	53.0	2.7	0.90	2
5	Importance of Occupational Technical Skills	71.0	3.6		
6	Rating of Additional Technical Skills	72.0	3.6	0.10	5
7	Importance of Additional Technical Skills	74.0	3.7		
8	Rating of Computer Skills	44.0	2.2	1.20	1
9	Importance of Computer Skills	68.0	3.4		
11	Rating of Social Skills	52.0	2.6	0.75	3
Importance	Importance of Social Skills	67.0	3.4		
14	Rating of Education Sufficiency	54.3	2.7	2.7	Rank Education Gap Priority Here
14	Satisfaction with Entry-Level	51.0	2.6	2.6	1
14	Satisfaction with Technical	57.0	2.9	2.9	3
14	Satisfaction with Professional	55.0	2.8	2.8	2

Most Important Skills

On a scale of 1 to 4, with four being highest, the surveyed companies reported a variety of skills they felt were most important. The data showed that *Occupational Technical Skills* and *Additional Technical Skills* were the two most important skills in aggregate. *Problem-Solving Skills* were ranked as least important, most likely because employees in lower level jobs focus on completing tasks, while higher level employees are the problem-solvers.

Largest Skill Gaps

Comparing the importance of a skill versus the current performance of that skill allows us to determine the largest skill gap between expectations and actual. From the table and the same scoring system, we see that *Computer Skills* has the largest gap, with *Occupational Technical Skills* the second highest. At the company level, the widest gap in computer skills is for medical and dental assistant positions whose current computer skills were ranked as “not meeting expectations” while deemed “very important for the future.” The same gap in computer skills was reported for solar installers and computer network line installers.

With the exception of architectural and engineering firms, many of the other companies surveyed noted that entry-level employees are not very well trained in basic occupational technical skills. For companies that hire workers directly out of high school, many said that entry-level employees lack basic skills such as math, science, reading and writing. These basic skills are the foundation for being able to successfully learn specialized technical skills.

By contrast, the smallest gaps are *Problem-Solving Skills* and *Additional Technical Skills*. This result may indicate that many lower level positions do not require interdisciplinary skills and as mentioned above, problem-solving is not a critical skill in these jobs.

Virtually tied for third in the skills gap results are *Social Skills* and *Workplace Skills*. A lack of social skills such as being a team player and having customer service and good communication skills appears to be a

problem for the majority of the companies surveyed. Companies reported turnover due to a poor work ethic and mentioned the need for teachable, dependable employees. A list of individual company comments can be found in the Survey Results section in the addendum.

Qualitative Results Summary

WIRED 3.1 Survey		Trend of Responses						
		Technical Skill	Basic Skills	Communication Skills	Customer Service	Problem-solving		
1a	Critical Skills Required	14	6	9	4	3		
		Team Player	Cross-cultural apprec.					
12	Other Social Skills	7	1					
		Teachable	Dependable reliable	Certified	Accurate	Good Attitude	Multi-task	Time Manager
13b	Describe best employee	6	4	3	3	3	2	1
		Technician	Professional	Both	No			
15	Critical Shortage	8	6	4	2			
		Technical	Computer Skills	None				
16	Identify Future Skills	8	7	4				
		Technical	Computer Skills	Communication (speaking/ writing)	Social Skills	Team Building	Leadership	Ethics
17	Identify Desired Training	6	4	4	3	2	1	1
		No comment	Work ethic	Union, inhouse training	Liberal arts ed.	Adapt to fast pace	Riv. Co. not dynamic	Unskilled labor pool
19	Other Comments	11	2	2	1	1	1	1

Critical Skills Shortage (Technical or Professional)

Ninety percent of those surveyed reported that there is a critical skills shortage at the professional or technical level. With a fairly even split, eight reported more of a shortage of Technicians and six noted more of a shortage of Professionals. However, four employers said that it was at both levels. One company remarked that the reason for shortages is because Riverside County is not perceived as dynamic enough to attract these highly skilled workers. Another employer noted that the shortage of professionals is at the middle-manager level. "There are plenty of entry-level candidates and highly experienced executives, but we can't find mid-manager professionals who are crucial for the success of our business." This type of comment underscores the importance of organizational succession planning as the older more experienced leaders reach retirement age.

Best Employees

It is not surprising that the best employees in higher level positions have excellent technical knowledge while a solid foundation in "the basics" is essential for lower level positions. Nearly half of the companies surveyed mentioned good communications skills as very important, cutting across all types of occupations from computer network technicians and architects to plumbers. Even solar heating companies look for installers who have public speaking skills so they can attend trade shows. Teamwork is also highly valued for a variety of types of companies in the three disciplines of specialty contractors, health care and professional services. Six employers said having employees who are teachable is extremely important. Being willing to learn applies to college graduates who think "they know it all" as well as to high school graduates.

Identification of Future Skills

Eight companies said that new skill sets required for future workers in their industry would be technical in nature, referring to constantly changing technology that affects the key elements of their business or trade. Since technology changes are often computer-related, seven employers mentioned the importance of computer skills for future employees. Several of those interviewed also commented that it will be critical for employees to be able to easily learn new software programs and new equipment. Examples mentioned of changing technology were digital x-radiology, three-dimensional modeling and merging technologies such as telephones with high-tech surveillance systems. It was noted that new skill sets will emerge from the developing green building sector.

Education Issues

Desired Training

At the Community College level, three employers asked for specialized computer training in Revit architecture building design software and AutoCAD. Other types of desired computer training included web site programming; graphics design software and Microsoft Office system software courses. Four employers requested communications classes in public speaking and business writing. Allied health care employers suggested medical terminology classes and an introduction to patient care.

At the High School level, some companies would like to see more computer classes so new employees will have "more knowledge than just computer games and email." One employer suggested that high schools provide vocational courses such as Interior Design, AutoCAD Drafting, Electronic Documentation and General Design, stating that vocational trade tech schools are not very effective. Also mentioned as crucial are basic workplace skills that involve teaching soft skills like workplace etiquette, how to dress for an interview and team building. While difficult to teach a work ethic, this is clearly an issue for many of the companies surveyed. Two employers' comments: "Our high turnover rate is because of a poor work ethic." "Our biggest problem is the entry-level employee's work ethic."

How Skills Will Evolve

No quantitative results can be reported for this question. Cal Poly Pomona, the University of California, Riverside, USC and UCLA were specifically mentioned as resources for Riverside County's technical workforce. Riverside Community College, Mt. San Jacinto College and College of the Desert already offer many of the computer, communications and health care courses requested by the companies surveyed. Similarly, Riverside County's Regional Occupation Programs also offer many of the vocational classes requested. Agencies such as the Workforce Development Centers of Riverside County and the Coachella Valley Economic Partnership provide training in soft skills such as customer service, workplace etiquette and how to keep a job.

How to Continue Employees' Education

The majority of the surveyed companies reported that they use on-the-job training as their means for keeping their employees current with technology. One employer has a mandated continuing education program and a specialty contractor uses its union for training. Also, one business uses certificate programs through Microsoft and Cisco Systems to maintain high technical standards.

Regional Investment Strategy

The mission of Riverside County's Workforce Development Board is to link resources, people, business and education together to help form a globally competitive workforce. In support of this mission, one of the top goals of the Board is to strengthen the bridge between education and business. Two objectives include building the relationship with the Building Trades Apprenticeship program and placing more emphasis on On-the-Job training. These types of programs and training will have a favorable impact in creating the ideal worker. Continued collaboration between community colleges and businesses through

regional Advisory Boards will help create the types of classes and certificate programs most valuable for continued employee education.

Summary

Although this survey tool did not result in statistically relevant results, it did provide insight into Riverside County's workforce composition, current and future skill needs and education and training gaps. Compared to neighboring Los Angeles, Orange and San Diego Counties, Riverside County has a lower portion of its workforce in the professional, scientific and technical services sector. However, the survey's targeted industries of specialty trade contractors, professional services and ambulatory health care services represent growing segments in the area's economy. Architects, engineers and planners represented the area's high level technical employees, while skilled laborers such as plumbers and plasterers represented some of the area's highly paid blue collar workers and those whose skills will be critical in the innovative field of sustainable development.

Reflective of the region's overall business composition, the companies surveyed tended to be small to medium sized. Computer skills are the biggest concern for these surveyed companies. Except for professional firms, many companies noted that entry-level employees were not well trained in basic occupational skills. Most of those interviewed agreed that the biggest need for the future is to have employees who are able to keep up with rapidly changing technology such as learning new software programs and operating new equipment.

Two apparent ways to maintain high technical standards, lower employee turnover and provide long term stability are to expand on-the-job training programs and to increase the continuing education offerings at local community colleges to include specialized computer software packages. Improving basic math, writing, communication, comprehension, computer skills and reinforcing excellent work ethics are critical to raise the quality of the area's workforce.

Greater Antelope Valley

Workforce Investment Board Partner:	Antelope Valley WorkSource Centers (2)
Workforce Investment Board Partner Contact:	Daniel Levitch, Palmdale; Shirley Kemp, Lancaster
Economic Development Partner:	Greater Antelope Valley Economic Alliance
Economic Development Partner Contact:	Mel Layne, President (661-945-2741)
Date:	July 28, 2008
Location:	Greater Antelope Valley: Lancaster, Palmdale, Mojave, Tehachapi, Ridgecrest
Number of Companies Surveyed:	22

WIRED 3.1 Project Overview (Project Goal): Conduct a labor needs assessment of 200 entities, to include 100 key space and information technology companies and government employers, 50 space entrepreneurial and small business companies, and 50 manufacturing companies. Workforce composition, current and future skill needs, education and training gaps will be identified and included in the assessments.

Introduction:

The purpose of the survey was to gather information about the skills required for critical positions and to identify future workforce gaps in order to develop a strategy to address future California Innovation Corridor employer needs. To collect the data, GAVEA revised the original WIRED 3.1 survey instrument to allow for greater detail for rating specific skills. Four groups of employees were broken out into separate sections: Current Employees, New Hires, Future Employees and High-Performance Incumbents.

Because the format of the GAVEA survey is slightly different than the original, the summary data are also presented in a format that reflects greater quantitative detail.

The geographic region that was covered spanned from Lancaster and Palmdale to Mojave, Tehachapi and Ridgecrest. The region's economies are intertwined, derived predominantly from business related to aerospace, defense contractors and companies supporting Edwards Air Force Base, China Lake, and the Mojave Air and Space Port. There were also a number of non-aerospace high-tech companies, plus three hospitals included in the survey.

Target Companies:

Out of 91 employers contacted, GAVEA was successful in securing surveys from 22 Greater Antelope Valley employers. The three largest companies in terms of number of employees were NASA, Northrop Grumman and Boeing. One of the three largest aerospace employers in the region declined to participate because of their company policy against sharing proprietary data. Many of the respondents had multiple NAICS designations.

Summary of Surveyed Respondents:

Type	Service		Manufacturing			Government		Other – R & D		Not Stated
Count	10		10			2		3		0
FTE	0-4	5-9	11-19	20-49	50-99	100-249	250-499	500-999	1000+	
Count	1		3	4	2	4	5	1	2	
Respondent Position	HR Director		Supervisor/Manager			President/CEO		Other – Fin. Dir.		Not Stated
Count	13		5			4		1		1
Background	A: Supervise		B: Periodically Observe			C: Discuss with Supervisors		D: Other		Not Stated
Count	3		1			14		2		0

The companies surveyed were fairly equally divided between manufacturing and service, with the larger aerospace/government contractors doing both. Some listed more than one type of company type, most often listing both service and manufacturing or manufacturing and R & D. The average number of full-time employees was 254.

Critical Occupations

Overview:

The 22 respondents were asked to list their critical core occupations, comprising a list of 104 occupations, an average of 4.2 each per company. The 104 responses were charted to identify commonalities and were consolidated, reduced to a list of 61 unique critical occupations for this sample set.

These were grouped into general occupation “fields” which were ranked in the table below, indicating the percentage of responses in each field.

% of Responses per Field - out of 104 listed		
Rank	Type of Fields:	% of responses
1	Engineers:	32%
2	Operations:	18%
3	Business Management:	15%
4	Medical:	14%
5	Technicians:	9%
6	R & D	8%
7	Computer Science:	4%

Emphasis on Engineering: The top 12 critical occupations are ranked below in descending order, starting with the largest number of responses. The top 4 positions are engineering. Mechanical Engineers and Electrical Engineers were the highest ranked within this group, which spanned 11 different

engineering specialties. Although some companies listed up to four engineering specialties, engineering was a critical occupation for 73% of the responding companies; 16 out of the 22 respondents.

Top 12 Critical Occupations - out of 61 listed			
Rank	Field	Critical Occupation	Responses
1	1	Mechanical Engineer	8
2	1	Electrical Engineer	7
3	1	Engineers - not specified	5
4	1	Aeronautical Engineers	4
5	2	Machinist	4
6	2	Aircraft Mechanics	3
7	2	Quality Assurance	3
8	3	Program Mgrs.	3
9	4	RN	3
10	4	Medical Lab Staff	3
11	5	Assembly Techs	3
12	6	Physicist	3

Other Types of Positions:

- **Medical:** Three of the responding companies were hospitals, listing 10 critical occupations; an average of 5 per company, ranging from lab technician to MD. Healthcare is a growing industry in the Greater Antelope Valley, as hospitals expand and the new Palmdale Medical Center is under construction. As new medical technologies develop, employees may need retraining.
- **Operations:** This category was used to include all of the production, fabrication and manufacturing specialties. This definition was used as opposed to “technical” which was applied only to positions which specified “technician.”
- **Business Management:** Even within the engineering/manufacturing companies, there was still a considerable need for traditional business management occupations.

Typical Education: Respondents rated the importance of each level of education for their core, critical occupations. As reflected in the excerpt below, there was not much difference among the three groups of employees. A Bachelors degree was more important, behind AA/AS and Certificates.

Certifications referenced as important include: A & P (2), DER, PMP, T & E, CAN, CPR, Aerospace Mechanic and Narte.

Qualifications	New Hires	Current	Future
AA /AS	2.0	1.8	2.0
BA/BS	2.9	2.7	3.0
MA/ MS	2.0	2.0	2.0
Ph.D.	1.3	1.3	1.3
Certificates	2.1	0.0	2.0

Major Skills Gaps:

Most Important Skills (Quantitative Data):

The detailed responses within the four categories were averaged and compared to determine skill gaps in two primary areas described below as Current and Future.

Gap A: Current		
Greatest Gap:		
Social Skills	Decision Making	0.8
Social Skills	Resource Mngt.	0.8
Social Skills	Judgment	0.7
Most Important Attributes:		
Basic Skills	English	0.6
Workplace Skills	Initiative	0.6
Social Skills	Problem Solving	0.6
Workplace Skills	Dependability	0.3
Workplace Skills	Reliability	0.2
Social Skills	Judgment	0.7
Social Skills	Coordination	0.5

Gap B: Future		
Greatest Gap:		
Computer Skills	Presentations	1
Computer Skills	Word processing	0.9
Computer Skills	Internet	0.9
Computer Skills	Engineering Software	0.8
Most Important Attributes:		
Basic Skills	English	0.6
Basic Skills	Reading	0.5
Workplace Skills	Dependability	0.4
Workplace Skills	Reliability	0.4
Basic Skills	Math	0.7
Social	Problem Solving	0.5

Gap A: Largest Skill Gaps, Current compares the importance of a skill with the current employees' performance of that skill. This allows us to determine the largest skill gap between expectations and actual. From the table above, we can see that the largest gaps appear in the Social Skills category: *Decision Making, Resource Management and Judgment.*

The most important attributes include: *Problem Solving* and *Initiative* as well as Basic Skills: *English* and *Reading.*

By contrast, the smallest gaps are in the *Computer Skills* category and the *Other Additional Technical Skills* and *Computer Skills.* From these results, we could argue that current workers are receiving a good technical education, but there is still a need to improve their problem-solving processes.

It is interesting to note that the majority of skills ranked above average (over 3 on a scale of 1-4) when evaluating current performance. One can assume that the hiring/screening process for innovative companies assures a level of technical knowledge and competence that may not be observed in general terms within companies with more entry-level functions such as retail and service industries.

Gap B: Largest Skill Gaps, Future compares the projected importance of a skill for future operations with the skill level encountered in new hires. The gap analysis in this section would be helpful for educators in developing the curricula for future programs to address these anticipated short-falls. From the table below, we can see that the largest gaps appear in the Computer Skills category: *Presentations, Word Processing, Internet and Engineering Software.* Here too, *Problem Solving, Dependability and Reliability* are among the most important, along with Basic Skills: *English, Reading and Math.* This reflects concern over the quality of the new hires' skill level in these areas. Basic Skills and Social Skills become more of a problem for the future.

It is interesting to note that Computer Skills moves from the area of the smallest gap in Current Employee group to the largest gap for the Future. Social Skills remains about the same while Basic Skills will become more critical. For more detail, please see the complete Skill Gap Analysis.

Qualitative Results Summary:

The information in this section was gleaned from the narrative answers and comments provided by the respondents. Question responses were analyzed to find common themes, which are ranked below to reflect the number of times they were mentioned.

Section III								
	Critical Skills 3 Required	Leadership	Understanding aircraft	MATLAB, LABNET	Computer literacy	Military Experience	Prior Experience	English
		1	1	1	2	2	3	1
Section V								
	General Satisfaction/CURRENT	Lack Loyalty/Work Ethic	Composites	Clear Communication in English				
10		2	1	1				
	2 Critical Shortage	Engineers	Flight Test	Technical Skills	Imaging Techs, Nurses, respiratory therapists	Machinists	Hands on experience	Hydraulics
(15)		4	2	8	1	1	1	1
	3 Identify Future Skills	Computer Skills, IT, Excel & basic level	Aircraft Workers	Electronics	MATLAB, CAD, CAM	Machining	Pediatric nursing, physical therapists	Work Ethic, Dependability
(16)		4	3	2	2	2	2	1
	4 Identify Desired Training, HS and CC	Electronics, Electrical Theory	Math & Science & English	Critical Thinking	MATLAB, CAD, CAM	Computer Skills	Internship/Hands On	Vocational
(17)		5	3	2	3	2	2	1
	6 Other Comments	Security Clearance/Background checks	Hire from Military; Must have otj experience	Importance of Science	English Skills Extremely Important	Work Ethic, Leadership, Loyalty	Sodering, tools, trouble shooting	Fit. Test training
(18)		2	3	2	2	2	2	1

*the numbers in the first column refer to the survey questions; the first number is from the GAVEA version, the number in parenthesis is from the original version.

Identification of Future Skills:

Putting the qualitative and quantitative data together creates a picture with four central themes:

- 1) Importance of advanced engineering degrees

- 2) Need for computer literacy for all positions
- 3) Need for on-the-job experience and overall job understanding
- 4) Importance of work ethic and problem solving

Because of the way the questionnaire was designed, CAAD and CAM do not appear to be important, but that is because not all of the responding companies listed them and the survey calculates the average. The twelve companies that do list it give them a 3.5.

Education/Training:

Engineering

Because this survey targeted innovative/high-tech companies, the greatest emphasis is on engineering, indicating the predominant need for employees with engineering degrees. The greater Antelope Valley region does not currently have a local college offering a four-year engineering degree. There are out-of-the-area colleges including Purdue, Cal State Fresno, Pepperdine and DeVry which are either offering or plan to offer specific engineering courses or certifications.

Based on feedback received from the major advanced degree stakeholders, one of the main problems facing both the local companies and these institutions is the communication gap between them. Specifically, colleges like Purdue are willing to offer customized courses for a given company, but there has not been evidence of sufficient interest or demand to make their offering in this region viable.

Even though there are several educational stakeholders willing and able to provide customized, project-specific training and certification for individual companies and work groups, there is an information gap. Part of the challenge is the timing and difficulty getting information about available courses into the hands of the individual department managers directly involved with the specific technical training and certification required. In cases where training needs are dictated by specific projects, as work teams are assembled, there is not sufficient lead time necessary to design and implement appropriate training courses.

Company human resources departments are traditionally the onsite "clearing house" for educational benefits, such as tuition reimbursement programs, handling the responsibility of disseminating educational opportunities to management and employees. Each college essentially solicits interest through human resources, and in effect competes for the attention of the company's gatekeepers, not to mention decision makers. Their relative success in reaching the right person within a workable time-frame depends on the marketing resources available to that college locally, as well as the quality of their contact networks.

One way to overcome this obstacle is to increase the synergies between the various educational institutions, creating a comprehensive resource guide for employers and potential employees outlining how all of the various educational institutions dovetail and complement each other. The resource would be kept updated to accurately reflect all prerequisites and courses to obtain the desired degree or certification.

