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Workforce Innovation in Regional Economic Development

Task 1.2: 21st Century Worker Profiles

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BACKGROUND

Along with WIRED 1.2 team partners[1] the South Bay Economic Development Partnership (SBEDP) is challenged by this task to develop 21st Century job profiles in organizations focused on high technology and high impact future innovation career pathways in the following industries: bio/pharma, bio/info/nano and biomedical health.

The results of this study area will enable educators and workforce skill training providers to have a better focus on existing technical careers and those that may emerge from continuing advances in the specified technology fields under study. Collaborating with CSA leadership, the task 1.2 team members and California Employment Development Department (EDD), the SBEDP assisted in development of a comprehensive approach to data gathering, data target selection, and resources supporting the chosen industries.

The selected industries and their North American Industry Classifications are:

- Pharmaceutical and Medicine Manufacturing (3254)
- Semiconductor and Other Electronic Component Manufacturing (3344)
- Navigational, Measuring, Electromedical, and Control Instruments Manufacturing (3345)
- Scientific Research and Development Services (5417)

IMPLEMENTATION

The project team elected to consign initial data gathering to the Labor Market Information Division (LMID) of the California Employment Development Division (EDD), an organization with resources and analytical capabilities necessary to gather specific quantitative data on the following occupations:

- Biological Technician
- Chemical Technician
- Electrical Engineering Technician
- Robotic Technician
- Electronics Engineering Technician
- Industrial Engineering Technician
- Mechanical Engineering Technician

LMID's survey results are in a separate document and not reported here. Those results were presented to the team at a meeting in Anaheim November 2007. After analysis of the results and further evaluation of the survey instrument for qualitative study of

[1] Bay Area Science and Innovation Consortium (BASIC), LA County Workforce Investment Board (WIB), South Bay WIB, Riverside County WIB, San Bernardino WIB, North Valley Job Training Consortium (NOVA), and CCST

companies in target industries the SBEDP began an outreach program enlisting company cooperation necessary to gather data as specified by task requirements. Working initially from Target Company lists provided by LMID and its own regional database the SBEDP began an extensive communications program January 2008, using surface mail, Internet email, and facsimile transmissions.

The mailings were followed by telephone calls to all companies on the target list, beginning with those firms with which the SBEDP has a relationship. We quickly learned that although NAIC identity indicated the targets fit the desired study profile, many targets were not accurately identified via NAIC designation. Early survey returns were rejected on that basis. Another issue was company reluctance to participate in workforce studies. Many have blanket policy against doing so. To overcome this attitude the SBEDP enlisted what it calls 'credible messengers' or persons of influence with individual and groups of companies to carry the WIRED message. This included speaking engagements at community meetings with business focus.

The SBEDP also enlisted the assistance of third party organizations such as the South Bay Science Foundation, NANOWorld USA, area chambers of commerce, the Los Angeles Regional Technology Alliance, colleges within the region and Southern California Biomedical Council, among others. Most all agreed to communicate to members and contacts the need for cooperation with WIRED data collection.

The SBEDP continued to mail to targets, send email messages and call on a regular basis with limited results. The organization teamed with the South Bay Workforce Investment Board to facilitate focus group meetings. Unfortunately, those SBEDP/SBWIB focus group meetings were cancelled due to lack of company commitment. There was some success recorded when the SBEDP began offering items of perceived value in return for interview time. One successful offering was the SBEDP's annual South Bay Economic Digest.

When the SBWIB suggested using an online survey the SBEDP collaborated with the WIB and other organizations to drive companies to the web site. Again, although several thousand email messages were delivered to targets in designated NAICs, the results were less than exciting and the SBEDP decided to not try a similar approach to gather data. The SBEDP continued communicating with targets by mail, email, and fax and calling regularly, especially those companies that promised to schedule interview time.

FINDINGS

The primary research in this report is based on 10 qualitative surveys conducted with employers in the South Bay of Los Angeles County. Of the several hundred survey targets only these ten companies provided information as desired to satisfy WIRED program requirements.

Future of the Industry

Where is the industry going and how will changes in the industry shape the workforce?

Issues and ideas driving your industry

This item elicited a variety of comments. Funding was mentioned by three respondents, industry innovation and wireless communications were stated twice Changing laws and regulations, more involved processes and products along with new product research round out the responses.

Funding The firms mentioning funding indicated that a large part of their research is based on grants or federal government funding of specific project areas. Without these sources the firms say their work is limited due to the cost of leading edge technology that does not promise short term reward that private investors seek.

Innovation Those companies mentioning innovation as a driver said that, as is commonly known, when a product is released it is usually obsolete, ready to be replaced by the next generation development in process. Today's global economy strips away many traditional barriers to entry for the technology company.

