Strong Workforce Program
Cross-Sector Advisory: Automation & Artificial Intelligence in Agriculture and Manufacturing
April 30, 2021
Virtual - Zoom

Introduction

The Los Rios Community College District, in partnership with Valley Vision, and in collaboration with Sierra College and Yuba Community College District, invests Strong Workforce funding to organize and convene Regional Advisories. The objectives of the Regional Advisories are to build strong relationships between employers, educators, and workforce that:

- Provide timely information on skills gaps and workforce needs, informing partners on major industry trend information;
- Improve the efficiency of the advisory process for educators and employers;
- Reflect a regional view of workforce needs and assets;
- Provide opportunities for more systemic, ongoing engagement that includes workforce partners in key industry sectors.

Regional Advisory meetings help inform decisions on needed investments and enhancements for Career Education (CE) programs to help fill the growing demand for middle-skill positions. This meeting proceedings report includes key findings, best practices, and minutes from the Spring 2021 Cross-Sector Regional Advisory meeting focused specifically on the effects of Automation and Artificial Intelligence on occupations within the Agriculture and Manufacturing sectors.

Valley Vision supports a robust talent pipeline through our multiple 21st Century Workforce initiatives. We prepare our regional workforce for the future by addressing skills gaps, advancing research, aligning efforts and strengthening systems. Valley Vision's workforce efforts are supported by the Sacramento Employment and Training Agency (SETA), Golden Sierra Workforce Development Board (WDB), North Central Counties Consortium, Yolo WDB, City of Sacramento, local community college districts and others.

The Strong Workforce program provides Career Education opportunities to increase social mobility and fuel regional economies with skilled workers.

Key Findings

- Automation has become critically important for agriculture and manufacturing companies to continue business operations as they face a lack of workers and increasing wage costs to pay incumbent workers. While workers with lower or middle skill jobs are likely to lose their positions to automation, workers within higher skilled positions with four year degrees are expected to retain stable employment. In the future, companies are projected to be run by teams of highly skilled staff, with repetitive manual labor jobs replaced by automation.

- Labor market research data shows that 60% of jobs in the capital region are found to be at medium to high risk of automation, with industries like manufacturing and agriculture projected to be highly affected. Though automation will lead to some job loss in agriculture and manufacturing industries, it will make remaining jobs safer for workers by preventing workplace injuries due to repetitive motion or exhaustion. The expansion of automation is also projected to lead to better quality of life for employees; allowing them to gain additional skills, earn a higher wage, and experience improved work schedules and work/life balance.

- The panel of employers stressed the need for incoming workers to possess educational backgrounds with a combination of computer, electrical, and mechanical experience, as well as communication skills. Regarding communication, the ability to relay clear and concise information covering technical topics in emails and business communications is a highly sought after skill.

- Education partners and employer panelists encouraged community colleges to form relationships with high schools and four year universities to introduce students to AI, manufacturing, and engineering early in their education, and forge a pathway for students to advance to a four-year degree in order to achieve the higher skilled, more resilient occupations in this sector.

- While few current job postings specifically mention artificial intelligence in their descriptions, researchers argue a workforce more educated and familiar with this technology could increase adoption levels and result in more artificial intelligence jobs.

- The employer panel stated that a key way to attract students to the Agriculture and Manufacturing industries is to highlight how fulfilling this work can be. As technology advances, business practices become more sustainable, and eliminate waste. Many companies also support environmental or human rights initiatives, such as sponsoring initiatives to clean the ocean, or feeding children in need.

Meeting Proceedings

Welcome & Overview

This advisory was a Cross-Sector Regional Workforce Advisory Meeting on Automation and Artificial Intelligence (AI) in Agriculture and Manufacturing. Valley Vision's Managing Director, Trish Kelly, began the meeting, stating the goal of bringing together employers and professionals from these sectors to discuss the current level of technology adoption in their industries and what they are predicting for the future. Kelly also introduced the Community College Regional Directors from the North Far North Centers of Excellence who helped to plan this advisory, pictured below. The regional directors work with industry partners to develop pathways to employment for students coming out of college programs. From left to right, the Regional Directors are:

- **Carrie Peterson** - Agriculture, Water, & Environmental Technology
- **Cornelius Brown** - Information & Communication Technologies / Digital Media
- **Jeff Briggs** - Advanced Manufacturing

Collaboration with K12

Jared Amalong, the Director of Computer Science and Distance Learning at the Sacramento County Office of Education, briefly presented in support of curriculum covering computer science and ICT. Amalong noted that the region has seen growth in the field of ICT and computer science, and that this knowledge could be transcendent to agricultural pathways for students. He also agreed that pathways for this industry in our region, in conjunction with the community colleges, could help workers achieve higher wages and access higher demand jobs.

What's Happening Now - Employer Panel
- **Greg Ahart** - Vice President of Operations, Superior Farms
- **Raf Peeters** - CEO and Founder, Qcify Inc.
- **Patrick Andersen** - President and Chief Financial Officer, Andersen & Sons Shelling Inc.

Lack of Labor & Investment in Automation - The employer panel delved into the process of automation, and how it has affected their companies. Overall, automation has reduced dependency on manual intervention; all employers agreed that they faced difficulty finding and hiring enough workers to meet product demand. In order to keep their companies running and meet demand for product, automation has become critically important with employers introducing machinery to replace or reduce staff. Production volumes at these companies continue to grow, with insufficient workers to continue relying on human staffing. Multiple employers noted that California's minimum wage increase and benefit requirements are costly to companies. In contrast, automation's labor savings and the efficiency it provides often pays for itself and has shown to be a better long-term investment for business sustainability.