It was suggested that the region develop a single resource that maps out all of the educational resources available in the Antelope Valley in a sequence which covers the basic requirements through each step of the certification or degree process. Without such coordination, potential candidates would have to rely on a high school or college counselor to be an expert on all of the resources available and requirements for highly specialized degrees required by high-tech employers.

Such a resource could be created through a task force that integrated the needs and assets of educational resources, engineering department managers, human resource professionals, college and high school counselors and resources such as the Aero Institute. If this initiative were to move forward,

Antelope Valley Workforce Gap Analysis:
WIRED Project 3.1 July 28, 2008

the first step could be to focus on engineering and technical programs, with a similar resource developed for the other vital vertical markets such as healthcare.

Hands-on Experience:

Even with the desired educational experience, many responding companies report that lack of practical, hands-on experience is a problem with the current work forces. For this reason, some companies strongly prefer to hire individuals with previous military experience/retired military. Employees with this background are considered to have practical experience, self-discipline and a positive work ethic.

Several companies state the importance of internship programs to introduce prospective employees to workplace fundamentals. A challenge with this recommendation is that internship programs require fairly extensive time commitments and offer more of a long-term benefit for the company, as opposed to an immediate one. Some companies even go so far as to advocate that an on-the-job type of internship should be *required* in order to graduate with a certification or degree.

Basic Skills:

Antelope Valley College has a highly respected curriculum offering basic courses in business, computer skills, communications, math, English and science, as well as practical vocational courses.

Soft Skills:

Antelope Valley College has developed and is promoting a comprehensive workplace skills training course, in response to feedback from all types of businesses, including innovators as well as service-related businesses. The program is affordable and highly flexible and can be adapted for specific companies or groups of companies. If it hasn't already, this program should be reviewed with our top employers for feedback, followed by a comprehensive marketing and community outreach program to ensure saturation and implementation.

How skills will evolve:

Greater cooperation and synergies are required between employers and educational stakeholders to develop and modify curricula to anticipate future needs and meet present needs. There are some provisions for local follow-up to enhance the dialogue between the stakeholders, but our region currently lacks any major type of oversight from which to build future initiatives.

Summary:

Although the number of companies surveyed for this report was not large enough to yield statistically relevant results, it raises many issues that apply to all businesses throughout the Greater Antelope Valley and the larger region as a whole. We need to ensure that our educational institutions are in tune with the changing needs of our major employers to develop a workforce with the required technical training. The employers and educational institutions need to work together to create the opportunities for those on this career path to gain practical exposure to the core occupations, so future employees can develop the theoretical framework to understand and contribute.

Problem solving skills are the biggest concern for the surveyed companies. The future need for employees to solve problems efficiently is equal to the other significant concerns for acquiring proficiency in basic skills and computer literacy. Even if these needs are met, as a community, we need to address the potential difficulty represented by the culture of "entitlement," as well as other work ethic issues.

In essence, our future success developing the workforce required by our innovative companies depends on greater communication and synergies between all of the stakeholders in the Greater Antelope Valley.

Kern Economic Development Corporation

Economic Development Partner:	Kern Economic Development Corporation
Economic Development Partner Contact:	Robin Fleming (661-862-5157)
Date:	October 3, 2008
Location:	Bakersfield, CA
Number of Companies Surveyed:	20

WIRED 3.1 Project Overview (Project Goal): Conduct a labor needs assessment of 200 entities, to include 100 key space and information technology companies and government employers, 50 space entrepreneurial and small business companies, and 50 manufacturing companies. Workforce composition, current and future skill needs, education and training gaps will be identified and included in the assessments.

Introduction:

The purpose of the survey was to gather information about the skills required for critical positions and to identify future workforce gaps in order to develop a strategy to address future California Innovation Corridor employer needs. To collect the data, the Kern EDC used the WIRED 3.1 survey instrument revised by GAVEA to allow for greater detail for rating specific skills. Four groups of employees were broken out into separate sections: Current Employees, New Hires, Future Employees and High-Performance Incumbents.

The geographic region that was covered included the greater Bakersfield metropolitan area. Due to the redundant coverage by GAVEA, the Kern EDC surveyed companies in the following industries: Valued-Added Agriculture, Energy (Petroleum and Renewables), Logistics/Warehousing, and Bio Medical. This change in target companies was approved by Christine Purcell.

Target Companies:

Out of 76 employers contacted, the Kern EDC received 20 completed surveys from Kern County companies. The largest companies included Occidental Petroleum, Chevron Oil Company, and Giumarra Vineyards with over 1000 employees each.

Summary of Surveyed Respondents:

Type	Energy		Logistics/Distribution			Bio Medical		Value-Added Ag.		Other
Count	6		2			2		3		7
FTE	0-4	5-9	11-19	20-49	50-99	100-249	250-499	500-999	1000+	
Count	0		4	0	1	6	3	3	3	
Respondent Position	HR Director		Supervisor/Manager			President/CEO		Other – Fin. Dir.		Not Stated
Count	7		3			8		2		0
Background	A: Supervise		B: Periodically Observe			C: Discuss with Supervisors		D: Other		Not Stated
Count	7		1			12		1		1

Critical Occupations

Overview:

The 20 respondents were asked to list their critical core occupations, comprising a list of 37. The responses were categorized by industry.

These were grouped into general occupation “fields” which were ranked in the table below, indicating the percentage of responses in each field.

% of Responses per Field - out of 37 listed		
Rank	Type of Fields:	% of responses
1	Engineers:	22%
2	Computer/Programmer	19%
3	Sales professionals	16%
4	Logistics/Warehousing	10%
5	Electricians (all industries)	5%

Emphasis on Engineering: The top 10 critical occupations are ranked below in descending order, starting with the largest number of responses.

Top 10 Critical Occupations - out of 61 listed		
Rank	Critical Occupation	Requested
1	Engineers - not specified	9
2	Computer/Programmer	7
3	Sales	6
4	Logistics/Warehousing	3
5	Electricians	2
6	Earth Sciences (Petroleum)	2
7	Qualified Supervisors (All fields)	2
8	Safety Professionals	2
9	Industrial Electronics	2
10	Physicians	2

Typical Education: Respondents rated the importance of each level of education for their core, critical occupations. As reflected in the excerpt below, there was not much difference among the three groups of employees. A Bachelors degree was more important, behind AA/AS and Masters degrees.

Qualifications				
AA /AS	2.4	2.2	2.2	2.2
BA/BA	2.8	2.8	2.5	2.4
MA/ MS	1.5	1.5	1.5	1.7
Ph.D.	0.8	0.9	0.9	0.8
Certificates	1.5	1.5	2.1	1.2

Major Skills Gaps:

Most Important Skills (Quantitative Data):

The detailed responses within the four categories were averaged and compared to determine skill gaps in two primary areas described below as Current and Future.

Gap A: Current		
Greatest Gap:		
Technical Skills	Materials	1.1
Computer Skills	Databases	1.0
Social Skills	Initiative	0.9
Most Important Attributes:		
Workplace Skills	Dependability	0.8
Basic Skills	Reading	0.6
Basic Skills	English	0.6
Basic Skills	Writing	0.6
Basic Skills	Math	0.8
Workplace Skills	Reliability	0.9

Gap B: Future	
Greatest Gap:	
Computer Skills	Word Processing
Computer Skills	Internet
Computer Skills	Spreadsheets
Technical Skills	Materials
Most Important Attributes:	
Basic Skills	English
Basic Skills	Reading
Workplace Skills	Dependability
Workplace Skills	Reliability
Social Skills	Problem Solving

Gap A: Largest Skill Gaps, Current compares the importance of a skill with the current employees' performance of that skill. This allows us to determine the largest skill gap between expectations and actual. From the table above, we can see that the largest gaps appear in the Social Skills category: *Decision Making, Resource Management and Judgment*.

The most important attributes include: *Reliability, dependability, followed by math and English skills*.

It is interesting to note that the majority of skills ranked above average (over 3 on a scale of 1-4) when evaluating current performance. One can assume that the hiring/screening process for innovative companies assures a level of technical knowledge and competence that may not be observed in general terms within companies with more entry-level functions such as retail and service industries.

Gap B: Largest Skill Gaps, Future compares the projected importance of a skill for future operations with the skill level encountered in new hires. The gap analysis in this section would be helpful for educators in developing the curricula for future programs to address these anticipated short-falls. From the table below, we can see that the largest gaps appear in the Computer Skills category: *Reliability and dependability once again play the most important roll for future hires*.

Qualitative Results Summary:

The information in this section was gleaned from the narrative answers and comments provided by the respondents. Question responses were analyzed to find common themes, which are ranked below to reflect the number of times they were mentioned.

Skills Summary
(20 respondents)
Communication
Computer/Internet
Customer Service
English/language
Electricity/Wind technology
Math and Science
Technical related
Written/oral communication

Identification of Future Skills:

The qualitative data suggest the following themes for future hires:

- 1) Improved communication, both written and oral
- 2) Importance of computer and Internet capabilities.
- 3) Soft skills, such as customer service are considered vital.
- 4) Math and science and earth sciences as it related to the energy industry.

Because of the way the questionnaire was designed, CAAD and CAM do not appear to be important, but that is because not all of the responding companies listed them and the survey calculates the average

Education/Training:

Engineering

The findings of the surveys suggest that Engineering skills are in demand and will continue to be in demand for future positions. Specifically, mechanical engineering was mentioned more than once as an area that needs improvement. The oil and gas industry is currently experiencing a shortage of qualified engineers. Local businesses must recruit from outside of the area for qualified applications. California State University, Bakersfield does not currently offer an engineering program, therefore, companies must go to Fresno or out-of-state to find engineers possessing a bachelor's degree or beyond.

Basic Skills:

Another area of importance to surveyed businesses includes hiring candidates with a firm grasp of the English language. Due to the nature of agriculture, a large employer in the county, language skills continue to pose a problem for businesses. The Bakersfield Adult School (BAS) does offer ESL classes in the evening to anyone in the community for a nominal fee.

Soft Skills:

Customer service and other soft skills is another primary source of concern for local businesses. One company commented that both high school and college students no longer possess customer service or office skills upon graduation. Local business will spend training dollars sending employees to classes in an effort to improve upon these skills.

Summary:

This survey cut across a variety of industry lines; however, it was interesting to see that the areas of concerns are generally the same. Lack of customer service, communication and computer skills continue to plague area businesses. English language skills are also a deterrent to hiring labor. Additionally, the energy industry is currently experiencing rapid growth in the nation and there is a definite push for growth in Kern County. These companies cannot find enough skilled labor to fill key positions in oil, gas, wind, and solar growth sectors. The most common complaint is that there are not enough prospects that understand electricity, earth sciences or math. There are currently training programs available at Cerro Coso College (Ridgecrest) and Taft College that provide specific energy industry training; however, they are not producing graduates at a fast enough rate to fill vacant positions.

Los Angeles County Economic Development Corporation

Economic Development Partner: Los Angeles County Economic Development Corporation
Carrie Rogers, VP Business Assistance and Development
Economic Development Partner Contact: (213) 236-4824
Workforce Investment Board Partner: City of Los Angeles Workforce Investment Board (LA-WIB)
Linda Mims, Senior Manager, Business Operations, LAPC
Workforce Investment Board Contact: (213) 744-7175
Date: August 28, 2008
Location: Los Angeles County
Number of Companies Surveyed: 30

WIRED 3.1 Project Overview (Project Goal): Conduct a labor needs assessment of 200 entities, to include 100 key space and information technology companies and government employers, 50 space entrepreneurial and small business companies, and 50 manufacturing companies. Workforce composition, current and future skill needs, and education and training gaps will be identified and included in the assessments.

Introduction:

The purpose of the survey was to gather information about the skills required for critical positions and to identify future workforce gaps in order to develop a strategy to address future California Innovation Corridor employer needs. To collect the data, a survey instrument was created where employers were asked to rate both the competency and importance of workforce skills. As a participant of the WIRED 3.1 project, the Los Angeles County Economic Development Corporation (LAEDC) and the Los Angeles City Workforce Investment Board (WIB) collected data from 30 City of Los Angeles employers.

To complete this project, a survey instrument was created for the 3.1 project by utilizing an LMID survey development process. Company, occupation, and staffing pattern data were analyzed to help each county identify potential target companies. The survey instrument was utilized by the LAEDC and LA City WIB during May 2008 through July 2008 to gather information on the 30 targeted companies. In addition to this survey, other relevant information was collected and utilized in this report. This summary provides an analysis of the survey and includes data from the 30 targeted key companies in the fields of hi-technology, aerospace, environmental, bio-tech, manufacturing, and transportation which represent the innovation and economic diversity of the City of Los Angeles.

Although this sample size may not be large enough to be considered relevant statistically, the survey accurately reflects the diversity within the high-tech communities within the City of Los Angeles and gives voice to common themes and workforce concerns.

Target Companies:

The Los Angeles County Economic Development Corporation and City of Los Angeles Workforce Investment Board conducted surveys of 30 Los Angeles City employers in the 325, 332, 334, 336, 483, 488, 515, 517, 541 and 561 NAICS codes.

Los Angeles County is the largest manufacturing center in the country based on the number employed within the region. In addition, Los Angeles International Airport (LAX) is the largest "origin and destination" airport in the world and the fifth largest in terms of total passenger volume. LA County is also home to the nation's largest port complex. The ports of Los Angeles and Long Beach are responsible for 45% of all consumer products shipped into the U.S. In addition, there are a number of transportation-based companies located in the region which support these industries. While these large economic generators are located in the County, there are a number of

transportation-based companies and many of the support companies that are located within the City of Los Angeles.

The region surveyed also includes biotech/pharmaceutical, manufacturing, engineering, environmental design, and high precision machining. The typical growing clusters in Los Angeles County (e.g. Entertainment and Hospitality, Retail, Aerospace, and Health Care) were excluded as target industries because of their lack of connection to technical innovation.

The following tables show the self-identified profile of the businesses surveyed.

Targeted Company NAICS Designations

NAICS	Description	FTE
325	Chemical Manufacturing	(1) 5 – 10
332	Fabricated Metal Product Manufacturing	(1) 0 – 4
334	Computer and Electronic Product Manufacturing	(1) 100 – 249
336	Transportation Equipment Manufacturing	(1) 5 – 10; (1) 20 – 49
483	Water Transportation	(1) 11 – 19
488	Support Activities for Transportation	(2) 0 – 4; (1) 5 – 10; (1) 20 – 49; (2) 100 - 249
515	Broadcasting (except Internet)	(1) 100 – 249
517	Telecommunications	(1) 1,000+
541	Professional, Scientific, and Technical Services	(1) 0 – 4; (4) 5 – 10; (4) 11 – 19; (1) 20 – 49; (2) 50 – 99; (1) 100 – 249; (1) 250 – 499; (1) 1,000+
561	Administrative and Support Services	(1) 100 – 249

Summary of Surveyed Respondents

Type	Service	Manufacturing	Transportation	R & D	Telecom	Other			
Count	2	5	7	12	1	3			
FTE	0-4	5-9	11-19	20-49	50-99	100-249	250-499	500-999	1000+
Count	4	7	5	3	2	6	1		2
Respondent Position	HR Director	Supervisor/Mngr.	President/CEO	Other	Not Stated				
Count	8	3	7	12	0				
Background	A: Supervise	B: Periodically Observe	C: Discuss with Supervisors	D: Other	Not Stated				
Count	12	3	11	4	0				

Type of Companies: Of the 30 companies surveyed, 40% indicated R & D as their primary classification, 23% transportation, 17% manufacturing, 7% service, 10% other, and 3% telecommunication. Although many of the responding companies could be characterized within several classifications, the individuals

responding to the survey did not select multiple classifications, which may reflect their single focus on the critical occupations described in the survey.

Number of Employees: Although the average number of employees of those companies surveyed was 190, it is more accurate to view them in categories: small (under 20) is 53%; small to mid (20 - 99) is 17%; mid to large (100 – 499) 23% and large (+1000) is 7%. Overall, 70% of the responding companies have less than 100 employees. This percentage is reflective of the business base of Los Angeles County, as a whole, which is predominantly made of small and medium-sized businesses.

Feedback was obtained directly from upper management that either directly supervises employee performance or regularly discusses performance with the direct supervisor, as in the case of human resources (HR).

Core Critical Occupations:

	Chemical Manufacturing Fabricated Metal Product Manufacturing Computer and Electronic Product Manufacturing Transportation Equipment Manufacturing Water Transportation Support Activities for Transportation - Aviation Broadcasting (except internet) Telecommunications Professional, Scientific, and Technical Services Administrative Support										%	
NAIC	325	332	334	336	483	488	515	517	541	561	Total	%
Critical Occupation	1	2	3	4	5	6	7	8	9	10	Total	%
Engineer	1		1						6		8	18%
Scientist									5	2	7	16%
CNC		1		2							3	7%
Technician								1	2		3	7%
Machinist		1		1							2	4%
Assembly/Line			1			1					2	4%
Demolition/Construc									2		2	4%
Project mngt			1						1		2	4%
Sales			1				1				2	4%
Operations						2					2	4%
Electrician						1					1	2%
Geologist									1		1	2%
Architectural Design									1		1	2%
Ground handlers						1					1	2%
Maintenance						1					1	2%
Molders			1								1	2%
Production solderer			1								1	2%
Product Devlpmt.									1		1	2%
Legal									1		1	2%
Analyst									1		1	2%
Drivers						1					1	2%
Admin Support									1		1	2%
Total	1	2	6	3	0	7	1	1	22	2	45	100%

Type of Employees: The chart above captures all of the various responses in terms of specific positions required for core critical occupations. On the lower scale of the chart, the small sample size of the survey limits the relevancy of the percentage weighting for each position, especially for those with only one response. However, when grouped together, the largest concentration of critical occupations are Technical (36%), such as engineering, programmers, technicians and machinists; and Scientific (19%) which spanned several occupational disciplines including environmental, aerospace, biotech and architecture. Production/manufacturing skills represent 12%.

Major Skills Gaps:

Quantitative Results Summary:

Survey Question #2	Ranking of Employees Skills	Total	Average	Gap Score	Skills Gap Priority Rank
2	Rating of Problem Solving Skills	94	3.1	0.35	4
Importance	Importance of Problem Solving Skills	104.5	3.5		
3	Rating of Workplace Skills	87.5	2.9	0.64	1
Importance	Importance of Workplace Skills	103.0	3.6		
Technical Skills	Technical Skills	541.5	3.1		
4	Rating of Occupational Technical Skills	87.0	3.0	0.40	3
5	Importance of Occupational Technical Skills	102.0	3.4		
6	Rating of Additional Technical Skills	94.0	3.1	0.13	6
7	Importance of Additional Technical Skills	98.0	3.3		
8	Rating of Computer Skills	71.5	2.6	0.53	2
9	Importance of Computer Skills	89.0	3.2		
11	Rating of Social Skills	88.5	2.95	0.22	5
Importance	Importance of Social Skills	95.0	3.17		
14	Rating of Education Sufficiency (Average)	87.3		2.9	Education Gap Priority Rank
14	Satisfaction with Entry Level	85.0	2.8	2.8	1
14	Satisfaction with Technical	90.0	2.9	3.0	3
14	Satisfaction with Professional	87.0	3.0	2.9	2

Most Important Skills:

In addition to identifying and ranking the Skill Gap, the chart above denotes how companies rated various Employee Skills in terms of importance. The following is the list of important skills, from greatest to least:

- 1) Workplace Skills 3.6
- 2) Problem Solving Skills 3.5
- 3) Occupational Technical Skills 3.4
- 4) Additional Technical Skills 3.3
- 5) Computer Skills 3.2
- 6) Social Skills 3.17

Workplace Skills, defined on the survey as judgment, decision making, management of resources and time, are ranked as most important, even above technical and computer skills. In the qualitative section of the survey, companies expanded upon these definitions to include a full range of abilities including communication, teamwork, work ethic, reliability, which would all be necessary components for good judgment and management.

All six of the skill areas are important, evidenced by a rating of 3+ and there are not wide margins between the categories.

Largest Skill Gaps:

The Skill Gap is derived from comparing the relative importance of the specific skill to the rating of the current performance of that skill. The larger the gap, the greater the dissatisfaction with the level of performance, vis a vis its impact on the critical core occupation. The Skill Gaps are ranked in terms of priority, 1 being the greatest opportunity or challenge. As with Skill Importance, Workplace Skills have the greatest skill gap and remain the greatest priority.

Education Sufficiency:

Employers are least satisfied with the quality of education of Entry Level employees, followed by Professional. Of the three categories, they are most satisfied with the educational sufficiency of Technical Employees, but the margins of difference are miniscule.