Other Issues and Drivers Remaining respondents said that their challenges were keeping up with changing laws and regulations that may cause them to address items that are not part of their core business…doing what is necessary to conduct business where they are located. Generally most respondents indicated that they rely on more legal expertise than in past years. Another item mentioned is tighter specifications that may involve newer materials. Technology companies are developing product for use in challenging environments that are made of or brush up against newer materials. Working with what may be initially unorthodox materials is a challenge for the current workforce. An example of this is reliance in many industries on composites, powder based metals and new pharmacology delivery systems.

Next Frontier

There is little commonality of responses to this subject area. Each respondent believed their answer to be the next headline grabber. A sampling of responses is:

- Stem cell research and nanotechnology
- Pharma
- IP transport and delivery
- Regenerative medicine
- Wireless communications

The Next Great Breakthrough

This subject area elicited responses along the lines of *Next Frontier* answers.

- Stem cell research and nanotechnology – Cited were announcements from Japan of stem cell applications healing damage to the human heart and nanotechnology used for efficient delivery systems of pharma products. One respondent mentioned how stem cell technology will allow for advancement of regenerative medicine, including healing wounds and complete regeneration of limbs.
- Spectral sharing – This is an advanced wireless technology that addresses issues resulting from the growth of wireless applications, including those of cell phone use. One goal is to avoid congestion when using wireless communication devices.
- Miniaturization – The desire to create ever smaller scales for mechanical, optical and electronic products and devices is driving this trend in technology research and development. An area of high impact is design and manufacture of semiconductors and printed circuit boards.

Industry's Future Impact on Workplace Skills

Responses to this question resulted in a few common areas:

- More (quantity) skilled workers will be needed with much stronger (quality) abilities.
- Emphasis will be on education, skill and experience.
- More will be expected from entry level technicians.

<u>More skilled workers</u> – Emerging industries, especially those based on science and technology, will require many more workers in the future than today. It was emphasized that business will go where the workers are.

These workers will need to be skilled within narrow disciplines that are not emphasized in education circles today. Examples are bio, propulsion engineering, chemistry, and regulatory issues.

Education emphasis – Future emphasis will be on overall education including communication skills, English, and working in teams along with general core competency and STEM courses. Education will not be enough, with respondents emphasizing the need for specialized skills and industry experience.

Greater Expectations – The worker of tomorrow is expected to communicate better, understand new processes and equipment, and have a strong sense of customer service. There appears to be a growing emphasis on not only what is accomplished, but how it is accomplished.

Ideal Skills, Education and Experience

This section looks at staffing requirements today and ten years in the future.

Managerial Level

- Respondents believe that managers need to be better educated along diversified lines with emphasis on core technology knowledge backed up by business awareness. They believe that interdisciplinary focus is what is most desired.
- It is also expressed that practical experience in the field of company expertise will benefit the manager with tutorials is supervisory skills and methods.
- Respondents stated that team building and communication skill are highly valued.

Professional Level

- In alignment with the manager level of responses respondents emphasized education with 80% advocating advanced degrees.
- Communication skills are also viewed as desirable.
- Along with advanced degrees it is suggested that experience in the field is absolutely necessary.

Technician Level

- Understanding that the responding companies are not the norm, 40% of respondents wanted their technicians to have a 4-year degree. Another 40% wanted technicians to have a 2-year degree, although half of them said a HS diploma would suffice based on experience and a desire to continue education.
- Technicians are expected to understand new machinery, technical applications and have strong industry experience, along with good communication skills.

Critical Skills Shortage

Interestingly 70% of respondents registered answers indicating critical skills shortage of one type or another. Yet 100% of respondents said that they were able to find individuals with the skills respondent currently needs. The gap is most pronounced at the managerial level.

Managerial Level

- Lack of supervisory and management skills dominated this area followed by communication and team building expertise. Communication was mentioned at various times throughout the interviews, yet not one respondent asked about acquiring better communication skills. Similarly lack of management skills was mentioned often with no response about training or how to acquire those skills.

Professional Level

- Only 50% of respondents indicated professional level skills shortage and those fell into the following areas:
  - Communications skills
  - Understanding regulations and compliance of grant funding
  - Ability to build a team
  - Lack of business sophistication

Technician Level

- 60% of respondents indicated technician level skills shortage. 83% of them said that poor English or writing skills was a problem.
- 50% of respondents said that basic job skills were lacking, especially lab experience.

We Would Be Interested in Hearing

This section of the survey queried target companies relative employee effectiveness at the manager, professional and technician levels. After responding to what is today the interview target is asked to project responses 10 years into the future.

Effectiveness of Today's Manager

80% of targets responded that:

- Managers are good communicators
- Blend business and scientific skills
- Build teams and motivate people

Good Communicators – Today's effective manager is believed to be a good communicator who understands what motivates people. In a diverse work place this skill is a premium.