Qualitative Results Summary:

		People Skills	No	Other	Communication	Account-ability	Punctuality	Problem Solving/Commo n Sense	Work Ethic
12	Other Social Skills	3	17	4	3	3	2	2	2
		Problem Solver	Attn. To Detail	Multi-tasking	Good communication	Reliable	R & D, Science Background	Teamwork	Ability to Learn
13b	Describe best employee	4	6	2	7	5	4	4	1
		Technical	Professional	Both	Neither	N/A			
15	Critical Shortage	7	9	1	10	3			
		Regulatory Affairs, legal, insurance	Information Tech.	Project Mgt.	Scheduling, Cost Analysis	Reliability	Work Ethic	Good Business Practices	No/N/A
16	Identify Future Skills	5	1	1	1	2	2	2	18
		Math & Science	Interpersonal skills, common sense	Communication	Writing	Welding, metals, molding	Machining	CNC Programming	Legal
17	Identify Desired Training	3	5	4	4	2	4	1	1
19	Other Comments	4							

Critical Skills Shortage (Technical or Professional):

Of the 17 companies that reported a critical skills shortage, 53% identified a shortage in the area of Professional Skills; 41% in Technical Skills, and 6% in both. Six out of the 30 respondents stated that they did not perceive a shortage of professional or technical skills. **Note:** This survey question does not provide any detail regarding the definition of the terms professional and technical. This is one of the areas where the low number of responses does not represent a sufficiently large statistical pool from which to draw a strong conclusion.

Best Employees:

The top category of attributes characterizing the “best employees” includes excellent communication skills, attention to detail and reliability. Attention to detail was mentioned within the context of laboratory and research work environments. The next set of attributes includes problem-solving, teamwork and a science background.

Identification of New Skills:

Of the 30 surveyed companies, 16 either did not answer Question #16 which addressed this issue, or answered it negatively that there were no new skills that they could identify that would be required by future workers in their industry. This is interesting, considering that one of the main purposes of this survey is to help identify skills needed to equip the workforce of the future. From this, it can be concluded that the skills that are identified for current employees will be the same ones needed for future employees.

Of the 14 companies that provided a specific response, there were 13 different specific answers covering a broad spectrum ranging from technical, basic skills, soft skills and personal attributes such as integrity that employers are looking for in future employees. To demonstrate the range and diversity of these answers, they have been included in this summary:

New Skills Required by Future Workers:

	Responses	Skill Set
1	2	Artistry and Imagination
2	2	Insurance
3	2	Legal Process
4	2	Project Mgt.
5	2	Reliability/Follow-through
6	2	Social/Human Skills
7	1	Basic Programming
8	1	Green Environmental Practices
9	1	Info Tech
10	1	Moral ethics/Integrity
11	1	Regulations
12	1	RFID Technology
13	1	Writing and Communication

Education/Training Issues:**Engineering and Technical Training:**

Referring back to data presented earlier in this summary, 55% of the companies interviewed have engineering-related, scientific or technical core critical occupations. There is a wide variety of choices for obtaining advanced degrees in engineering as well as technical certification, both within the City of Los Angeles and Los Angeles County.

One of the key issues for success is ensuring that the educational providers stay in tune with the changing needs of the area innovators so that programs do not become outdated or irrelevant. This can be secured through continuous dialogue between companies and those educational institutions that develop the technology-related curricula.

Basic Training:

Nearly all of the companies surveyed identified the need for strengthening basic skills training in the areas of Communication (written and verbal), Math, and Science.

Although most professionals believe in the value of mastering basic skills, there is evidence of a growing generational disconnect among members of the younger generation of people entering the workforce as far as the perceived relevance of these skills. One of the challenges our educators face, in addition to ensuring the quality and accessibility of basic skills education, is conveying the relevance of these subjects as they relate to lifestyle and material success.

Soft Skills Training:

Based on the results of this survey, “soft skills” fall into two categories: practical skills, such as problem solving, communication and teamwork, which can be taught, and items which are more closely related to personal attributes, qualities and abilities, such; as creativity, integrity, reliability and accountability. Across all business disciplines, the need for these characteristics remains of primary importance to the core critical occupation. Even with the most rigorous technical training, can a person build a plane without them? Can our educational institutions teach these?

The first group of practical soft skills can be taught and are, in fact, increasingly incorporated into modern course work which requires students to complete projects together, encouraging teamwork and communication.

The second group of soft skills that revolve around character issues are more complex, with more complex origins and influences beyond the academic environment. These successful behaviors and character attributes are modeled in the family, churches, community organizations, schools, and within the corporate workplace. They are integrally woven throughout the fabric of these social structures. To have a positive impact on the development of desirable character traits will require an unprecedented, concerted effort and multifaceted approach.

Hands-on Experience:

In a fast-paced, competitive job environment, especially within aerospace and high-tech companies, it is assumed that educated applicants possess the skills required to be successful within a relatively short time after being hired. However, many employers are reporting that prospective employees lack the overall job knowledge and the practical foundation required for them to effectively learn on-the-job, despite possessing a college degree or technical certification. In general, companies requiring a high degree of functionality from key employees do not have the in-house programs in place to sufficiently train new employees in order to maximize successful workplace skills and overall knowledge.

Compounding this challenge, on-the-job (OJT) training programs through the LA County WIB have experienced a sharp decline in federal funding. Because of a lack of funding, many companies no longer consider OJT as a viable strategy for employee development and attraction. Fortunately, California companies have an excellent resource available to help them upgrade the skills of existing employees through the use of the state-funded Employer Training Panel (ETP) program. ETP allows companies to work with a hired consultant or educational institution to create a tailored curriculum for their training needs, while the state pays for a portion of the training.

How skills will evolve:

The results of this survey represent a fresh perspective to enhance the cooperative dialogue already underway between our business community, educational stakeholders and supportive agencies/resources such as ETP. The impact that this survey will have on how skills will evolve will be the direct result of how it is used to encourage the synergy between members of these three groups.

How to Create a Culture of Continuous Employee Education:

Traditionally, companies use the employee benefit of tuition reimbursement to encourage employee education and help attract and retain self-motivated employees. In contrast with very general tuition reimbursement programs, companies could retool these programs to address specific needs. If they do not already do so, employers could offer credits on annual performance reviews for successfully completing selected courses which are directly relevant to advancement within the organization.

Regional Investment Strategy:

Looking ahead, one possible outcome of the WIRED 3.1 Survey for the City of Los Angeles, the Los Angeles region, and for the Innovation Corridor, in general, would be to extend the reach of ETP through cross-promotion to expand awareness and outreach of programs and funding opportunities.

Survey results could be used to help create curricula that would meet the needs of innovative companies within industry clusters and geographic regions which could be replicated and extended throughout the Innovation Corridor.

Another solution is for companies to work with local educational stakeholders to expand practical internships, which would allow prospective employees to gain real-world experience and provide employers a tool to train prospective employees for workplace success. Internship programs, however,

require an investment of time and resources as well as a top-down commitment to long-term workforce development.

Summary:

Innovative, high-tech companies are a natural subset within our business community to take a leadership role in shaping a successful workforce for the City of Los Angeles, the Los Angeles region, as well as statewide. Many of the larger technology leaders have multi-city locations within the Innovation Corridor and could perhaps be brought together to develop programs that would have a great impact on California.

Due to the highly competitive nature of high-tech markets, which is increasingly global, there is a real sense of urgency for these companies to develop solutions. It is likely that without corrective action, the skill gaps identified will become more pronounced. Educational solutions take time, even with a concerted, well-coordinated effort. If solutions are not developed, the demands of the international market place may make outsourcing positions to overseas labor markets more attractive than long-term local and regional programs.

All of our stakeholders, whether they are educational, government agencies, trade organizations, or community groups have much to gain and lose. We need to extend the definition of the "Innovation Corridor" to apply to innovation in workforce development and Los Angeles is an excellent region from which to start.

All surveys conducted by:
The Los Angeles City Workforce Investment Board and
the Los Angeles County Economic Development Corporation

Orange County Workforce Investment Board

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Date:	July 14, 2008
Location:	Orange County
Number of Companies Surveyed:	20

WIRED 3.1 Project Overview (Project Goal): Conduct a labor needs assessment of two hundred entities, to include one hundred key space and information technology companies and government employers, fifty space entrepreneurial and small business companies, and fifty manufacturing companies. Workforce composition, current and future skill needs, and education and training gaps will be identified and included in the assessments.

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A. Summary of Surveyed Respondents

The purpose of the survey is to gather information about the skills required for positions at your firm and any gaps between your expectations and what is available in the current workforce. Employers were asked to rate both the competency and importance of skills. I don't understand this.

Introduction

The Orange County Workforce Investment Board (OCWIB) and Orange County Business Council (OCBC) collected data from twenty Orange County employers during January and February 2008, for the WIRED 3.1 project. The purpose of the WIRED 3.1 project was to gather information about the skills required for critical positions, identify future workforce gaps, and develop a strategy to address future California Innovation Corridor employer needs. Employers were asked to rate both the competency and importance of workforce skills. In addition to the survey data, other relevant industry information was collected and utilized in this report. This summary is the resultant analysis of the survey results and related information for Orange County.

Target Companies

OCWIB and OCBC conducted surveys of twenty local Orange County businesses categorized in the 236, 332, 336, 441, 541 NAICS codes. While Orange County is not widely known for its manufacturing base, in fact the County does have a vibrant manufacturing sector, which includes many firms that are directly or indirectly related to Aerospace and Defense. In fact, most of the manufacturing firms surveyed were directly involved in Space/Aerospace activities as their primary business. A good cross section of small, medium, and large firms were surveyed in order to understand the needs of the region on a broad basis. Because of the survey content, respondents were primarily Human Resource Directors, an occupational category that assesses workforce skills of incumbent workers and new jobseekers on a daily basis. For incumbent employees, supervisors who have direct contact and who evaluate existing employees on a regular basis were the sources of information. The following table shows the self-identified profile distribution of the firms.

Type	Service		Manufacturing			Government		Other		Not Stated
Count	8		10			0		2		0
FTE	5-10	11-19	20-49	50-99	100-249	250-499	500-999	1000+	Not Stated	
Count	1	8	3	3	1	2	0	1	0	
Respondent Position	HR Director		Supervisor/Manager		President/CEO		Other		Not Stated	
Count	16		1		1		1		1	
Background	A: Direct Observe		B: Periodically Observe		C: Discuss with Supervisors		D: Other		Not Stated	
Count	1		4		15		0		0	

Type of Employees

Engineering was the primary core critical occupation, mentioned by 60% (12) of the companies. Specific engineering sectors included Civil/Structural, Aerospace, Mechanical/Industrial, Telecom, Environmental, and Materials. Additional key occupations reported by multiple companies were Sales & Customer Service, Drafting, Computer Design, Architects, Warehousing, and Technicians.

Number of Employees

As outlined above, there were a broad range of companies in terms of size. The most numerous category was the 11-19 small business section; but, there were four companies with over 100 employees, and one company with over 1000 employees. This diversity in terms of size provided a good cross-section of Orange County companies, which tend to congregate in the small to medium size range, especially in these industry clusters.

Typical Education

All of the engineering occupations that are reported above require a 4-year Bachelors degree. Higher education levels seem to be increasing as reported by companies surveyed. Some of the sales, drafting, warehousing, and technician jobs would only require a high school or Associates degree, but even in these occupational categories the trend was toward more education rather than less.

Typical Job Experience

As noted throughout this report, experienced engineering talent is in short supply in Orange County. Many employers report that just not enough students went into engineering 10-15 years ago, especially in the Civil Engineering and Mechanical Engineering fields. Experienced engineers with 10-15 years of experience are in especially short supply, and these are most critical as they typically perform project management duties. With this shortage, engineers with even a few years of experience are considered “experienced”.

Typical Pay Range

Median hourly rates for engineers are typically \$35 to \$45 per hour in Orange County. There is some variation between sectors – Civil Engineers (\$34.55 per hour), Environmental Engineers (\$38.98), Industrial Engineers (\$34.99), Materials Engineers (\$32.42), and Mechanical Engineers (\$34.96). It is likely that experienced engineers with project management experience would command in the \$45-\$55 per hour range, and executive/management Engineering positions would go up from there.

B. Major Skills Gaps: Quantitative Results

List the top skills with the lowest rating in competency and highest rating in importance. Discuss findings.

Table B1: Major Skills Gaps: Quantitative Results					
QUESTIONS FROM SURVEY PART IV	QUESTION TOPIC	Total	Average	Gap Score	Rank Skills Gap Priority Here
2	Rating of Problem Solving Skills	60.5	3.0	0.38	4
Importance	Importance of Problem Solving Skills	68.0	3.4		
3	Rating of Workplace Skills	52.5	2.6	0.70	1
Importance	Importance of Workplace Skills	66.5	3.3		
4	Rating of Occupational Technical Skills	57.0	2.9	0.40	3
5	Importance of Occupational Technical Skills	65.0	3.3		
6	Rating of Additional Technical Skills	65.0	3.3	-0.05	5
7	Importance of Additional Technical Skills	64.0	3.2		
8	Rating of Computer Skills	50.0	2.5	0.50	2
9	Importance of Computer Skills	60.0	3.0		
11	Rating of Social Skills	60.0	3.0	-0.08	6
	Importance of Social Skills	58.5	2.9		
14	Rating of Education Sufficiency	61.7	3.1	3.1	Rank Education Gap Priority Here
14	Satisfaction with Entry Level	58.0	2.9	2.9	1
14	Satisfaction with Technical	67.0	3.4	3.4	3
14	Satisfaction with Professional	60.0	3.0	3.0	2

Aggregate Workforce Rankings

The cumulative overall ranking of today's workforce was 3.1, but varied by type of employee. Technical employees were rated highest at 3.4, Professional employees were rated at 3.0, and Entry-Level employees lowest at 2.9 on average. Employers, however, reported the highest levels of shortages in the Professional workforce (12 companies), with five (5) reporting shortages of Technical workers, and none reporting of shortages of Entry-Level workers.

Most Important Skills

The survey results indicated there are a variety of skills that employers felt were most important. Depending on the job type, answers varied throughout the range and there was not much variation in the scores. However, the data did show that "Creative Problem Solving" (3.4 importance), "Workplace Skills" (3.3 importance), and "Technical Skills" (3.3) were the three most important skills overall. Generally, Engineers, Sales, and Customer Service occupations were reported to be in greatest demand/shortest supply. In analyzing the open-ended responses to the most important skills questions, the following were reported as *most important* by many employers in the survey:

- Experience
- Technical Knowledge
- Problem Solving
- Attention to Detail
- Communications Skills
- Understanding of Client/Customer Needs

Largest Skill Gaps

By comparing the importance of a skill vs. the current performance of that skill the largest skill gap between expectation and actual can be determined. From the table, *Workplace Skills* (0.70 gap) has the largest gap, followed by *Computer Skills* (0.50 gap), *Occupational Technical Skills* (0.40 gap), and *Problem Solving Skills* (0.38 gap). These rankings mirror OCWIB and OCBC environmental scans of other industries in Orange County which have reported similar gaps in all four categories. In contrast, the

Orange County Workforce Gap Analysis:
WIRED Project 3.1 Report: July 2008

smallest gaps were *Additional Technical Skills* and *Social Skills*, where the ranking of current employees was actually higher than the importance of those skills.

These results show that local education and training institutions still have a fairly long way to go to address employer needs in these industries, and the gaps are across the spectrum of important skills. While many of the skills reported as deficient were somewhat workplace/company specific, many were skills gaps that should have been addressed previously with education and training. Perhaps this is why companies report that there is no shortage of entry-level workers, as their expectations for this type of worker may be generally lower. Conversely, most companies report shortages of experienced workers, in which most, if not all, of these skills are expected to be present upon hire.

Particularly troubling is that scores in these four key areas reported as “Major Skills Gaps” – “Workplace Skills”, “Computer Skills”, “Occupational Technical Skills”, and “Problem Solving” – were reported as most severe by the manufacturing companies surveyed. In general, manufacturers reported lower numbers in almost every category compared to companies in other industries. There were some particularly low marks for Computer Skills from several manufacturing respondents which does not bode well for the future of manufacturing in our region and State. Most manufacturers in California must continually become more productive in order to stay competitive in our global economy. The primary way in which they do this is through technology, primarily computers and computer interfaces. Low ratings by several companies could mean that unless this computer skills gap is remediated, these companies will become less competitive over time and move or simply go out of business.

A table of individual occupation ratings can be found in the addendum.

C. Major Skills Gaps: Qualitative Results

Rate the skills gaps as defined by survey respondents' qualitative comments. Discuss findings.

Table C1: Major Skills Gaps: Qualitative Results							
Trend of Responses: Top Rated Skill Gap Has Highest Score							
Critical Skills Required	Technical Skill	Basic Skills	Trouble-shooting	Customer Service			
	15	2	3	4			
Social Skills Desired	Good with People	No	Other				
	2	16	2				
Best Employees are...	Independent	Certified	Willing to Learn	Experienced	Communicator	Team Player	Time Manager
	3	2	4	6	3	1	1
Critical Shortage	Professional	Technical	No				
	12	5	4				
Identify Future Skills	Technical	Computer Skills	Reading Writing	None			
	2	6	1	11			
Desired Training	Technical	Leadership	Computer Skills	Personal	Ethics	College/Univ. Programs	
	2	4	1	4	1	4	
Other Comments?	NO						
	20						

Critical Skills Shortage--Technical or Professional

Sixty percent (12) companies reported that their critical skills shortage is at the Professional level. Only twenty-five percent (5) companies reported that their primary shortage is with Technical employees.

Best Employees

The characteristics identified for "Best Employees" were surprisingly diverse in, although once again "Experienced" came up as the most desired trait. "Willing to Learn" was second, and shows that there are great opportunities for education and training institutions to partner with employers to provide targeted training. Conversely, it is likely that some skills are very company/workplace specific and can only be taught at the workplace by the employer. The need for "Workplace Skills" also shows up in the qualitative responses of "Independent", "Trouble-shooting", "Team Player", and "Time Management". Finally, soft-skills such as "Customer Service" and "Communicator" were deemed important primarily by those companies who see customers at their workplace on a regular basis.

Identification of Future Skills

Employers often have a difficult time identifying specific future skills. This is likely because technology and global competitive forces are changing the workplace and the nature of work so rapidly that employers do not believe they can accurately forecast future skills with any certainty. In this survey, 11 respondents chose not to answer this question. Of those who did answer, "Computer Skills" was far and away the most frequent answer which demonstrates how prevalent computers have become in the workplace, and how critically important computer skills are to employers. Two companies cited "Technical Skills" as future skill needs, and one employer cited basic "Reading and Writing".

D. Regional Training Resources

List the regional training resources where the skills gaps identified in section B may be addressed.

Available Training

The Workforce Investment Act requires States to establish a list of training providers who are eligible to receive the WIA funds for training services. WIA also requires that local boards establish a listing of training services and programs that are directly linked to the demand occupations for that area. The intent of the legislative requirement is that individuals will be trained for jobs that are readily available in the local area.

The OCWIB updates the Demand Occupation List for Orange County after the State's Labor Market Occupational Projection is updated. The Employment Development Department Labor Market Information Division (EDD LMID) determines the Employment Change, Entry Level Wage and Education / Training Levels for each occupation listed. In addition to the information provided by the State, the OCWIB considers the local labor market information, trends, and focused on skills that are in high demand in the regional economy. However, a study of Orange County local resources show that more than half of demand occupations do not have corresponding training programs to help meet the need of skilled workers in those fields, most of which require an AA degree or Post Secondary Vocational Education. Training programs for demand occupations are offered throughout Orange County by private vocational schools as well as community colleges; Table D1 lists the occupations being served with existing training programs by WIA Training Providers. Table D2 lists the occupations not being served with existing training programs by WIA Training Providers, and Table D3 lists the community colleges offering demand occupation training.

Table D1: Demand Occupation with Training Programs Listed on the ATPD

SOC Code	Occupational Title	Education / Training*
29-2052	Pharmacy Technicians	1-12 Months OJT
31-9091	Dental Assistants	1-12 Months OJT
31-9092	Medical Assistants	1-12 Months OJT
53-3032	Truck Drivers, Heavy & Tractor-Trailer	1-12 Months OJT
49-9052	Telecommunications Line Installers & Repairers	12-Months OJT
33-9099	Protective Service Workers, All Other	30-Days OJT
43-3011	Bill & Account Collectors	30-Days OJT
15-1041	Computer Support Specialists	AA Degree
15-1099	Computer Specialists, All Others	AA Degree
23-2011	Paralegals & Legal Assistants	AA Degree
29-2012	Medical & Clinical Laboratory Technicians	AA Degree
29-2031	Cardiovascular Technologists & Technicians	AA Degree
29-2032	Diagnostic Medical Sonographers	AA Degree
29-2034	Radiological Technologists & Technicians	AA Degree
29-2071	Medical Records & Health Information Technician	AA Degree
31-2021	Physical Therapist Assistants	AA Degree
17-3019	Drafters, All Other	Post-Secondary Voc Ed
29-2055	Surgical Technologists	Post-Secondary Voc Ed
29-2061	Licensed Practical & Vocational Nurses	Post-Secondary Voc Ed
29-2099	Health Technologists & Technicians, All Other	Post-Secondary Voc Ed
31-9094	Medical Transcriptionists	Post-Secondary Voc Ed

SOC Code	Occupational Title	Education / Training*
43-6012	Legal Secretaries	Post-Secondary Voc Ed
49-3023	Automotive Service Technicians & Mechanics	Post-Secondary Voc Ed

Table D2: Gaps in Training Programs for Demand Occupations

SOC Code	Occupational Title	Education / Training
19-4021	Biological Technicians	AA Degree
17-3022	Civil Engineering Technicians	AA Degree
29-2021	Dental Hygienists	AA Degree
17-3024	Electro-Mechanical Technicians	AA Degree
17-3029	Engineering Technicians, Except Drafters, All Other	AA Degree
17-3025	Environmental Engineering Technicians	AA Degree
19-4092	Forensic Science Technicians	AA Degree
19-4093	Forest and Conservation Technicians	AA Degree
17-3026	Industrial Engineering Technicians	AA Degree
19-4099	Life, Physical, & Social Science Technicians, All Other	AA Degree
17-3027	Mechanical Engineering Technicians	AA Degree
31-2011	Occupational Therapist Assistants	AA Degree
29-1111	Registered Nurses	AA Degree
29-1126	Respiratory Therapists	AA Degree
29-2056	Veterinary Technologists & Technicians	AA Degree
49-3011	Aircraft Mechanics & Service Technicians	Post-Secondary Voc Ed
13-2021	Appraisers & Assessors of Real Estate	Post-Secondary Voc Ed
49-3031	Bus & Truck Mechanics & Diesel Engine Specialists	Post-Secondary Voc Ed
35-1011	Chefs & Head Cooks	Post-Secondary Voc Ed
53-2012	Commercial Pilots	Post-Secondary Voc Ed
43-9031	Desktop Publishers	Post-Secondary Voc Ed
29-9099	Healthcare Practitioners & Technical Workers, All Other	Post-Secondary Voc Ed
51-9071	Jewelers & Precious Stone & Metal Workers	Post-Secondary Voc Ed
41-9022	Real Estate Sales Agents	Post-Secondary Voc Ed
49-2098	Security & Fire Alarm Systems Installers	Post-Secondary Voc Ed
25-1194	Vocational Education Teachers, Postsecondary	Post-Secondary Voc Ed

Table D3: Local (Orange County) community colleges that have training programs serving demand occupations.

<u>Santiago Canyon College</u>		<u>Saddleback College</u>	
19-4021	Biological Technicians	19-4021	Biological Technicians
17-3024	Electro-Mechanical Technicians	17-3022	Civil Engineering Technicians
51-9071	Jewelers & Precious Stone & Metal Workers	17-3024	Electro-Mechanical Technicians
19-4099	Life, Physical, & Social Science Technicians, All Other	19-4099	Life, Physical, & Social Science Technicians, All Other
		29-1111	Registered Nurses
<u>Santa Ana College</u>		<u>Irvine Valley College</u>	
19-4021	Biological Technicians	19-4021	Biological Technicians
17-3022	Civil Engineering Technicians	41-9022	Real Estate Sales Agents
17-3029	Engineering Technicians, Except Drafters, All Other		
29-9099	Healthcare Practitioners & Technical Workers, All Other	<u>Coastline Community College</u>	
17-3026	Industrial Engineering Technicians	13-2021	Appraisers & Assessors of Real Estate
19-4099	Life, Physical, & Social Science Technicians, All Other	19-4021	Biological Technicians
17-3027	Mechanical Engineering Technicians	41-9022	Real Estate Sales Agents
31-2011	Occupational Therapist Assistants		
29-1111	Registered Nurses	<u>Cypress College</u>	
<u>Golden West College</u>		49-3021	Automotive Body & Related Repairers
27-4011	Audio & Video Equipment Technicians	49-3023	Automotive Service Technicians & Mechanics
49-3021	Automotive Body & Related Repairers	15-1099	Computer Specialists, All Other
49-3023	Automotive Service Technicians & Mechanics	15-1041	Computer Support Specialists
15-1099	Computer Specialists, All Other	31-9091	Dental Assistants
15-1041	Computer Support Specialists	43-9031	Desktop Publishers
17-3019	Drafters, All Other	29-2099	Health Technologists & Technicians, All Other
17-3029	Engineering Technicians, Except Drafters, All Other	29-2034	Radiological Technologists & Technicians
17-3025	Environmental Engineering Technicians	21-1093	Social & Human Service Assistants
	Human Resources Assistant, Except Payroll & Timekeeping		
43-4161	Human Resources Assistant, Except Payroll & Timekeeping		
41-9022	Real Estate Sales Agents		
29-1111	Registered Nurses		

Desired Training

The importance of “Workplace Skills” is emphasized by the desired training reported by businesses in the survey, while the relatively low levels of desired training in technical skills and computer skills needs to be further examined.

The high desire for leadership and personal training is very interesting. While technical skills and even computer skills can be relatively company specific, especially in these industries, leadership and personal training overarches almost every industry and company. Survey analysis indicates that these type of courses may be proxies for experience – in other words, grooming perhaps the executive team for the future when experienced workers are in short supply. It also speaks to the very nature of current workplaces where those experienced workers are in high demand and; therefore, every perk and benefit necessary to keep those employees vital and engaged is important, as keeping any experienced worker is vital.

In keeping with this trend toward the need for better trained employees at the middle and upper level (rather than entry level), companies primarily stated their desire was for college and university training. An even better example of this is the company that mentioned “Ethics”, a new need very critical to very high functioning companies in the wake of Enron, WorldCom, and Sarbanes-Oxley.

The relatively low scores for technical and computer skills training are at first puzzling, as in several other portions of the survey these were reported as both important and lacking in current employees/jobseekers. Perhaps employers do not believe that most training available in these areas is up-to-date or valuable. Conversely, these skills may be very company specific and therefore the solution may be to utilize Employment Training Panel (ETP) funding or community college training geared very specifically to that company’s unique training needs.

How skills will evolve

Based upon the survey and documented also by OCWIB and OCBC extensive workforce research in Orange County, the skills needed in these types of businesses are constantly evolving upwards. In order to maintain competitiveness, the future workforce will need to be higher- skilled in terms of both technical and computer skills. What is somewhat new in terms of high importance are “Workplace Skills”, including Project Management, Time Management, Team Building, Leadership, and Ethics. As the nature of work moves much more towards project based, both for employers and employees, these types of skills take on singular importance. However, they are rarely taught in our K-12, community colleges, or universities. Sector specific courses in these areas would be an excellent addition to Orange County’s education and workforce training system. The trend toward project based learning is starting to take root in some charter and magnet schools, but for the incumbent workforce and retraining of jobseekers, these kinds of courses could easily be developed by the County’s four community college districts or university extension programs through the University of California, Irvine, California State University, Fullerton, and Chapman University. University extensions are particularly suited to this type of training due to a greater degree of flexibility and agility in curricula development.

Continued Employee Education

The majority of the companies reported that they must use a combination of “on the job” and “outside” training as their means for keeping their employees current with technology and workplace skills. Typical outside training included attending seminars, symposiums, conferences, and/or reimbursement for relevant college courses.

E. Regional Investment Strategy

Discuss the strategy to be taken by the partner organization to address the skills gaps identified in section B.

For technical skills and cluster-specific education at the K-12 level, there is promising movement starting with programs such as BITA (Building Industry Technology Academy) at several high schools and High School Inc. in Santa Ana which just completed its first year. The hypothesis that education should only provide the fundamental knowledge base for a worker is being replaced by the realization that much more is needed in the global competitive environment. In fact, the U.S. nationally is far behind the rest of the world in this realization. Cluster relevant education involving project based learning, internships, and partnerships with business are the only way to make the workforce and economic base sustainable in the modern environment.

The OCWIB has been especially proactive in applying the cluster approach to targeted industry specific training partnerships, such as the Healthcare Collaborative, the C3 project (Computer Cluster Collaborative) and several other good examples of how public-private partnerships pay immediate dividends for both jobseekers and the business community. Orange County Business Council (OCBC), community colleges, and university extension programs have been especially good at identifying needs of the workplace, designing relevant training programs, and providing the institutional capacity and infrastructure to see these programs to fruition. Many successes of this approach have already been documented in Orange County.

Based upon this survey and related research projects, several areas appear ripe for program development. Industry specific computer skills training is one example from the survey, but also in the ancillary healthcare industry collaboration. A suite of cluster-specific "Workplace Skills", encompassing Leadership, Project and Time Management, Communication, Team Building, and Ethics would certainly pay dividends as well.

F. Summary:

The database developed from surveying twenty Orange County businesses is rich and further work should be done analyzing more in-depth company specific trends. This summary paints a picture of the results, both the commonalities and the gaps/mismatches that were larger than single company specific issues. In general, businesses spend 99% of their day with company specific issues, as they should in this very competitive environment, especially for manufacturing. This leads to some overall conclusions about how workforce and economic development organizations can best work with businesses under these conditions.

In general, employers are able to articulate their current needs which are documented and outlined in this report. Forecasting the future is more difficult for them, and studies such as this can be very helpful in identifying key trends and/or gaps and mismatches that are common across several businesses. As there are a multitude of training programs and educational institutions, employers, in general, have a hard time identifying which ones might be important and useful to their employees. Publication of these opportunities in a concise, cluster specific communication tool developed and distributed on a regular basis would certainly be helpful to many employers.

Finally, the fundamental nature of employment and the workplace is changing, especially in Orange County, driven by global competitive pressures and demographic changes. The overriding theme running through all of this project's survey data is that experience is the most valuable, critical, and sought after characteristic that most employers are having problems finding these days. Experienced workers can not just be "created"; however, the OCWIB and partners can continue to play a key role in a couple of ways –

the simplest of which is being a matchmaker between employers and employees. OCWIB plans to utilize the results 3.1 survey in our business community to further refine skills training policies on the WIB level to meet local need. OCWIB will add this new skills needs assessment to our current combination of the cluster concept, in use for 6 years in Orange County, with the Demand Occupation List information provided by LMID, to constantly refine and redefine workforce development policies. OCWIB and OCBC are jointly revising and updating the Orange County clusters, and results from the survey will be incorporated into this decision making process.

Transforming the public workforce system

The OCWIB has already begun to dovetail the WIRED project process with the training policy of the board. Information provided by LMID for purpose of conducting the 3.1 survey was taken into consideration alongside the WIB's local clusters policy when determining the target survey community. LMID data is combined with cluster definitions to determine and fine-tune training programs and drive the direction of workforce development. Obvious skills gaps identified in the survey result data will be incorporated into existing WIB policy on training investments. The skills needs will be compared with existing training programs at Orange County community colleges and vocational programs, and the training gaps will be addressed and incorporated into future WIB policy refinements, including assistance to colleges in capacity building wherever possible.

Development of cluster specific training and retraining programs that serve as proxies for experience have paid dividends for the Orange County workforce and employers. Those characteristics embodied by experience, such as Leadership and Project Management, can be the focus of new training program development. Some of the newly developed training strategies have included ramped-up training efforts for Science, Technology, Engineering, and Math (STEM), as well as the development of a successful Leadership and Management Program (LAMP) in partnership with the Extension of University of California at Irvine, with majority funding by the US Department of Labor through a High Growth Initiative Grant and significant employer contribution from the companies whose workers received the training; namely, Edwards Lifesciences, AMO, and Beckman-Coulter, all Orange County-based companies. The success of this LAMP program at UCI Extension is such that the university has moved to make the 2-week course available to the general public as part of the regular Extension course offering, sustaining the curriculum beyond the term of the grant.

The Workforce Investment Board plans to continue to study the skills gaps identified in this study to further refine the OCWIB Demand Occupation List and investment in appropriate training programs that will address the needs of both the employer and the once-and-future employees.

All surveys conducted and summary report authored by: Compilation of survey responses by:

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G. Data Compilation

Compiled data spreadsheet(s) [provided to CSA]

County of San Bernardino Workforce Investment Board

Project Organization: -	County of San Bernardino Workforce Investment Board 215 North D Street, Suite301, San Bernardino, CA 92415-0046
Project Contact:	Deborah Dukes 909-387-9865
Companies Surveyed:	20

Introduction

The purpose of the project and survey was to Identification of current and future workforce skill gaps in order to develop a strategy to address the needs will go far in achieving the overarching WIRED intention to “Optimize the Corridor for innovation and 21st Century workforce competitiveness”. This project has linkage with nearly all projects in the 3.0 series of talent development, but also specifically correlates with Project 1.2 which is addressing workforce skill gaps of specific industries while this project will drive down to individual pre-defined types of companies and government entities. All other projects that deal with technical workforce preparation will be looking to the results of this project to assist them to understand the current and projected workforce skill gaps.

As a member of the project team, San Bernardino County Workforce Investment Board utilized a California Employment Development Department, Labor Market Information Division (LMID) survey development process. Company, occupation, and staffing pattern data were analyzed to help each county focus in on potential target companies and survey 20 employers: The survey was used as an outreach to a targeted group of innovation drivers and referral entities as a means of identifying current and future workforce skill gaps in order to develop a strategy to address these needs.

Targeted Companies

The San Bernardino County Workforce Development Department (WDD) developed a preliminary list of industries to be surveyed. The workforce board and representatives of organized labor and economic development organization reviewed this list Based upon the input of these organizations, some industries were eliminated and some were added. A criterion was developed and applied to narrow the list of possible industries. The criteria was the industry had to have a substantial employment base in the county, it must have a high Location Quotient, (anything above 1.0 is considered high) there should be a substantial number of projected job openings in the county, and the industry had to appear to have substantial potential for earning capacity. The 3 NAICS chosen were as follows:

Continued on next page

**Targeted
Companies
(continued)**

484 Truck Transportation

In San Bernardino County the Truck transportation employed 17,938 employees and 672 employers. It's Location Quotient(LQ) is 3.74 and had a payroll of \$198,197755.

541-Professional, Scientific, and Technical Services

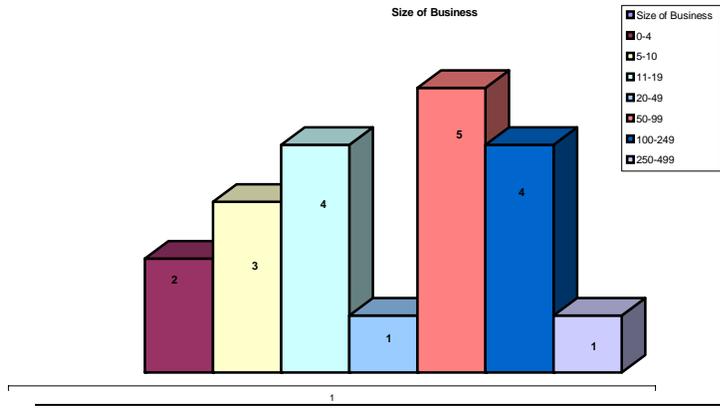
In San Bernardino County the professional and technical services industry employed 20,256 employees with 2,513 employers. Location Quotient(LQ) was only 0.48 however its change in LQ was up 25% and its payroll was \$226,433,293 near, if not the top.

423-Merchant Wholesalers, Durable Goods

In San Bernardino County the Merchant Wholesalers employed 21,578 employees and 1,140 employers. It's Location Quotient(LQ) is 1.4 and has a payroll of \$241,778,502.

**Targeted
Company
Profile**

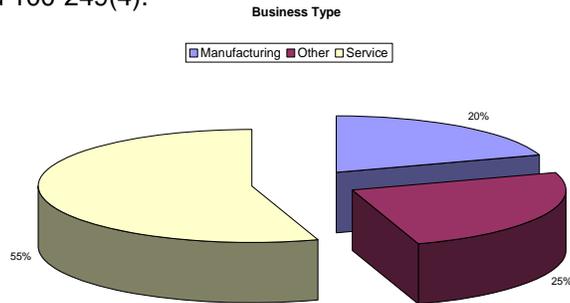
NAICS	Business Type	FTE
541330	Engineering- Job Shop	50-99
484230	Trucking-Motor Freight	250-499
423810	Contractors-Equip/Supls-Dirs/Svc	11-19
484110	Trucking-Motor Freight	11-19
541710	Physical Engineering	0-4
541380	Laboratories-Testing	11-19
423840	Hose Couplings Wholesale	5-10
541720	Philanthropic Research	0-4
423440	Restaurant Equipment & Supplies (Wholesale	20-49
423450	Dental Equipment & Supplies-Wholesale	5-10
541330	Contractors-Engineering General	100-249
484230	Trucking	100-249
484110	Trucking- Delivery	100-249
484230	Trucking-	100-249
541330	Engineers-Consulting	50-99
541380	Testing	50-99
54130	Architects	50-99
484110	Trucking-Moving	50-99
541712	Commercial Biomedical Research	11-19
541712	Manufacturing	5-10



Continued on next page

Summary of Surveyed Respondents

The majority of the companies surveyed described their business types as service. Most of the respondents were Human Resource managers. Of the companies surveyed when it came to Full-Time Employees (FTE) it was nearly equal among 50-99 (5) and 100-249(4).



Profile of Respondents

Type	Service	Manufacturing	Government	Other
Count	11	3	0	6
Respondent Position	HR Director	Supervisor or Manager	President/CEO	Other
Count	10	4	3	3
Background	Direct Observance	Periodic Observance	Discussions w/ Supervisors	other
Count	8	3	9	0

**Type of
Employees**

Freight is an important part of the transportation sector, and the transportation sector is in itself a major component of San Bernardino County's economy. Therefore it was not surprising that six of the companies surveyed were in the trucking business. The occupations employed by the trucking employers included packers, truck drivers, material movers, expeditors, managers and supervisors.

Employees of Engineering companies were the next most represented employees. Four of the employers were engineering firms. More than one-fourth of their workforce is professional and technical workers, with such occupations as engineers (aerospace, mechanical, chemical, industrial, computer, electrical), engineering technicians, system analysts, and computer programmers. Product assembly and material handlers occupations (e.g., precision inspectors and testers, aircraft mechanics, tool and die makers, machinists, aircraft structure assemblers, electrical assemblers, machine tool operators, general assemblers) garner a significant share of the engineering workforce.

Continued on next page

Critical Employees

Summary

Occupational Title	Median Hourly Wage	Education/Training Minimum Requirement
Mechanical Engineer	\$36.17	Bachelor's degree
Civil Engineer	\$37.50	Bachelor's degree
Machinist	\$16.96	
Aeronautical Engineering	\$40.41	Bachelor's degree
Truck Driver Heavy	\$21.10	Moderate-term on-the-job training (1-12 months)
Truck Driver Light	\$13.88	Moderate-term on-the-job training (1-12 months)
Laborers and Freight, Stock, and Material Movers, Hand	\$10.19	30 day OJT
1 st Line Supervisor Material Movers	\$22.30	12 Month OJT
Quality Control Inspectors	\$33.73	Moderate-term on-the-job training (1-12 months)
Operations Manager	\$45.55	Bachelor's degree
Architect	\$32.41	Bachelor's degree
Bio technicians	\$17.93	Associate degree
Researchers	\$26.88	Bachelor's degree
Seamstress	\$10.53	30 day OJT
Electrical Engineer	\$39.47	Bachelor's degree
Machine Tool Operators	\$16.61	Moderate-term on-the-job training (1-12 months)
Transportation, Storage, Distribution Managers	\$37.80	Work experience (in related occupation)
Sales Representatives, Wholesale and Manufacturing, Technical	35.07	Moderate-term on-the-job training (1-12 months)

Education

Due to the broad range of occupations of the surveyed companies' there is a wide range of educational experience. A Bachelor's degree is required at a minimum for architects, and engineers to on the job training for material movers and drivers.

Job Experience

A majority of the companies surveyed hire employees with no job experience. The jobs requiring the minimum education were more inclined to hire without experience. Two architectural firms hire from the pool of recent college graduates. One engineering firm hires only engineers, with at least five years of experience in their specialty. The company employing seamstress require that they speak English and can prove their right to work in this country.