Business and Scientific Skills – It is believed that in today's competitive business environment managers need to possess technical skills along with business acumen. The effective manager needs to understand how to budget all resources to realistically plan each project to completion.

Team Building and Motivation – Respondents believe that a manager's ability to motivate employees and create teams around products and problems greatly enhances their effectiveness. Respondents believe that these attributes help develop employee passion for their job and the tasks involved.

Effective 2018 Manager

- Generally respondents replied that similar requirements would prevail or a higher level of current day expertise would be desired.

Effectiveness of Today's Professional

- Only 7 of 10 persons responded to this question category. The responses were virtually identical: top education linked with industry experience.
- Two respondents said that today's effective professional needs to be a visionary and another respondent offered the effective professional needs to have an understanding of the marketplace.

Effective 2018 Professional

- Three respondents did not reply.
- 60% said the criteria would not change.
- One stated that the effective 2018 professional would be an innovation leader.

Effectiveness of Today's Technician

- 30% of respondents did not reply.
- Sophisticated in laboratory techniques and can communicate and create interest with others.
- Interested in the work, wants more responsibility, interested in continuing education.
- Good work ethic, respects science and work environment
- Takes direction well, is curious, understands specifications,
- Dependable and wants to advance in the company,
- Good communicator who wants to get ahead, seeks continuing education,
- Understands math and science and works to achieve quality on time.

Effectiveness of 2018 Technician

- 30% did not comment
- 60% said that the criteria would be the same
- One respondent said that the effective technician would be as today with a better knowledge of changing equipment and processes.

Leadership and Skills

What skills will future leaders need to have?

- 20% of respondents said that future leaders will need the same skills as today.
- 30% indicated interdisciplinary knowledge will make the future leader more effective.
- The rest of respondents commented that experience is very necessary along with regulatory knowledge and certification such as ISO and GMP.

Where will you look for future leaders?

100% of respondents projected their current recruitment patterns which consist of:

- Internet recruiting
- Within the industry,
- Recruiters
- From other companies,
- Area colleges and universities,

It is interesting that respondents positioned other sources above colleges and universities. When questioned about this they generally referred to the experience factor when recruiting a leader, saying that recent graduates do not fit the profile.

Education Report Card

This particular area of questioning did not yield much insight to local employer views on regional colleges and universities. Only University of California was mentioned by name when respondent queried about institutions meeting company needs. That company has ongoing research relationships with various UC campuses.

Other firms simply answered generically, saying 'top line schools', or simply colleges and universities in the area.

When asking about sources that have been bad no schools were mentioned. Two respondents said they had bad experiences with Workforce Investment Boards and another said that California K-12 in general was lacking and preferred to avoid high school graduates without further education.

Ensuring education's future

Respondents were asked to recommend what educators need to do to prepare individuals for the skilled jobs of the future. The responses were generally in two areas:

- Have educators stay in touch with industry.
  This allows educators understand the relevance of their subject to today's world. It is believed that this may excite students to understand how dynamic sciences are to every day life and what the scientific community contributes to the student's quality of life.

- Encourage students to study sciences, teach them to make something.
  It is expressed that not enough is done to excite students, creating a desire for them to study science. Teaching them to make something is one recommended method for creating that excitement. Give them more laboratory time and encourage internships with companies in the community.

Primary Concerns and Key Messages From Industry

Respondents were asked to voice their concerns relative a future workforce and the message they wish to convey to California leadership.

Key concerns about the future workforce

Sixty percent of South Bay respondents commented that a lack of basic math and science skills was a top concern relative ensuring a skilled future workforce. This was matched by 60% of respondents believing the lack of a broad understanding by key educators of the key elements that are the driving force for technology companies. Half of respondents noted that a lack of easily accessible training for professionals and management to obtain the added knowledge necessary as a corporation moves into different areas is a key concern. This was the case when 50% of respondents stated that a lack of a system for quickly incorporating needed changes into the education system is a problem. No respondent indicated that the lack of interest in becoming a bench scientist was an impediment to ensuring a future skilled workforce.

Key message to government

The message to government from respondents is this:

- There will be growing opportunities in this sector and we should take advantage,
- Emphasize science at all grade levels, educate the public relative what science is contributing to California's quality of life,
- Respect science and build emphasis in every day communication, not just special events,
- Learn what our community is doing,
- Understand the cost of innovation and the value of the return on investment in the scientific community. Support California's private sector science/technology firms as other states support theirs,

- Don't get in our way. Don't over regulate.
- Give students what they need to engage a career. Give them something that is exciting, something they want to know more of, something that creates passion for what can be.

This concludes the South Bay Economic Development Partnership report on WIRED task 1.2 qualitative survey of specific NAICS in the South Bay of Los Angeles County. Questions or comments should be directed to:

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