Wages

The median hourly wage for the Riverside San Bernardino MSA is \$15.14 per hour. Which is below neighboring Los Angeles \$16.83 and Orange County at \$17.76. Only three occupations fall below that median those occupations are Truck Driver Light at \$13.88, Seamstress at \$10.53 and Laborers/Material Movers at \$10.19. The occupations with the highest median hourly wage are Operations Managers at \$45.55 and Aeronautical Engineers at \$40.41.

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Major Skills Gaps

WIRED 3.1 Survey					
Part IV: Questions	Part IV Details	Total	Average	Gap Score	Rank Skills Gap Priority Here
2	Rating of Problem Solving Skills	65.0	3.3	0.10	5
Importance	Importance of Problem Solving Skills	67.0	3.4		
3	Rating of Workplace Skills	58.5	2.9	0.88	1
Importance	Importance of Workplace Skills	76.0	3.8		
4	Rating of Occupational Technical Skills	59.5	3.0	0.38	3
5	Importance of Occupational Technical Skills	67.0	3.4		
6	Rating of Additional Technical Skills	71.5	3.6	-0.18	6
7	Importance of Additional Technical Skills	68.0	3.4		
8	Rating of Computer Skills	54.0	2.7	0.15	4
9	Importance of Computer Skills	57.0	2.9		
11	Rating of Social Skills	58.0	2.9	0.65	2
	Importance of Social Skills	71.0	3.6		
14	Rating of Education Sufficiency	50.0	2.5	2.5	Rank Education Gap Priority Here
14	Satisfaction with Entry Level	49.0	2.5	2.5	1
14	Satisfaction with Technical	54.0	2.7	2.7	3
14	Satisfaction with Professional	51.0	2.6	2.6	2

Most Important Skills

On a scale from 1-4, with four being the highest, the surveyed companies reported a variety of skills they felt were most important. *Workplace Skills* and *Additional Technical Skills* were the two most important skills in response totals. *Computer Skills* ranked the lowest in important skills of the respondents.

Largest Skill Gaps

Comparing the importance of a skill to the current performance of that skill it can determine the largest skill gap between what the employer expects and the actual skills of the employee. From the responses of the survey, the gap of *Work Place Skills* and *Social Skills* showed the largest gaps. In the area of time management and decision making three companies identified these skills as weak among employees. One manager said “This generation is afraid to make a simple decision on their own, the wait for someone to tell them the next step.” *Social Skills* are very important in the trucking industry because of the interaction between the employee and the customers. On a scale from 1-4 with four being the highest, five out of the six trucking companies rated *Social Skills Importance* a four.

Continued on next page

Qualitative Results Summary

WIRED 3.1 Survey				Trend of Responses		
	Technical Skills	Basic Skills	Communication Skills	Customer Service	Problem Solving	
1.a. For each occupation, what are the most critical skills of these occupations?	6	11	3	6	3	
	Team Player	Adaptable	Drug Free			
12. Are there any social skills not mentioned which you include in entry level expectations, now, or will in the future? Please discuss.	3	1	1			
	Treainable/ Fast Learner	Strong	Clean Driving Record	Motivated	Multi Tasker	Positive Attitude
13.b In terms of technical abilities and organizational fit, please identify the characteristics, which best describe your most effective, reliable technical employees for each critical occupation:	2	2	2	3	3	4
	Technician	Professional	Both			
15. Is there a critical skills shortage, if so, is it more at the:	14	6				
	Technical Skills	Computer Skills	Other			
16. Are there any new skills sets that may be required of future workers in this industry?	3	4	3			
	Soft Skills	High School Math	Softwar Skills	High School Vocational Skills		
17. Are there any classes or training programs you would like to see covered during high school years or offered by the local community college that would better prepare potential employees for employment by your company?	2	1	2	1		
	No Comment	Benefits of Survey	Illegal Workers	Bilingual Workers		
19. Are there any further comments you would like to make?	17	1	1	1		

Best Employees

It is not surprising that the best employees in higher level positions have excellent technical knowledge while a solid foundation in “the basics” is essential for lower level positions. Nearly half of the companies surveyed mentioned good communications skills as very important, cutting across all types of occupations from engineers and architects to truck drivers. Teamwork is also highly valued for a variety of types of companies in the engineering and trucking firms. Thinking critically and acting logically to evaluate situations, solve problems and make decisions ranks high on the list for best employees.

Identification of Future Skills

The forecast for more technical skilled employees is positive. More and more companies including the trucking industries are using computers. Tracking of loads and drivers is now being done by GPS systems. Technology will dominate learning environments in the future. More and more learning will be done by distance learning classes thereby making basic computer knowledge skills a must for nearly all employees. Six respondents stated that they see more computer skills needed in the future.

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Critical Skills Shortage

All twenty of the companies surveyed indicated that there is a critical shortage at the professional or technical level. The majority, fourteen, of those stating more of a shortage of Technicians. Across the transportation, warehousing and durable wholesale sectors in San Bernardino County nearly 13,000 jobs require a high school diploma or less this helps explain the reason the Professional shortage is not as great. There has been a recent surge in the County's office construction and this should attract more professionals and the trend could very well change in the coming years.

Desired Training

Employers stressed the need of more training in the high school setting. The needs most often stated were math and vocational classes.

How to Continue Employee Educations

Most of the trucking companies rely on "on the job training" rather than outside training. The engineering and research companies have tuition reimbursements for their employees as well as continuing education and training by outside trainers.

Regional Investment Strategy

The San Bernardino County Workforce Investment Board (WIB) is charged with addressing major workforce issues in the county. The WIB's role is to convene appropriate parties around these issues. They create dialogue among relevant parties, and generate creative, innovative solutions through consensus and to enlist community commitments to action, in order to achieve a competitive advantage.

Creating these competitive advantages requires the community to be more strategic. Acting to facilitate this approach, the WIB is beginning to engage other community leaders in carefully crafting strategies to identify and build these competitive advantages within each of the major regions in the county. These strategies will capitalize on industries that already exist, help broker innovative workforce solutions between the public and private sectors, engage business in the strategies needed for long term workforce solutions, and in general, change the paradigm in regards to business investment in employment development.

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Summary

Although this survey tool did not result in statistically relevant results, it did provide insight into San Bernardino County's workforce composition, current and future skill needs and education and training gaps. Compared to neighboring Los Angeles, Orange and San Diego Counties, San Bernardino County has a lower portion of its workforce in the professional, scientific and technical services sector. However, the survey's targeted industries of specialty *Truck Transportation, and Merchant Wholesalers, Durable Goods* represent growing segments in the area's economy. Several of the leading economic sectors in San Bernardino County are in the Truck Transportation, Warehousing, and Durable Wholesale Goods. The wage rates for occupations in these sectors are higher or at the median wage for San Bernardino County. Most of these jobs require only a high school degree or less.

In the *Professional, Scientific, and Technical Services* there is a strong projected growth within San Bernardino County. However for an economy to continue growing the labor force must provide appropriately trained employees to meet business demand. In addition, to attract or develop growth in the Professional Scientific and Technical Services, more educational facilities that supply workers in this field are needed. In order to thrive this industry will need a continued supply of trained workers, which is not being met. The County of San Bernardino has not yet capitalized on the higher-education, growth sectors of the information economy.

While occupations that require minimal education is good is shows a weakness in the San Bernardino economy by the limited growth of jobs that require higher levels of education. Erasing the education shortfalls will require collaboration among educational institutions and local businesses within the county. The San Bernardino County WIB is part of the Education Alliance, and has developed a strong partnership with the local Academic community of the county. This report should help in identifying the training and educational needs gaps.

Private Industry Council of San Luis Obispo County

Workforce Investment Board Partner:	Private Industry Council of San Luis Obispo County
Workforce Investment Board Partner Contact:	Lee Ferrero, President and CEO, (805) 788-2016
Economic Development Partner:	Economic Vitality Corporation of San Luis Obispo County
Economic Development Partner Contact:	Michael Manchak, President and CEO, (805) 788-2013
Date:	May 28, 2008
Location:	San Luis Obispo County
Number of Companies Surveyed:	10

WIRED 3.1 Project Overview (Project Goal): Conduct a labor needs assessment of 200 entities, to include 100 key space and information technology companies and government employers, 50 space entrepreneurial and small business companies, and 50 manufacturing companies. Workforce composition, current and future skill needs, education and training gaps will be identified and included in the assessments.

Introduction:

The purpose of the survey was to gather information about the skills required for critical positions and to identify future workforce gaps in order to develop a strategy to address future California Innovation Corridor employer needs. To collect the data, a survey instrument was created where employers were asked to rate both the competency and importance of workforce skills. As a participant of the WIRED 3.1 project, the Economic Vitality Corporation and Private Industry Council have collected data from ten San Luis Obispo County employers.

Two survey instruments have been utilized for data collection in San Luis Obispo County. The initial agreed upon survey instrument was conducted in December 2006-January 2007 on ten targeted employers. This survey instrument was deemed incomplete by the partners by mid 2007. In September 2007, a new survey instrument was created for the 3.1 project by utilizing an LMID survey development process. In addition, company, occupation, and staffing pattern data was analyzed to help each county focus in on potential target companies. The resultant survey instrument was utilized by the SLOEVC and SLOPIC in April 2008-May 2008 and conducted on the same ten targeted companies. This summary is the resultant analysis from both surveys, which include data from the ten targeted key space and innovative companies in San Luis Obispo County.

Target Companies:

The San Luis Obispo County Economic Vitality Corporation and Private Industry Council conducted surveys of ten San Luis Obispo County employers in the 541, 32x, 33x, and 517 NAICS codes. Although San Luis Obispo County is not known for manufacturing, a number of smaller sized companies (20-49 FTE) that support the space industry reside in the county. The companies targeted are adept at high precision machining, satellite telecommunication manufacturing, engineering design, software development, silicone component manufacturing, and pharmaceutical manufacturing. The typical growing clusters in San Luis Obispo County (e.g. Utilities, Real Estate, Builders and Contractors, Hospitality, Retail) were excluded as target industries because of their lack of connection with the space industry.

The following tables show the self-identified profile of each surveyed firm.

Targeted Company NAICS Designations

NAICS	Description	FTE
517410	Satellite Telecommunications	20-49
335314	Controls for Adjustable Speed Drives Manufacturing	20-49
325412	Pharmaceutical Preparation Manufacturing	50-99
541511	Custom Computer Programming Services	20-49
332710	Machine Shop	20-49
336411	Target Drones, Aircraft Manufacturing	50-99
54171	Physical, Engineering, and Biological Research	0-4
339112	Surgical and Medical Instrument Manufacturing	250-499
333611	Turbine Manufacturing	20-49
541511	Software Analysis and Design Services, Custom Computing	50-99

Summary of Surveyed Respondents

Type	Service		Manufacturing			Government		Other		Not Stated
Count	1		8			0		1		0
FTE	0-4	5-10	11-19	20-49	50-99	100-249	250-499	500-999	1000+	
Count	1	0	0	5	3	0	1	0	0	
Respondent Position	HR Director		Supervisor/Manager		President/CEO		Other		Not Stated	
Count	0		1		8		1		0	
Background	A: Direct Observe		B: Periodically Observe		C: Discuss with Supervisors		D: Other		Not Stated	
Count	6		0		4		0		0	

The majority of the companies surveyed were manufacturing companies, in which most of these companies do direct work for space and other governmental contracting companies. The surveyed companies tended to be of medium size in general (20-99 FTE), which was expected since most of the targeted companies were manufacturers of some sort. Because San Luis Obispo County tends to be tight knit, feedback was obtained directly from upper management that either directly observe or discuss with supervisors their employee performance. It should be noted that a few companies did not feel comfortable rating their current employees' performance, so that data was not included in the analysis.

Critical Employees:

Occupation	Satellite Telecommunications	Controls for adjustable speed drives manufacturing	Pharmaceutical Preparation Manufacturing	Custom Computer Programming services	Machine Shop	Target drones, aircraft, manufacturing	Physical, engineering and biological research, also 54158	Surgical and Medical Instrument Manufacturing	Turbine Manufacturing	Software Analysis and Design Services, Custom Computer	
Mechanical Engineering	x			x	x	x	x	x			60%
Electrical Engineering	x				x	x	x	x			50%
Manufacturing Engineering				x	x		x	x			40%
Aeronautical Engineering					x	x		x			30%
Materials Engineering							x	x			20%
Systems Engineering	x		x								20%
Chemists (Research)			x								10%
Chemists (Process)			x								10%
Chemists (Analytical)			x								10%
Aerospace Fabricator					x						10%
Computer Engineering								x			10%
Computer Science								x			10%
Engineering	x										10%
Firmware/Software Engineering		x									10%
Machinist				x							10%
Management	x										10%
Manufacturing	x										10%
MIS								x			10%
Other Engineering Disciplines								x			10%
Sales/Administration	x										10%
Software Engineering			x								10%
Technical Support	x										10%
Tooling Engineering								x			10%
Assembly Technician				x							10%
NAICS	517410	335314	325412	541511	332710	336411	54171	339112	333611	541511	

Type of Employees: Engineering dominated the technical professions with Mechanical Engineering being utilized by 60% of the surveyed companies. Electrical Engineering, Manufacturing Engineering, and Aeronautical Engineers were also utilized by a high number of these companies. Although these results may not be statically relevant, the results may be relevant for sake of discussion. It could be argued that Mechanical Engineers are highly utilized as a technical employee because of the general nature of the Mechanical Engineer education.

Number of Employees: The average number of critical jobs to the surveyed companies is 24.2 employees. The median is 16 with a minimum of 4 and maximum of 63. The average size of the companies surveyed is 66.5, thus the critical employees make up 36.4% of the total employees. Since companies tend to be smaller in San Luis Obispo County, the median of 16 key employees per company is not unreasonable. Again, because of the small sample size and diverse nature of each company surveyed, these numbers are not statistically valid, and they may not accurately reflect the all of the aerospace/innovative companies in San Luis Obispo County.

Typical Education: For the majority of the technical jobs, a Bachelor of Science degree was the most widely reported. Very few technical employees only had a high school or Associates degree. From these findings, we could argue that a BS or higher is required to attain the typical technical position.

Typical Job Experience: The overwhelming majority of the companies reported that greater than two years of experience in a related field is necessary for the technical person to be effective for their companies. The resolution of this question did not reveal anything surprising. The relevant number of

years of job experience is something more than two years, maybe three, five, or seven years, but that question was not asked.

Typical Pay Range: The “Entry Level” and “Some Experience” categories yielded typical salaries expected of the technical salaries of San Luis Obispo County, which were \$45,327 and \$63,040, respectively. The top-level, however, was higher than expected because two of the surveyed companies pay their top employees unusually well. When these companies were excluded from the sample, the average “Top Level” salary was \$87,400 instead of the initially reported \$130,400. Average salaries tend to be lower than other counties because there is a perceived trade-off between salary and quality of life in San Luis Obispo County.

Major Skills Gaps:

Quantitative Results Summary:

WIRED 3.1 Survey					
Part IV: Questions	Part IV Details	Total	Average	Gap Score	Rank Skills Gap Priority Here
2	Rating of Problem Solving Skills	27.7	3.1	0.72	1
Importance	Importance of Problem Solving Skills	34.2	3.8		
3	Rating of Workplace Skills	23.2	2.9	0.48	2
Importance	Importance of Workplace Skills	30.3	3.4		
4	Rating of Occupational Technical Skills	24.4	3.1	0.27	4
5	Importance of Occupational Technical Skills	29.9	3.3		
6	Rating of Additional Technical Skills	34.2	3.8	0.01	6
7	Importance of Additional Technical Skills	34.2	3.8		
8	Rating of Computer Skills	26.3	3.3	0.04	5
9	Importance of Computer Skills	29.9	3.3		
11	Rating of Social Skills	23.3	2.9	0.37	3
Importance	Importance of Social Skills	29.5	3.3		
14	Rating of Education Sufficiency	32.0	3.2	3.2	Rank Education Gap Priority Here
14	Satisfaction with Entry Level	31.0	3.1	3.1	2
14	Satisfaction with Technical	34.0	3.4	3.4	1
14	Satisfaction with Professional	31.0	3.1	3.1	2

Most Important Skills:

The surveyed companies resulted in a variety of skills that they felt were most important. Depending on the job type, answers varied throughout the range. However, the data did show that “Technical” and “Creative Problem Solving” were the two most important skills in aggregate. Both surveys produced identical results. It should be noted that a few companies commented that the most important skills depended on how a certain occupation is being used in their company (i.e. a Mechanical Engineer being used for design would need to be highly technically skilled vs. a Mechanical Engineer being used in Manufacturing would need to be a problem solver).

Largest Skill Gaps:

By comparing the importance of a skill vs. the current performance of that skill allows us to determine the largest skill gap between expectations and actual. From the table, we can see that *Problem Solving* has the largest gap, with *Workplace Skills* a close second. The companies reported that they are satisfied with the technical quality of their employees, but would like to see their creative problem solving improve for the future. By contrast, the smallest gaps are *Other Additional Technical Skills*

and *Computer Skills*. From these results, we could argue that workers are receiving a good technical education, but there is still a need to improve their problem solving processes.

For individual occupations, there were three skill gaps observed. In comparing all engineering occupations, *Technical Gap* is largest for Mechanical Engineers. Since Mechanical Engineers are used for many different purposes in the surveyed companies, it could be argued they are unfairly singled out. The general education for most Mechanical Engineers make them appealing for many different jobs, but it also takes away from a highly focused course of study. For Computer Engineering and related fields, the biggest gap is *Problem Solving*. As computers are used more in an artificial intelligence manner, the programming will become more difficult in the future, necessitating improved problem solving skills. For Technical Support employees, the largest gaps come from the lack of technical and workplace skills. As technology advances, the need for the Technical Support employees to keep pace will be vital to the success of these companies. A table of individual occupation ratings can be found in the addendum.

Qualitative Results Summary:

WIRED 3.1 Survey		Trend of Responses					
		Technical Skill	Basic Skills	Trouble-shooting	Customer Service	Problem Solving	
1a	Critical Skills Required	7	3			7	
		Good with People	No Comment	Other	Conceptualization		
12	Other Social Skills		9		1		
		Independent	Certified	Willing to Learn	Hard Worker	Communicator	Technical Knowledge
13b	Describe best employee	2		1	1	2	6
		Professional	Technical	No Comment			5
15	Critical Shortage	5	3	3			
		Technical	Multidisciplinary	Problem Solving	Working independently	Social Skills	Robotic Systems
16	Identify Future Skills	3	3	1	1	3	
		Technical	Drafting/Metal/Woodshop	Business Writing	High School Science	No Comment	PhD/Masters Program
17	Identify Desired Training		1	1	1	4	2
		No Comment	Tech Support	Housing Prices	Small Labor Pool	Land Development Difficulties	Employee Entitlement
19	Other Comments	6	1	1	1	1	1

Critical Skills Shortage (Technical or Professional):

Half the companies reported that the critical skills shortage is on the Professional level. Only 3 companies reported that their employees have technical skills shortage.

Best Employees:

It is not surprising that the best employees have excellent technical knowledge and are able to solve problems. A few companies did report that they like independent workers, ones that are able to work with little direction. In addition, a couple of companies stated that they liked employees with good communication skills. Therefore, it could be argued that the best employee would be highly skilled technically, able to solve complex problems on their own, and are able to explain how they solved the problem.

Identification of Future Skills:

All companies forecasted the future growth of their technical occupations as “positive”. Because of the open-ended nature of this question, specific answers to the type of growth could not be quantified. A few companies reported that a 10%-20% growth of these occupations would be reasonable. The overall outlook for all critical occupations is good, and will need to evolve to a more interdisciplinary capacity in the future. In addition, the future critical employees will be more technical in nature, but the need to improve social skills will also become necessary. One company discussed the issue of “entitlement” of the most recent graduates. Although only one company brought this up, the possibility of this being a very difficult issue for future employers is real. More study should be performed on this particular topic.

Education Issues:

Desired Training:

Some surveyed companies utilize Cal Poly graduates for their technical resource, where others believe that the lack of a doctorate program makes Cal Poly graduates unqualified for their higher technical occupations. A few companies expressed their desire to improve the Masters program at Cal Poly or the possibility of creating a PhD program there. However, since Cal Poly is a State University, it will be very difficult to implement a PhD program, but that does not stop the university from improving its Master’s program. It was suggested that improvements to the Engineering programs could include more business experience (e.g. Business writing, Business presentation) for technology students.

On the Community College and High School levels, some companies would like to see more computer training courses implemented, specific to their industry, such as robotics and ladder logic controller training. Also, the High School level has gotten away from offering technical courses such as drafting, wood working, and metal shop. If these skills are experienced at an early age, it will help groom future employees to be more “hands on”. It should be noted that Cal Poly has a “learn by doing” approach to education. Lastly, it was suggested by one company that High School Science should be made more interesting, to guide students towards the sciences and technology fields in college.

How skills will evolve:

No quantitative results can be reported for this question. However, the move from a single-discipline to a multi-disciplinary employee is highly appealing and necessary for future growth. Cal Poly will continue to be a resource for San Luis Obispo County’s technical workforce as well as Cuesta Community College. An improved Master’s program that focuses on interdisciplinary education (e.g. Business, Other Engineering and Science Fields) would be a valuable resource to a number of the surveyed companies.

How to Continue their Employees Educations:

The majority of the companies reported that they use a combination of “on the job” and “outside” training as their means for keeping their employees current with technology. Typical outside training included attending seminars, symposiums, and conferences. Some companies have a mandated training program, but most companies use the self-motivation method.

Regional Investment Strategy:

The educational preparation side of a worker’s experience typically provides the fundamental knowledge base needed in the workplace. However, the on-the-job preparation side (“hands on”) is seldom accomplished in the academic setting. Instead, employers frequently are left to devise their own solutions to fulfill that practical knowledge requirement, which has the benefit of elevating their workforce productivity level to where it has to be. Systems of well-organized and managed on-the-

job training (OJT) and other real-world situations devised in a training setting can have a very favorable impact towards creating the ideal worker.

The PIC has operated programs of this nature in San Luis Obispo County, in which the agency and the employer cooperatively negotiate OJT contracts that suit the needs of the employer, the trainee, and the training organization. Success is most probable in those situations where the PIC, the employer, and the potential trainee are all very clear about the mutual needs, requirements, and details found in such a partnership...as well as any potential pitfalls that can arise...for all parties.

Specific training classes cannot be identified from this small sampling of employers, but it does show that there may be a need for some OJT contracts to fill the gaps in the San Luis Obispo County workforce. A more in depth study may need to be performed to understand the true demand for such an approach.

Summary:

Although this survey tool did not result in statistically relevant results, it does paint a picture of the current technical workforce status in San Luis Obispo County. Engineers dominate the technical workforce, requiring a minimum of a BS and a few years or related experience to be effective as a technical employee of the surveyed companies. The companies surveyed tended to be small to medium sized companies, with 36% of its workforce being deemed critical to the companies' operations. The overall outlook for the occupations is good, and will need to evolve to a more interdisciplinary capacity in the future. A disconnect exists between business and the local university, but the reason for this disconnect cannot be concluded from this survey.

Problem solving skills are the biggest concern for the surveyed companies. The future need for employees to solve problems efficiently is a larger concern than improving their technological skills. The best employee is defined as a highly technical person with the ability to solve problems independently, and later able to explain what they did to solve the problem. Even if this employee exists, the potential difficulty of the future employee "entitlement" and work ethics may be of more concern.

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South Bay Economic Development Partnership

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E. Summary of Surveyed Respondents

SBEDP conducted surveys of 20 local South Bay employers in the 332, 334, and 541 NAICS codes. The following table shows the self-identified profile distribution of the firms.

Type	Service		Manufacturing			Government		Other		Not Stated
Count	3		15			0		2		0
FTE	5-10	11-19	20-49	50-99	100-249	250-499	500-999	1000+	Not Stated	
Count	2	4	4	2	2	3	2	1	0	
Respondent Position	HR Director		Supervisor/Manager		President/CEO		Other		Not Stated	
Count	3		1		14		2			
Background	A: Direct Observe		B: Periodically Observe			C: Discuss with Supervisors		D: Other	Not Stated	
Count	10		0			10		0	0	

F. Major Skills Gaps: Quantitative Results

QUESTIONS FROM SURVEY PART IV	QUESTION TOPIC	Total	Average	Gap Score	Rank Skills Gap Priority Here
2	Rating of Problem Solving Skills	58.0	2.9	0.75	3
Importance	Importance of Problem Solving Skills	73.0	3.7		
3	Rating of Workplace Skills	52.0	2.6	1.10	1
Importance	Importance of Workplace Skills	74.0	3.7		
4	Rating of Occupational Technical Skills	51.5	2.6	1.08	2
5	Importance of Occupational Technical Skills	73.0	3.7		
6	Rating of Additional Technical Skills	69.0	3.5	0.15	6
7	Importance of Additional Technical Skills	72.0	3.6		
8	Rating of Computer Skills	51.0	2.6	0.50	5
9	Importance of Computer Skills	61.0	3.1		
11	Rating of Social Skills	54.5	2.7	0.55	4
	Importance of Social Skills	65.5	3.3		
14	Rating of Education Sufficiency	50.7	2.5	2.5	Rank Education Gap Priority Here
14	Satisfaction with Entry Level	44.0	2.2	2.2	1
14	Satisfaction with Technical	54.0	2.7	2.7	2
14	Satisfaction with Professional	54.0	2.7	2.7	2

Companies surveyed value more experienced technicians than new hires, meaning that more experienced are more mature (older) with a different approach to their occupation than younger workers new to the discipline. Respondents indicated that they respect the education of older workers more than that of younger, less experienced workers. Discussion with company managers indicates that they believe gaps in critical thinking is generational with more mature workers willing to take calculated risks and younger workers making mistakes because they do not know what they do not know.

In more technical positions requiring higher education, respondents commented that more mature professionals were sometimes wired in place and had a hard time accepting new theories and processes. Younger workers

bring new methods and tools learned at universities that older professional workers may not know or trust. This places a hardship on team building and indicates the need for continuing education and ongoing training, even with professionals holding masters and doctorates. The more sophisticated companies found that leadership was an issue when working with highly educated staffs. Smarter people occasionally seem harder to manage.

In general poor communication skills are an issue at all levels of employment. Lower skilled workers are not as proficient in English as one would like and company communication suffers. Higher skilled workers may not know how to write technical reports even though they are fluent in English. Top level engineers are prone to engage in techno-speak with heavy use of technical terms not easily understood.

We were told that the diverse workforce is posing problems in some companies with particular attention paid to conflict resolution among different ethnic background workers. Unmet cultural expectations may foster employee discontent. Misunderstood glances, body language, and gestures may also create problems among workers making team building that much more difficult.

When asked to take a long term view relative hiring there was not much enthusiasm from respondents, although they were generally attempting to be positive in their answers. The one criticism across most interviewees was denigration of current K-12 the education system. Employers often linked lack of ethics and poor attitude with what they perceive as poor school systems. Consistent with general statistics most employees separated from employment simply couldn't get along with co-workers, were not dependable, had serious difficulty grasping company processes and could not fit in with existing company culture.

More successful companies are more diligent when hiring, carefully screening applicants and avoiding hiring potential problems. Some employers asked the survey interviewer for guidance relative aptitude tests for potential employees. We guided them to the local WIB. These employers want help but are not quick to reach out for it. Even those active in trade associations seem to be searching for more hiring and training assistance than the association offers, although the company trusts the trade association more than a government funded agency such as a Workforce Investment Board.

Major Skills Gaps: Qualitative Results

Critical Skills Required	Trend of Responses: Top Rated Skill Gap Has Highest Score						
	Technical Skill	Basic Skills	Trouble - shooting	Customer Service			
	13	7					
Social Skills Desired	Good with People	No	Other				
		17	3				
Best Employees are...	Independent	Other	Willing to Learn	Experienced	Communicator	Team Player	Dedicated/Passionate
	1	1	2	8	2	1	5
Critical Shortage	Professional	Technical	No				
	7	15	4				
Identify Future Skills	Technical	Computer Skills	Reading Writing	None	Other		
	8	0	2	9	1		
Desired Training	Technical	Leadership	Other	English	Ethics	College/Uni Programs	None
	8		2	5	2	0	3
Other Comments?	NO						
	20						

Regional Training Resources

California State University, Dominguez Hills
 Los Angeles Harbor College
 El Camino College
 El Camino Center for Competitive Technology
 Southern California Regional Occupational Center
 Small Business Development Center
 South Bay Workforce Investment Board
 California Manufacturing Technology Consulting

G. Regional Investment Strategy

The SBEDP recommends a strategy involving regional resources working in tandem to educate local companies relative resources available to them. Although this has been a corner stone of SBEDP programs for nearly a dozen years, there needs to be more coordinated efforts that bring local jurisdictions into play with information distributed with business licenses. In addition the SBEDP recommends working with trade associations to assist companies better understand the value of funded education and training programs available to association members.

The SBEDP also recommends placing greater emphasis on communication with elected officials at all levels to get their assistance leveraging resources and carry the message to CIC companies that there is no lack of assistance to companies and if current resources are used success stories generated will provide strong messages for increasing current programs and developing others that fill existing gaps.

Another strategic move is coalescing regional resources to develop recommendations for consideration by educators for ensuring that current and future students are prepared to take advantage of growth industries in the South Bay of Los Angeles County. This economic region is home to several robust knowledge based industries that rely on well educated and skilled workers. It is estimated that 55% or more of regional technology workers employed in manufacturing companies commute to the South Bay from throughout the Los Angeles 5-County region.

It is likely that another U.S. Department of Defense Base Realignment and Closure (BRAC) round will be forthcoming in the next few years and the SBEDP suggests that a regional effort by the Los Angeles Air Force Base Regional Alliance include focus on workforce development. The prominence of the LA AFB in California's economy may provide regional workforce efforts an effective platform for delivering an important message to all CIC agenda.

H. Data Compilation
[Provided to CSA]

South Bay Workforce Investment Board

Partner Organization Name:	South Bay Workforce Investment Board
Partner Contact:	Robert T. Mejia
Contact Telephone Number:	310-970-7700

Summary of Surveyed Respondents

SBWIB conducted surveys of 10 local South Bay employers in the 334, 336, and 541 NAICS codes. The following table shows the self-identified profile distribution of the firms.

Type	Service	Manufacturing				Government		Other		Not Stated
Count	1	9				0		0		0
FTE	5-10	11-19	20-49	50-99	100-249	250-499	500-999	1000+	Not Stated	
Count	1	1	1	3	2	1	1	0	0	
Respondent Position	HR Director		Supervisor/Manager		President/CEO		Other		Not Stated	
Count	5		2		2		4		1	
Background	A: Direct Observe		B: Periodically Observe		C: Discuss with Supervisors		D: Other		Not Stated	
Count	4		1		5		0		0	

Major Skills Gaps: Quantitative Results

QUESTIONS FROM SURVEY PART IV	QUESTION TOPIC	Total	Average	Gap Score	Rank Skills Gap Priority Here
2	Rating of Problem Solving Skills	27.0	1.4	0.40	4
Importance	Importance of Problem Solving Skills	35.0	1.8		
3	Rating of Workplace Skills	24.0	1.2	0.60	1
Importance	Importance of Workplace Skills	36.0	1.8		
4	Rating of Occupational Technical Skills	28.0	1.7	0.40	3
5	Importance of Occupational Technical Skills	36.0	1.8		
6	Rating of Additional Technical Skills	34.0	1.7	0.05	5
7	Importance of Additional Technical Skills	35.0	1.8		
8	Rating of Computer Skills	24.0	1.2	0.15	2
9	Importance of Computer Skills	27.0	1.4		
11	Rating of Social Skills	27.0	1.4	0.25	6
	Importance of Social Skills	32.0	1.6		
14	Rating of Education Sufficiency	7.7	0.4	0.4	Rank Education Gap Priority Here
14	Satisfaction with Entry Level	28.0	1.4	1.4	1
14	Satisfaction with Technical	31.0	1.6	1.6	3
14	Satisfaction with Professional	28.0	1.5	1.5	2

Companies surveyed responded with similar expression relative the current workforce. The older, more experienced worker is more productive and demonstrates desired and required skills and personal attributes than does the younger, less experienced worker, regardless of educational level achieved. In conversation

during the interviews employers generally described a gap in level of passion for the work, an inquisitive nature to solve problems, and overall desire to produce a superior product between the mature worker and those relatively new to the industry.

An example given us is that of a recruit with a 4-year engineering degree who knows how to use the latest software modeling application program, but does not have a driving interest beyond what the software produces and is willing to accept the outcome without question. The older more desirable employee appears to be more skeptical of face value and doesn't as readily accept initial findings. This was expressed as the carpenter's "measure twice and cut once" rule.

At the technician level employers said basic education is lacking, especially in math, science and English. Companies giving higher marks to entry level employees appear to have more rigorous hiring practices, choosing to take longer to hire and ensuring the quality of entry level employees. A few companies hire on perceived character qualities, preferring to train on site. The stated reason for this approach is to ensure not disturbing the current company culture.

A company hiring primarily more highly educated workers offered one interesting insight. The smartest of these, who were slightly older than the mean, were not as socially adaptable as the newer, younger employee and often rejected out-of-hand that with which they were not familiar. This was an example of today's company handling conflict resolution on a near daily basis. Cultural differences were also mentioned as a source of conflict. In Los Angeles County, where more than ninety languages are spoken and many workers are not native, it is possible and perhaps likely that off-shore prejudices are brought into the work place. This underscores another level of management training beneficial to employers in the region.

Major Skills Gaps: Qualitative Results

Trend of Responses: Top Rated Skill Gap Has Highest Score							
Critical Skills Required	Technical Skill	Basic Skills	Trouble-shooting	Customer Service			
	8	2					
Social Skills Desired	Good with People	No	Other				
	2	4	4				
Best Employees are...	Independent	Customer Focused	Willing to Learn	Experienced	Communicator	Team Player	Dedicated/Passionate
	1	2	2		2	1	3
Critical Shortage	Professional	Technical	No				
	4	5	1				
Identify Future Skills	Technical	Computer Skills	Reading Writing	None			
	2	6	1	11			
Desired Training	Technical	Leadership	Computer Skills	Personal	Ethics	College/Uni Programs	
	2	1	1	1		1	
Other Comments?	NO						
	10						

Employers expressed a clear line between older and younger workers, saying today's recent graduate, whether K-12 or college, is not as adept as their predecessors. In general the technical skills of a new hire, even one with a few years experience, were not up to expectations. The interviewer senses that expectations were lowering as time goes by and, therefore, easier to meet by the applicant. In general managers seem to be resigned to having to fill education and skill gaps with the less experienced employee.

The survey results show that technical skills are most lacking and social skills also rank in employer thinking. Persons interviewed hesitated when providing attributes of their top employee, seeming to the interviewer that they were thinking of what was desired in a top employee rather than what characteristics their top employee demonstrated. This leads the interviewer to wonder about succession. Where is the next generation of supervisors, managers and executives?

Regional Training Resources

- South Bay Workforce Investment Board
- California State University, Dominguez Hills
- Los Angeles Harbor College
- El Camino College
- El Camino College Center for Applied Competitive Technology
- El Camino College Small Business Development Center
- Southern California Regional Occupational Center
- California Manufacturing Technology Consulting

Regional Investment Strategy

A broad strategy includes reaching out to business to help them identify efficient methods to remedy skills gaps including an understanding of training organizations and funding sources. Secondary approaches include the following recommendations:

- Advise the thirteen school districts in the region, especially career counselors, on what student minimum requirements exist for employment in high paying jobs within the community.
- Conduct community forums for parents of current students to discuss employment opportunities and the requirements for each.
- Develop community advisory councils comprised of business owners, residents, educators, and skills trainers to determine the best methods for developing curricula necessary for educating those students wishing to enter the workforce after high school.
- Enlist the assistance of the California Department of Education to support community based efforts, establishing a platform for programs designed to reduce drop out rates via cooperative education/training programs and apprenticeships.
- Work closely with county, state and national elected officials to promote funding of education-to-work programs.

Data Compilation

[Provided to CSA]

A Survey of Skill Gaps and Related Workforce
Issues in Selected Manufacturing Sectors: Report and
Recommendations

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Introduction

The purpose of this study is to collect, analyze, and interpret information about current and future skills needed by selected Ventura County and Santa Barbara County employers. This project represents the Ventura County Workforce Investment Board's (VC-WIB) contribution in a broader multi-California study of workforce needs assessment, as part of the Workforce Innovation in Regional Economic Development (WIRED) initiative for the California Innovation Corridor (CIC). This VC-WIB study focuses on three sectors of manufacturing in Ventura and Santa Barbara County: chemical manufacturing, machinery manufacturing, and computer and electronic product manufacturing.

The concept of "skill gaps" is central to this study. Skill gaps occur when the qualifications (knowledge, abilities, skills, performance) of available workers are less than those needed by producers to remain competitive or profitable.

Concerns about work quality have become an issue of national scope and importance, particularly in manufacturing. A 2005 Deloitte Consulting survey of manufacturers across the U.S. discovered the following:

- Today's skill shortages are extremely broad and deep, cutting across industry sectors and affecting more than 80 percent of the companies surveyed.
- Skill shortages have a widespread impact on manufacturers' abilities to achieve production levels, increase productivity, and meet customer needs.
- High performance workforce requirements have significantly increased as a result of the skills gap shortage and the challenge of competing in a global economy, according to 75 percent of respondents.ⁱ

When asked to rank by importance seven possible developments that would contribute to their company's future business success, 74 percent ranked "developing a high performance workforce" highest. When asked to anticipate what kinds of workers would likely be in shortest supply in the next several years, 80 percent of the firms ranked production employees first.

All of the problems facing U.S. manufacturing companies in the age of global competition are of great concern in California. Historically, manufacturing has been central to the state's economy. As recently as 2003, California had more manufacturing jobs than any other state in the U.S. by a wide margin, at 1.5 million jobs. According to the Milken Report of August 2002, these jobs, via the economic multiplier effect, supported another 3 million, totaling 4.5 million jobs, or 30 percent of California's total.ⁱⁱ

One factor that has allowed California manufacturers to remain competitive, despite the many high business costs in California, has been the productivity of its workers. According to data from the Annual Survey of Manufacturers, California manufacturing

and production workers created more value added than the U.S. average in 2001. In some of the specific manufacturing sectors examined in this study, this so-called “California advantage” in worker productivity has been notable, totaling 38 percent in computer and electronics manufacturing, 10 percent in machinery manufacturing, and 1 percent in electronic equipment manufacturing. Nevertheless, California manufacturing has faced substantial jobs losses in some sectors. Between 2000 and 2003, California lost 104,000 jobs in computer and electronics manufacturing, 18,000 in machinery manufacturing, and 8,000 in electrical equipment manufacturing.

More recent numbers signal a continuing loss of manufacturing jobs in the state. State Employment Development Department data indicate that between July 2006 and July 2007, manufacturing jobs in the state declined 1.2 percent. July-to-July comparisons for 2007 and 2008 indicate a further reduction of 2.1 percent.ⁱⁱⁱ For California manufacturing, retaining jobs means remaining competitive. The quality of the manufacturing force will be one crucial component in this equation. How California manufacturing will fare is still uncertain.

A 2006 report by California’s EDGE Campaign states that California “now stands at a crossroads.”^{iv} In a 2006 Survey of members of the California Manufacturing and Technology Association, respondents report that the single most important business challenge we are facing is “sustaining and/or acquiring a skilled workforce.”^v The California Regional Economics Project reports that “a major workforce challenge for the manufacturing value chain is how to retain current production workers...”^{vi} Other factors contributing to this dilemma are the impending retirements of baby boomers, demographic changes, and the quality of workforce preparation in the schools.

In December 2006, the Ventura College Office of Research and Evaluation conducted a survey of employers in five manufacturing sectors in the tri-county region (San Luis Obispo, Santa Barbara, and Ventura).^{vii} In addition to providing estimates of likely future new hires in twenty manufacturing-related occupations, their results illustrate serious employer concerns about skill shortages, the number of workforce entrants the schools are training, and employees’ basic skill levels. Some of the specific results of this study are discussed later in this report.

Thus, the study of skill gaps and the search for ways to address these challenges in our local economy are both topical and timely. Manufacturing enterprises and the jobs they create are important factors in our regional economy. Thus, sustaining and strengthening them would make an important contribution to the future economic welfare of the region.

Methods Used in the Study

Data collection was carried out using a predetermined survey instrument common to all project participants. The VC-WIB was asked to collect data in three sectors of manufacturing industries, as defined under the North American Industry Classification System (NAICS, pronounced Nakes). This system was developed as the standard for use by Federal statistical agencies in classifying business [establishments](#) for the collection, analysis, and publication of statistical data related to the U.S. business economy. NAICS was developed under the auspices of the Office of Management and Budget (OMB) and

adopted in 1997 to replace the old Standard Industrial Classification (SIC) system. It was also developed in cooperation with the statistical agencies of Canada and Mexico to establish a three-country standard, allowing a high level of comparability in business statistics between the three countries. NAICS is the first economic classification system to be constructed based on a single economic concept. To learn more about the background, the development, and the difference between NAICS and the SIC, see www.census.gov/epcd/www/naicsdev.htm.

The three manufacturing sectors designated for the VC-WIB study are

- 325 – Chemical Manufacturing.
- 333 – Machinery Manufacturing.
- 334 – Computer and Electronic Product Manufacturing.

Appendices 1 and 2 provide longer-term employment and salary dates for these three sectors in Santa Barbara and Ventura Counties.

The State of California Employment Development Department (EDD) provided employer lists, as well as descriptions and contact information, for each of these three sectors. The accuracy of the contact information on the lists was verified, and companies were then contacted by the research team to determine their willingness to participate in the study. Participating companies were given the option of participating in the study by means of a written (mail) survey, telephone survey, or in-person interviews. The project team worked to provide a sample reflecting the geography, size (number of employees) and specializations of these sectors in the local economy.

Selected Demographics of Target Industries			
Designated Industries/County	# of Employers	# Employed	Average Weekly Pay
325-Chemical Manufacturing			
Ventura County	42	9,444	\$1,700
Santa Barbara County	14	850	\$1,700
333-Machinery Manufacturing			
Ventura County	90	3,415	\$1,054
Santa Barbara County	20	539	\$750
334-Computer and Electronics			
Ventura County	142	7,865	\$1,202
Santa Barbara County	68	3,832	\$1,345
<i>Source: Quarterly Census of Employment and Wages, provided by State of California Employment Development Department.</i>			

The following section describes the employer participation in each targeted sector.

325 Chemical Manufacturing

The Chemical Manufacturing subsector is based on the transformation (via a chemical process) of organic and inorganic raw materials and the formulation of products. This subsector distinguishes the production of basic chemicals that compose the first industry group from the production of intermediate and end products produced by further processing of basic chemicals, which make up the remaining industry groups.

Employer Name	Industry NAICS	Business Type	Size of Business	Respondent Position	Primary Site
NAICS Code 325 - Chemical Manufacturing					
AGRX	325311	Manufacturing	100-249	Other	Oxnard, CA
Rincon-Vitova Insectaries Inc	325320	Manufacturing	11-19	Other	Ventura, CA
Coastal Contract Packaging Inc	325620	Manufacturing	11-19	President/CEO/Director	Ventura, CA
Spatz Laboratories	325620	Manufacturing	100-249	HR Dir.	Oxnard, CA

333 Machinery Manufacturing

Industries in the Machinery Manufacturing subsector create end products that apply mechanical force. An example is the application of gears and levers to perform work. Some important processes for the manufacture of machinery are forging, stamping, bending, forming, and machining, all used to shape individual pieces of metal. Processes such as welding and assembling are used to join separate parts. Although these processes are similar to those used in metal-fabricating establishments, machinery manufacturing is different because it typically employs multiple metal-forming processes in the assembly of the various parts of the machine. These complex assembly operations are an inherent part of the production process.

In general, design considerations are very important in machinery production. Establishments specialize in making machinery designed for particular applications. Thus, for the purpose of implementing NAICS, design is considered part of the production process. The NAICS structure reflects this by defining industries and industry groups that make machinery for different applications. A broad distinction exists between machinery that is generally used in a variety of industrial applications (i.e., general-purpose machinery) and machinery designed for use in a particular industry (i.e., special-

purpose machinery). Three industry groups consist of special-purpose machinery—Agricultural, Construction, and Mining Machinery Manufacturing; Industrial Machinery Manufacturing; and Commercial and Service Industry Machinery Manufacturing. The other industry groups make general-purpose machinery: Ventilation, Heating, Air Conditioning, and Commercial Refrigeration Equipment Manufacturing; Metalworking Machinery Manufacturing; Engine, Turbine, and Power Transmission Equipment Manufacturing; and Other General Purpose Machinery Manufacturing.

Employer Name	Industry NAICS	Business Type	Size of Business	Respondent Position	Primary Site
NAICS Code 333 - Machinery Manufacturing					
Made in the Shade Intl.	333319	Manufacturing	0-4	President/CEO/Director	Moorpark, CA
Veeco Slider Process Equipment	333515	Manufacturing	100-249	HR Director	Camarillo, CA
Scientific Cutting Tools	333515	Manufacturing	20-49	President/CEO/Director	Simi Valley, CA
Joy Equipment Protection	333999	Service	5-10	President/CEO/Director	Santa Barbara, CA
American Machine Conveyor Inc.	333999	Manufacturing	5-10	President/CEO/Director	Oxnard, CA
Dynamic Automation	333999	Manufacturing	11-19	President/CEO/Director	Simi Valley, CA
Meissner Filtration Products	333999	Manufacturing	20-49	HR Director	Camarillo, CA
Trans-Motion Industries	333999	Manufacturing	5-10	President/CEO/Director	Simi Valley, CA
CCT-Fluid Kinetics	333999	Manufacturing	11-19	Other	Ventura, CA
Westover Control Corp.	333999	Service	11-19	Other	Newbury Park, CA

334 Computer and Electronic Product Manufacturing

Industries group establishments that manufacture computers, computer peripherals, communications equipment, and similar electronic products together with establishments that manufacture components for such products in the Computer and Electronic Product Manufacturing subsector. The Computer and Electronic Product Manufacturing industries have been combined in the hierarchy of NAICS because of their economic significance. Their rapid growth suggests that they will become even more important to the economies of all three North American countries in the future, and their manufacturing processes are fundamentally different from the manufacturing processes of other machinery and equipment.

The design and use of integrated circuits and the application of highly specialized miniaturization technologies are common elements in the production technologies of the computer and electronic subsector. Convergence of technologies motivates this NAICS

subsector. Digitalization of sound recording, for example, causes both the medium (the compact disc) and the equipment to resemble the technologies for recording, storing, transmitting, and manipulating data.

Communications technology and equipment have been converging with computer technology. When technologically related components are in the same sector, it is easier to adjust the classification for future changes, without redefining its basic structure. The Computer and Electronic Product Manufacturing subsector helps to delineate new and emerging industries, since the activities that will serve as the probable sources of new industries (such as computer manufacturing and communications equipment manufacturing, or computers and audio equipment) are brought together. As new activities emerge, they are less likely to cross the subsector boundaries of the classification.

Employer Name	Industry NAICS	Business Type	Size of Business	Respondent Position	Primary Site
NAICS Code 334 - Computer and Electronic Manufacturing					
Stitch Wire Systems Corp.	334112	Manufacturing	5-10	HR. Dir.	Newbury Park, CA
Demo Systems LLC	334112	Manufacturing	50-99	President/CEO/Director	Moorpark, CA
Interlink Electronics Inc.	334119	Manufacturing	100-249	HR. Dir.	Camarillo, CA
Coast to Coast	334119	Other	100-249	Other	Simi Valley, CA
AML Communications Inc.	334310	Manufacturing	50-99	HR. Dir.	Camarillo, CA
Ricoh Printing System America	334413	Manufacturing		Other	Simi Valley, CA
Shell Solar Industries	334413	Manufacturing	250-499	Other	Camarillo, CA
Hirose Electric Group	334417	Manufacturing	50-99	HR. Dir.	Simi Valley, CA
Kavlico	334419	Manufacturing	1000+	HR. Dir.	Moorpark, CA
Jaxx Manufacturing	334419	Manufacturing	50-99	Other	Simi Valley, CA
Viking Electronics	334419	Manufacturing	50-99	HR. Dir.	Moorpark, CA
C & L Aerospace	334511	Service	11-19	Supervisor/Manager	Ventura, CA
Pti Tech	334511	Manufacturing	100-249	HR. Dir.	Oxnard, CA
Indigo Systems-Flir Systems Ink	334513	Manufacturing	250-499	HR. Dir.	Santa Barbara, CA
Qualstar	334613	Manufacturing	50-99	HR. Dir.	Simi Valley, CA
Imation Corp.	334613	Manufacturing	100-249	HR. Dir.	Camarillo, CA

List of Participating Employers by Region

The following table lists the participating employers by location. Most are located along the so-called “101 Corridor,” but there is also a significant manufacturing presence in the Simi Valley area (represented here as well).

Simi Valley, CA 8	Camarillo, CA 6
Jaxx Manufacturing	Veeco Slider Process Equipment
Dynamic Automation	Meissner Filtration Products
Scientific Cutting Tools	Interlink Electronics Inc.
Qualstar	Imation Corp.
Coast to Coast	Shell Solar Industries
Ricoh Printing System America	AML Communications Inc.
Trans-Motion Industries	Newbury Park, CA 2
Hirose Electric Group	Stitch Wire Systems Corp.
Moorpark, CA 4	Westover Control Corp.
Kavlico	Santa Barbara, CA 2
Made in the Shade Intl.	Joy Equipment Protection
Viking Electronics	Indigo Systems-Flir Systems Ink
Demo Systems LLC	
Ventura, CA 4	Oxnard, CA 4
C & L Aerospace	American Machine Conveyor Inc.
Rincon-Vitova Insectaries Inc.	Pti Tech
CCI-Fluid Kinetics	Spatz Laboratories
Coastal Contract Packaging Inc.	AGRX

Distribution by Size (Number of Employees)

To classify by size, we focus on the number of employees in the local business unit. That is, in those cases in which the firm interviewed is a subsidiary of a larger business organization, only the employees working at Ventura or Santa Barbara locations are counted.

Employer Name	Industry NAICS	Size of Business	Primary Site
Made in the Shade Intl.	333319	0-4	Moorpark, CA
Stitch Wire Systems Corp.	334112	5-10	Newbury Park, CA
Joy Equipment Protection	333999	5-10	Santa Barbara, CA
American Machine Conveyor Inc.	333999	5-10	Oxnard, CA
Trans-Motion Industries	333999	5-10	Simi Valley, CA
C & L Aerospace	334511	11-19	Ventura, CA
Dynamic Automation	333999	11-19	Simi Valley, CA
Rincon-Vitova Insectaries Inc.	325320	11-19	Ventura, CA
CCI-Fluid Kinetics	333999	11-19	Ventura, CA
Westover Control Corp.	333999	11-19	Newbury Park, CA
Coastal Contract Packaging Inc.	325620	11-19	Ventura, CA
Scientific Cutting Tools	333515	20-49	Simi Valley, CA
Meissner Filtration Products	333999	20-49	Camarillo, CA
Jaux Manufacturing	334419	50-99	Simi Valley, CA
Qualstar	334613	50-99	Simi Valley, CA
Hirose Electric Group	334417	50-99	Simi Valley, CA
Viking Electronics	334419	50-99	Moorpark, CA
AML Communications Inc.	334310	50-99	Camarillo, CA
Demo Systems LLC	334112	50-99	Moorpark, CA
Ricoh Printing System America	334413	50-99	Simi Valley, CA
Veeco Slider Process Equipment	333515	100-249	Camarillo, CA
Interlink Electronics Inc.	334119	100-249	Camarillo, CA
Coast to Coast	334119	100-249	Simi Valley, CA
Imation Corp.	334613	100-249	Camarillo, CA
Pti Tech	334511	100-249	Oxnard, CA
Spatz Laboratories	325620	100-249	Oxnard, CA
AGRX	325311	100-249	Oxnard, CA
Shell Solar Industries	334413	250-499	Camarillo, CA
Indigo Systems-Flir Systems Ink	334513	250-499	Santa Barbara, CA
Kavlico	334419	1000+	Moorpark, CA

Critical Employees

A fundamental purpose of the study is to ask employers to identify those employees (occupations) most critical to their operations. Criticality in this sense can occur because employees of specific types are perceived as

- crucial to the production or other work processes.
- difficult to recruit and or retain.
- difficult to find with adequate skill levels.

The results of the survey are described in the following summary table. By far, the most frequently identified critical occupations are those related to the production processes (53% of firms). This general category includes a broad range of jobs at the semi-skilled, skilled, or technical levels. These include job titles such as assembler, solderer, steel fabricator, machine builders, operators, inspectors, and control technicians.

The next most frequently mentioned category is engineering, with 37 percent of employers reporting. Again, a broad array of specialization is identified, including electrical engineers, mechanical engineers, design engineers, industrial engineers, and systems engineers.

Summary Table of Employer-Identified Critical Employees, Jobs, or Occupations		
Critical Jobs/Occupations	# of Firms	% of Firms
Assembly/Production/Technical	16	53%
Engineering	11	37%
Sales	2	7%
Administration	2	7%
Non-Critical Skill Occupations	2	7%

A smaller number of firms identify critical occupations in sales (7 percent) and administrative positions (7 percent). Two firms (7 percent) indicate they had no occupation considered critical, given our criteria. Basically, this means these employers regard their labor needs as adequately met.

In all, these employers identify 25 different jobs or occupations as critical. The complete list of specialties, grouped by category, follows:

Specific Job Titles/Occupations Listed by Employers as Critical	
Job Title/Occupation	Category
Estimator	Admin.
Admin. Assistants	Admin.
Logistics Assistants	Admin.
Shipping Managers	Admin.
Mechanical Engineers	Engineering
Electrical Engineers	Engineering
Design Engineers	Engineering
Industrial Engineers	Engineering
IT Engineers	Engineering
Manufacturing Production Workers	Production
Solderers	Production
Steel Fabricator	Production
Assemblers	Production
Machine Operators	Production
Machine Builders	Production
Fine-Manufacturing Production Workers	Production
Value Stream Operators	Production
Software Programmers	Professional
Sales Managers	Sales
Sales	Sales
Interconnect Technicians	Technician
Insect Production Technicians	Technician
Controls Technicians	Technician
Pesticides Control Advisers	Technician
Radio Frequency Test Technicians	Technician

Shortages

Employers may consider a particular occupation as critical because there is not an adequate supply in the relevant labor market. Thus, we asked employers to list those occupations they considered to be in short supply in the current labor market. Shortages are reported most widely in technician and engineering positions. With regard to engineers, one employer comments, “The available workforce tends to concentrate in areas where universities with engineering programs are located.” Another comments, “Due to the high cost of living in this area (and combined with high gas prices), the lack of public transportation has paralyzed the [our] company. Something is highly needed to bring the workforce into this location.”

Employer-Reported Shortages in Various Occupations		
Occupations	# of Cases	% of Cases
Production Employees	2	6.7
Technicians	11	36.7
Engineers	10	33.3
Professionals	1	3.3
Other	3	10.0
No Shortages	9	30.0

Significantly, 30 percent of the responding companies are experiencing *no* labor shortages. While most can identify critical occupations, this is in many cases not so much related to a lack of available workers as it is to the quality of available workers. One company respondent says, “I find it very hard to find people to fill our company needs. I feel that people lack common sense, work ethic, and just basic customer service skills.”

These results present a different picture from that of the 2006 Ventura College survey of tri-county manufacturing employers, in which 70% of respondents indicated that there was a current shortage of workers.^{viii} These different results may, in part, be a product of differences in survey method. (The Ventura College survey asked about 20 specific occupational categories, whereas the current study allowed employers to designate their own “critical occupations.”) In addition, while the two surveys overlap in the geographic location of employers and industry sectors, these are not identical in the two studies. Also, the differences in economic conditions at the times of the two studies, including the continuing decline in manufacturing jobs in California, explain some of this difference.

Skill Gaps

Once employers had identified their critical occupations, they were asked to assess the importance of a series of work-related skills, to evaluate how well their critical employees were performing those skills, and to estimate how important those skills would be to future hires in their industry.

The tables below present the results from these assessments, using the exact wording of the survey instrument questions. Employers were asked to assess the *performance* of employees using the following scale:

- 4 – Exceeding Expectations
- 3 – Meeting Expectations
- 2 - Nearly Meeting Expectations
- 1 - Does Not Meet Expectations

In individual questions, raters were asked to assess performance compared to existing entry-level (new hire) expectations. They were also asked to assess the importance of various skills both for new hires and for future hires—that is, to assess whether a given skill might become more or less important to their business and industry in future years.

These responses could provide some insight into how the skill needs of future workers might change.

The *importance* of a skill set was rated using the following scale:

- 4 – Very Important
- 3 – Important
- 2 – Somewhat Important
- 1 – Not Important

In other instances, employers were asked how *satisfied* they were with current *performance of work preparation*, using the following scale:

- 4 – Very Satisfied
- 3 – Satisfied
- 2 – Unsatisfied
- 1 – Very Unsatisfied

Gaps, or skill deficiencies, were computed comparing their expectations to their assessment of performance.

The first table in this section focuses on employer perceptions regarding the importance they assign to the critical skills they identified. Not surprisingly, those skills employers listed as “critical” are viewed as very important (3.9 out of 4.), and employers also consider it highly desirable that workers enter employment with these skills in place (3.6).

Critical and Basic Work Skills and Skill Gaps		
Skills	Rating	Gap
1. Critical Occupations and their Basic Skills	3.9	
How important is it that employees meet your expectations in those skills when hired?	3.6	
2. How do you rate their problem-solving skills performance/competency?	2.8	
Please rate the importance of problem-solving skills for future entry-level employees?	3.2	-0.40
3. How would you rate typical new-hire performance/competency in workplace skills such as judgment and decision-making, management of resources, and time management?	2.5	
How important will these skills be for future employees?	3.3	-0.80

The survey then addresses several sets of more specific skill definitions, asking employers to rate the performance of their current workers and to compare that to the likely future importance of each individual skills category. In the case of *problem-solving skills*, for example, employers rated current skill levels, on average, at 2.8 against likely future needs of 3.2, creating a skill gap of .40.

An even larger gap was identified in the area of skills defined as *judgment, decision-making, and management of resources, and time management*. Here, employers (on average) rated current new-hire performance at 2.5 against a likely future importance of 3.3, creating a gap of .80.

Technical Skills and Skill Gaps

Two areas of technical skills are evaluated:

1. technical knowledge
2. computer-related skills

In these categories, employers rate current new-hire skills fairly low in technical knowledge (2.7) and lower still in a more complex bundle of skills that include using spreadsheets and databases, word processing, graphics, the internet, and presentations.

There are also substantial gaps between current performance and likely future importance. Technical knowledge associated with specific occupations demonstrates a skill gap of .80, as did the category concerned with the use of computer-based information and applications.

Two additional questions asked employers to assess both the current and likely future importance of workers' competence in the use/operation of equipment, tools, materials, software, information systems, or more than one specific technology when hired. These skills are considered important (an average rating of 3.3) and are likely to remain so, indicating that demand for well-prepared and skilled employees will continue.

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Technical Skills and Skill Gaps		
Skills	Rating	Gap
4. In your company, how well does the new employee typically meet performance/competency expectations set for entry-level workers in terms of technical knowledge related to the job s/he will perform?	2.7	
5. Please rate the future importance of occupational knowledge for employees	3.5	0.80
6. In the area of technical skills, how important will it be for entry-level employees to be adept in the use/operation of equipment, tools, materials, software, information systems, or more than one specific technologies when hired?	3.3	
7. What is the importance of these skills and/or abilities for future entry-level employees?	3.3	0.00
8. In terms of specific computer skills such as using spreadsheets, databases, word processing, graphics, Internet, or giving presentations, etc., how well does the new hire meet entry-level performance expectations?	2.0	
9. How would you rate the importance of information technology use and management for future entry-level employees?	2.8	0.80

Social Skills

The category of social skills relates to, among other things, teamwork, coordination, instruction, relationship building, cross-cultural understanding, negotiation, and persuasion skills. In this area, too, employers report a significant gap between perceived current levels of employee performance and future importance and needs.

The assessment of current new-hire performance is fairly low (2.7). The work ethic of new-hires also receives fairly low marks (2.7).

Employers rate the future importance of this set of “soft skills” fairly high (3.5), resulting in a skill gap of .80.

Social Skills and Skill Gap		
Skill	Rating	Gap
11. In the area of social skills, how well does the employee meet entry-level performance expectations for team-work, coordination, instructing, relationship building, cross-cultural understanding, negotiation, persuasion, etc.?	2.70	
12. What level of future importance will social skills have for your entry-level employees?	3.50	0.80
13. In demonstrating good work ethics (initiative, dependability, reliability), how well does the employee meet entry-level expectations?	2.70	

Characteristics of the Best Employees

To assess the quality of a labor force and to identify ways to improve labor work preparation, one can approach the task in two ways. The first, discussed in the above sections, is to look for areas of weakness, deficiency, and performance problems so that these can be clearly identified and then solved in some way. The other approach, discussed below, is to look at best practices, the qualities and practices of employers' best-performing employees.

We addressed these issues in the research survey by asking employers a number of open-ended questions. The first question asked them to identify the characteristics of their most effective, reliable employees in the occupations they identified as critical.

In some cases, a distinct minority, employers identify in best workers characteristics that fit generally under the traditional job assessment categories of knowledge, skills, and abilities (KSA's). The following are illustrative:

- Solderers need soldering skills.
- Fabricators need knowledge of basic math—geometry, algebra, the ability to read blue prints, and know-how with specific tools.
- Assemblers need good hand-eye coordination.
- Engineers need knowledge of specific programming languages.
- Engineers and assembly workers need knowledge of product design and work processes.

Overwhelmingly, however, employers describe the characteristics of their best workers in qualitative, behavioral, attitudinal, social, or "soft skills" terms rather than in terms of

specific technical knowledge. This is the case for all occupations levels. The following are illustrative:

- Attention to detail, stamina, good work ethic.
- Hard working, positive, looks ahead.
- Hard working, always learning, open-minded.
- Works well with others.
- Good communications skills, patient.
- Pride in learning, learns and adapts. Loyal to the company. Efficient. Innovative.
- Dependable, reliable, team worker, good at instructing others and receiving instruction, cross-cultural understanding, initiative, effective communication, and problem-solving skills.
- A team player with leadership skills, can communicate in both English and Spanish, good at problem solving, able to detect change and offers suggestions, punctual, attendant, reliable.

Appendix 3 provides the complete list of employer responses to this question.

Examples of Two Companies That Are Coping Well with Labor Market Issues

Finally, it is appropriate to briefly discuss two companies not experiencing quantitative or qualitative labor force problems. Both report no critical worker or skills issues. Significantly, each has worked out specific strategies to effectively recruit and retain long-term, well-qualified workers.

Company "A." This manufacturer describes no critical occupations and no workforce issues. The reason appears to be that they have extraordinarily low turnover. They state that most of their employees have been with them for 15 to 20 years. The employees of most concern for this aerospace manufacturer are assembly workers. It is difficult to find hard-working people with appropriate language and teamwork skills at the salaries required to maintain company profitability. The company approaches this problem in several ways. They only hire through temp agencies when the candidate is a current employee of the temp agency. This allows them to evaluate the employee's actual job performance before hiring. Because the company finds many workers unprepared, they routinely offer in-house remedial training.

Company "B." This electronic manufacturer describes no critical occupations and no workforce issues. They cite very low turnover, and the vast majority of their employees have been with the company for over 10 years. The company produces state-of-the art night-viewing systems using proprietary heat-sensing technology. Customers include the military, security companies, facilities needing sophisticated security systems, and consumers. The company operates in an area with a tradition of high-tech and defense-

related industries, and the company is located close to a major university. Although the local high-tech and defense sectors have been declining for over a decade, this works to the company's advantage. The company has been able to hire great people displaced by existing manufacturers. The company also hires top entry-level engineering talent from the local university. With an aggressive employee-referral program, employees receive \$1,000 for a hired referral. The company feels that this is an extremely effective way to hire quality assembly technicians while reducing poor hires. In part because of limited alternatives for workers, the company has extremely low turnover. With a goal of low turnover, the company invests considerable resources in that goal: it has generous benefits and benevolent employee policies. As with so many regional companies, many workers commute from as far away as Santa Maria to the north and Oxnard to the south. Housing prices and increasing commute costs are perceived as the most serious threats to workforce availability.

What New Skills Will Be Needed in the Future for These Companies?

This study seeks to discover the new skills employers believe will be important to their enterprises in coming years. Interestingly, about 43% of the respondents said they could not identify any new skills that would be needed. As one employer states, "No. The technology may change, but not the required skills of the workers."

Those that did identify what they characterized as new skills covered a broad array of subjects. Various companies identify the following as among the new skillsets that may be required of future workers:

- Bilingual
- Solar and LED-industry technologies
- Training in "social styles"

In most cases, employers identify as "new skills" knowledge or capabilities that are not necessarily new, but instead are becoming more important for their specific industry or work processes. The following list includes some of these described skills:

- Computer skills
- Critical thinking
- Social skills
- More technical skills, like quality assurance
- Semi-conductor skills
- Electrical engineering, chemistry, and physics
- Programming
- Machine programming
- Databases and computer applications

Education and Training

In this section, we focus on education and training issues: the preparation of today's regional manufacturing workers, the new skills, if any, employers in these sectors expect to need in the future, and the roles education and training play in preparing quality workers for critical jobs.

Overall Satisfaction with Worker Preparation

How satisfied are employers with the overall education preparation of workers at various levels? According to the results, not very. The overall, or summary, rating of employers' satisfaction with their workers' educational preparation is 2.7, which falls in the "Less than satisfied" range. The same is true for specific levels of workers. Ratings for new-level (lowest-skilled), technical, and professional workers are all below the 3.0 level, which indicates minimum satisfaction.

Employer Satisfaction with Current Levels of Worker Preparation	
Category of Worker	Rating
14. In general, how satisfied are you with the education of today's worker?	2.7
Entry-level	2.6
Technical	2.7
Professional	2.8

Here again, findings in the local economy echo those found in national surveys. In the 2005 Deloitte survey of U.S. manufacturers, when asked, "Are the K-12 schools doing a good job of preparing students for the workplace?", 84 percent of companies responding said, "No."^{ix}

Employer Suggestions for Classes and Training

Given employers' satisfaction with the level of workforce preparation at all job levels, we are interested in their ideas for improvement. We ask them, in an open-ended question

format, for specific ideas for classes or training programs “that would better prepare future employees.”

When assessing their responses, we were struck by the number of times the word “basic” was explicitly or implicitly found in their suggestions:

- Basic Skills: How to get a job, present themselves
- Basic business skills: self-confidence, communication, how to present yourself in an interview
- Basic communication skills
- Basic office skills
- Basic programming skills

This emphasis on basic skills reflects national trends. In the 2005 Deloitte national survey of manufacturers, respondents ranked “Strong Basic workforce skills” co-equal with “Technical Skills” as the types of skills employees will need more of in the future.⁸

These results parallel those in the 2006 Ventura College survey of employers in five manufacturing sectors in the tri-counties: When asked whether entry-level workers often lacked the initial skills required by the regional manufacturing industry, many employers stated that they did not.

Percent of Tri-counties' Manufacturing Employers Stating That Entry-Level Workers Lack Basic Skills	
Skill Category	Percentage
English Language Skills	71%
Reading Skills	49%
Basic Math Skills	50%
Employability Skills	65%
<i>Source: Ventura College 2006 Survey of Selected Regional Manufacturers</i>	

Communication and behavioral skills are also mentioned frequently:

- Social styles, personality styles training.
- Dress code, how to interview and act.
- Charm school, social skills.
- Work ethics, communication.

About 30% of the respondents suggest classes in English, and one observes, “English, basic courses already provided but people don’t take advantage of them.”

There are also a number of suggestions for specific technical training, such as electronics assembly courses, soldering, machining and technology classes, automation and systems control, and working in a clean room environment. The full list of responses is listed in Appendix 4.

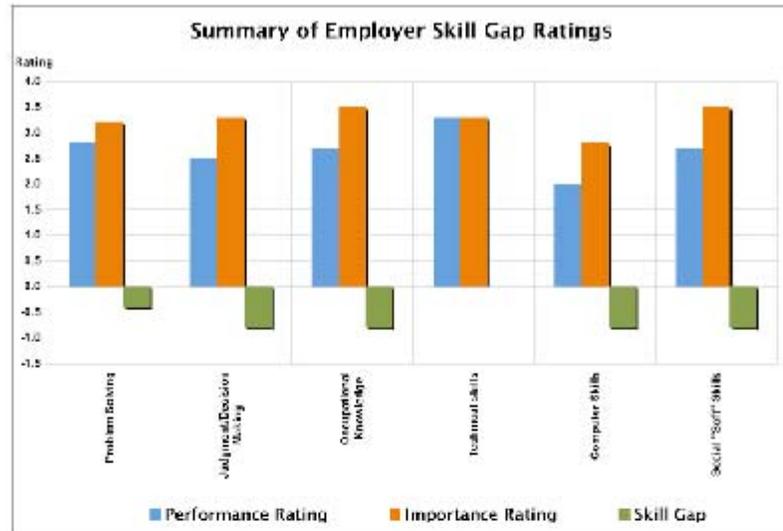
A number of employers advocate more workforce preparation in the schools. Taken together, the following observations made by respondents to the survey suggest a theme:

- Focus on high school students: teach the basic skills! Don’t outsource the jobs to other countries.
- Concentrate on manufacturing sector, not just the service sector. Workers should become more efficient in order to drive the country’s economy. Not all skills that we are demanding should be met/taught, but it is important that they meet most, which would be good for the community and country.
- Teach problem-solving skills. The cultural divide is a great challenge.... Workers must learn how to meet the standards of U.S. business procedures.

In sum, there is considerable concern among the employers participating in this survey about the quality of work education in the schools and also about the importance of creating a quality workforce for the sustainability of our regional and national economies.

Brief Summary of Findings

1. When asked to report those occupations within their workforce that are “critical,” the surveyed Ventura and Santa Barbara County manufacturers most frequently list production and technician positions (53%). A significant number also list engineering positions (37%).
2. Labor market shortages make up some of this “criticality,” with 36.7 percent of firms listing shortages in technician positions and 33.3 percent for engineering positions. It is also important to note that nearly a third of our respondents (30%) list no labor shortages at the current time.
3. For these critical occupations, skill gaps appear substantial.



The largest skill gaps pertain to judgment and decision-making, occupational knowledge, computer skills, and so-called “soft skills,” which have to do with affect, inter-personal skills, communications, teamwork, etc. Many studies refer to this latter category as basic employability skills.

4. Overall, employer satisfaction with workforce preparation in the schools is low.
5. Employers recommend emphasizing basic work skills education, English language instruction, and, on a more limited basis, specific technical knowledge and skills training to improve the education and training opportunities for workers.

Recommendations

The workforce challenges faced by manufacturing in our region, while serious and important, are not unique. These same problems are playing out across the state and the nation. As a result, many groups – government, industry, the academy, and others – are sponsoring discussions and assessments in order to find ways to strengthen both the supply and the quality of the workforce.

Because employers are not simply lacking a single type or worker with a single set of skills, these problems are complex. Even in these three specialized sectors of the manufacturing industry, many different types of jobs are involved, running the gamut from those requiring relatively low levels of skill and education to those requiring

advanced study and sophisticated applied knowledge. Individual enterprises may have, to some extent, unique work processes, where some of the skills and knowledge required of workers are firm and proprietary-process specific.

Another aspect of the problem is that many manufacturing firms are small in size, without trained human resources specialists and the sophisticated recruitment, selection, and training resources that may be found in large firms. And, for many firms, profitability margins are small. With the high costs of doing business in California, raising wages to attract and retain better-qualified workers and investing in internal training and development systems are difficult.

All this said, it might be useful to review the state- and national-level findings and recommendations other investigators have made.

The 2005 Skill Gaps study, conducted by Deloitte Consulting for the National Association of Manufacturers and The Manufacturing Institute, made the following recommendations:^{xi}

- Employers must understand (and act on) the importance of human capital as a business investment—that is, spend more on training.
- Employers must implement new and non-traditional approaches to dealing with skills-retention challenges, including making fuller use of traditionally under-utilized talent pools among older, female, immigrant, and non-traditional workers.
- Employers must help the general public and public sector to understand what companies need.
- Educators must produce graduates familiar with the world of work and the skills needed to be effective in it.
- Education and workforce policies must reflect the need for life-long learning.
- Individuals must take responsibility for their employability.

The Bay Area Economic Forum study of California Manufacturing asked the question, How can government support competitiveness and also save jobs? It answered this question with these recommendations:^{xii}

- Level the playing field: improve regulations and laws to make California manufacturers more competitive. Taxes on business, energy policy, labor rules, workers' compensation policies, tort reform, and more support for research are all examples of areas in which government could do more.

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- Build technical and vocational skills. Specifically, spend more on training programs. Improve the coordination of training organizations and programs around the state. Match school curricula more closely to marketplace needs.
- Promote California manufacturing. Specifically, the State should establish a clear strategy to attract and retain industries whose manufacturing is more likely to be competitive in the California environment. The provision of tax incentives and other inducements to firms in targeted industry sectors should be based on a “sound analysis” of economic costs and benefits.

The study sponsored by California EDGE made these recommendations:^{xiii}

- Invest in regional workforce and economic development strategies to build prosperous communities and competitive industries.
- Provide all California with access to high-quality post-secondary education and skills training.
- Provide working adults with opportunities to move up the skills ladder.
- Link workforce programs and institutions to create pathways to high-wage jobs.
- Align program goals and measures to achieve a shared vision of California’s future and to ensure accountability.

The Jobs for the Future study, conducted for the Rockefeller Foundation, focused on innovations in state government policies and programs that might be effective in building skills in the labor force and, as a result, increase economic vitality. They made recommendations and provided examples in four major areas:^{xiv}

- Redesign the financing of workforce development to make the use of public monies more flexible, to target priority industries, and to make programs more responsive to the needs of employers.
- Strengthen the linkage between workforce development and economic development initiatives and activities.
- Build the capacity of new labor market institutions wherein so-called “workforce intermediaries” would create public-private partnerships, intended to be nimble and collaborative, to bring about changes in education and training, linking educational providers to employers, and providing essential services to workers in training.

The Workforce Excellence Network – involving the National Association of Workforce Boards and the National Association of Workforce Board Chairs – in its report, “Using

Skill Standards & Certification in Workforce Investment Board Programs,” makes a strong argument for the more widespread adoption of nationally recognized, industry-based skill standards and occupation certifications.^{xv} Doing so, they advocate, would make education and training programs more relevant, would strengthen training, and would improve the employee selection processes.

And finally, for this discussion, Achieve, Inc. in its 2006 report on aligning high school policies and programs with the real needs of both college and workforce-bound students, reports that “our schools are not adequately preparing students for college and the 21st century jobs.” It advocates benchmarking the curriculum with verifiable college and work readiness measures.

When examining even a limited number of studies and reports, we are confronted with a dazzling array of program and policy options. These various organizations start from different perspectives and as a result produce different recommendations. Some recommend statewide or even national economic development strategies and initiatives at the “30,000 foot level,” while others encourage greater individual responsibility and individual employer actions.

Many, perhaps all, of the recommendations make some sense, but many are also pitched at the macro-level of government policy or industry initiatives. Of course, these should be pursued. But at the same time, what can the small company, on the ground in Ventura or Santa Barbara County, do to solve their specific challenges or to improve the quality and availability of their workforce?

After our round of data collection and the attendant conversations with employers, we turned to discussions with educators and others in our region, like the Ventura County Civic Alliance’s Workforce Education Task Force, who are concerned about the quality of workforce preparation in our region. On the basis of what we learned through both sets of conversations, we offer the following recommendations. These recommendations are not intended to exclude pursuing larger-scale changes in institutional policies and programs but are instead intended to help employers and labor force participants in our local regional economy take positive steps to make things better:

1. While more widespread changes to make school more relevant to work are certainly desirable, there are already very valuable workforce preparation and development programs and resources in place that are underutilized.
 - a. Employers need to learn more about these programs and take advantage of those that would be right for them.
 - b. Individual workers and prospective workers also need to research their options and take better advantage of programs that will help them build skills and earn more rewarding careers.

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- c. The organizations that provide these programs and services need to be more proactive in their own marketing – getting the word out is essential if valuable programs are to meet their service potential.
 2. Employers, especially smaller employers, should seek opportunities to develop collaborative associations, short term and long term, with each other and with entities such as community colleges in order to provide valuable workforce development services. This would allow small employers to create economies of scale, spreading the costs of labor force development over a larger number of firms.
 3. Individuals need to be encouraged to seek education and training opportunities. Former Ventura County Superintendent of Schools Chuck Wiess noted, at a 2006 conference on the Ventura County workforce, the county’s Regional Occupational Program (ROP) as “a highly successful serving of very few students.” At that time, there were 3,691 ROP students in the county, and Dr. Wiess noted that close to 80 percent of high school sophomores, juniors, and seniors do not participate in any kind of career preparation.
 4. Employers can take advantage, as the Workforce Excellence (see above) report notes, of existing programs for the development and certification of workplace skills.

Endnotes

ⁱ 2005 Skills Gap Report – A Survey of the American Manufacturing Workforce, Deloitte Consulting, 2005, p. i.

ⁱⁱ Cited in *One Million Jobs at Risk: The Future of Manufacturing in California*, Bay Area Economic Forum, March 2005, p. 4.s

ⁱⁱⁱ As reported in *Policy Points: Labor Day 2008: Little to Celebrate*, California Budget Product, August 2008, p. 2.

^{iv} *California EDGE: Keeping California Competitive, Creating Opportunity: California’s EDGE Campaign*, Summer 2006, p. 4.

^v California Workforce Investment Board, 2006.

^{vi} *Manufacturing in Transformation: Economic Change and Opportunities in the Design, Production, and Logistics Value Chain*, Collaborative Economics, September 2004.

^{xiii} Survey of Selected Regional Manufacturers, Ventura College, Institute for Community and Professional Development, Center of Excellence, January 31, 2007.

^{xiiii} Survey of Selected Regional Manufacturers, Ventura College, Institute for Community and Professional Development, Center of Excellence, January 31, 2007, p. 11.

^{xv} 2005 Skills Gap Report – A Survey of the American Manufacturing Workforce, Deloitte Consulting, 2005, p. 16.

^{xvi} 2005 Skills Gap Report – A Survey of the American Manufacturing Workforce, Deloitte Consulting, 2005, p. 8.

^{xvii} 2005 Skills Gap Report – A Survey of the American Manufacturing Workforce, Deloitte Consulting for the National Association of Manufacturers and The Manufacturing Institute, 2006,

^{xviii} One Million Jobs at Risk: The Future of Manufacturing in California, Bay Area Economic Forum, March 2005.

^{xix} California's Edge: Keeping California Competitive, Creating Opportunity, California's EDGE Campaign, Summer 2006.

^{xx} Building Skills, Increasing Economic Vitality: A Handbook of Innovative State Policies, Jobs for the Future, January 2005.

^{xxi} Using Skill Standards & Certifications in Workforce Investment Board Programs, Workforce Excellence Network, Washington D. C., 2002.

Appendix - Recommended Classes and Training

Core Critical Occupations	Classes or training programs that would better prepare future employees
Manufacturing/ Production	Basic Skill: how to get a job/present themselves, basic business class to better understand the corporate mentality and communication with management.
Interconnect Technicians, Soldering (Manufacturing)	Basic Skills: self confidence, communication, how to present yourself in an interview.
Estimator, Steel Fabricator, Welder.	Math - mandatory for blue-collar workers.
Sales Managers, Admin. Assistants, Logistics Assistants, Shipping managers.	Microsoft Office skills, Planning and organizing skills.
Mechanical and Electrical Engineers	More engineering.
Assemblers	Electronic assembly courses, soldering.
Assembly, Clerical - answer phones, interface with customers	Social styles, personality styles training
Design Engineers, Machine Builders.	Machine shop classes geared towards future work.
Machine Operators, Computerized Network Controlled (CNC)	Machining and technology classes, basic communication skills, and English speaking skills.
Engineering: Mechanical, Electronic and Design, Assembling.	Basic Skills: Improve math language.
Engineering: Mechanical, Industrial, Electrical, Production: Fine Manufacturing.	No.
Engineering: Electrical, Software/Hardware (IT), Mechanical	More Business Classes in High School: learn office skills, business language, and dress code, how to interview and act.
Sales.	No.
Manufacturing Operators.	Charm school, social skills, general business skills, financial planning, practical living skills, basic office skills.
Assembly Production	Work ethics, communication
Manufacturing Operators/ Assemblers	Hands-on skills to operate equipment.
Insect Production	Language - need more effective training and education in English. Need to be able to speak fluently.
Applied Machinery and Engineering	Basic programming skills.
Mechanical Engineering	

Controls Technicians	Introducing students to build automation and system control (Digital control)
No Critical Occupations	
No Critical occupations	
Engineers and Assembly Technicians	Process technicians, assembly technicians, clean room environment.
Engineers and Assembly Workers	English reading and teamwork.
Machine Operators	Education in retirement plans so they will take advantage of and value the benefits available to them.
Value Stream Operators	Maintenance operators.
Pesticides Control Advisors (PCA) and Applicators: applies the pesticides	
Production Employees: Assemblers and Radio Frequency Test Technicians	English, basic courses already provided but people don't take advantage of them.