Shift from Human Labor to Machinery - Panelists acknowledged that this transitional period from human to machine labor may be difficult. Many are investing in upskilling their team members whenever possible, although advanced degrees are becoming highly desirable. Employers are not trying to reduce the number of available jobs, but instead seeking to keep their facility running whether with automation or with workers. Employers noted that 70-80% of careers in the Agriculture, Manufacturing, and ICT industries are stable - for those with higher skilled positions that require additional education. Panelists stated that for lower or middle skill jobs, workers are likely to gain and lose jobs like a "revolving door" as companies incorporate automation and find the right fit. In the future, processing facilities are likely to have a core group of highly skilled staff supplemented by technology.

Worker Safety - The rise in automation may lead to some benefits for workers who remain. Jobs requiring repetitive motion will likely be automated, leading to a reduction of workplace injuries. Making investments in automation may improve worker safety, worker longevity, and ergonomics in the workplace. Due to a lack of workers, current employees often work overtime, which can lead to workers feeling tired or overworked. Introducing automation could reduce workplace injuries, allow realistic work schedules, and create a better work/life balance for employees.

Workforce of the Future - Workplace activities requiring repetitive action are some of the first to become automated. Employers explained that many workers who perform this work now are generally older, and many are migrant workers. Employers want to show learners, and even future posterity of current workers, that they can work for manufacturing and agriculture companies while still having access to better jobs than those who came before them - working in areas like quality control, operations, or with Programmable Logic Controllers (PLC). Automation requires highly skilled workers to run machines, leading to a demand for college-educated workers with familiarity with required machinery. An example of this can be seen at California State University, Fresno which has a tree nut focused class and laboratory to expose students to job opportunities and machinery in the tree nut processing industry. Panelists agreed that the food industry is in for a major shift; as technology evolves and often outperforms human capabilities, some jobs will be lost, while this same technology will elevate others' roles. As panelist Raf Peeters said, "It's not man vs. machine, but man with machine."

Workforce Implications of Automation & AI in the Greater Sacramento Region
This labor market research data was presented by Ebony Benzing, Research Manager, and Aaron Wilcher, Director, of the Center of Excellence for Greater Sacramento (North). They shared the [Automation Risk for Jobs in the Capital Region](#) report, and went over its key findings and regional strategies. The report found that about 60% of jobs in the capital region were found to be at high and medium risk for automation. These jobs were centered around routine cognitive, physical, and non-physical tasks with Manufacturing, Agriculture and Hospitality industries projected to be highly affected.

Within AI-related roles, most workers are involved in two functions: as an Architect/Builder, and/or Translator/Implementer. The Architect/Builder role is often responsible for creating or programming AI technology, while the Translator/Implementer role utilizes this technology, and communicates its data to outside partners. An analysis of job postings data from Burning Glass Technologies showed that there was not a large distinction between these categories in job postings. While AI Postings are highly technical in nature, they also require communication in order to collaborate on business opportunities across teams.

Regarding job postings, few positions specifically mention AI - with the most mentions in manufacturing and healthcare. For manufacturing positions, AI is only listed in 140 out of 5,600 job postings. There were two kinds of employer postings which referenced AI: large employers like Intel, Cisco, Applied Materials, and Anthem Blue Cross, and third-party firms that specialize in data systems, analytics, business, and operations strategy. None of the job postings for AI were considered middle-skill jobs, and

computer science was often the most commonly-referenced requirement on job postings. Figure 1 (below) summarizes job posting data for AI positions within healthcare, listing job title/position, employers, and skills needed.

Figure 1

The **jobs postings** in health care provide a sample of types of positions, employers, and skills.

Job title	Employer	Skill requirements
Systems director	CommonSpirit Health/ Dignity Health	• data/information/thought leadership-technical team supervision • advanced analytics • clinical informatics • data science • descriptive statistics • PowerBI, Tableau, R • database architecture/management • enterprise architecture / interoperability • SQL • .NET framework • Python • SaaS • business intelligence • forecasting • data driven decision-making • communicating value in laypersons terms • cross-function business-technical engagement
Senior marketing analyst	CommonSpirit Health/ Dignity Health	
Senior web application developer/analyst	xFusion Technology	
Senior Operations Analyst	MAXIMUS	
Clinical Informatics Supervisor	UC Davis Health	
Group Manager, Digital Health, Connectivity and Platforms	Baxter	
AI Principal Engineer	Anthem Blue Cross	
Strategy Director	Anthem Blue Cross	
AI Machine Learning Scientist	Anthem Blue Cross	

On the manufacturing side, shown in Figure 2 (below) the job postings data that mentioned AI was similar, with an emphasis on large employers, and required a combination of technical engineering, analytics, management, and planning skills. There was a large emphasis on the previously mentioned "Translator" type role for business operations.

Figure 2

The **jobs postings** in manufacturing provide a sample of types of positions, employers, and skills.

Job title	Employer	Skill requirements
Director, Capability & Analytics	Intel	• Data science • PowerBI, Tableau, R • Data mining / modeling • Predictive modeling/analysis/simulation • Agile, Scrum • SQL; Oracle; XML; Python; Java; NODE.JS; Matlab; C++ • SCADA • SAS • ML packages: TensorFlow, PyTorch • "bringing together technical and business skills" • Managing schedules, business goals, supply chains • Work across technical and business teams • Collaborative team member • Understand stakeholders; stakeholder management
Application Engineer: Operations Productivity	Applied Materials	
Graphics Silicon Planner	Intel	
Data and Business Technology Lead	Merck & Co, Inc.	
Project Manager/ Project Analyst	Intel	
Junior Data Scientist	Intel	
Vegetable Predictive Breeding Lead	Bayer	
Technical Product Marketing Manager	Tignis	
DEVOPS Engineer	Hewlett Packard	

Wilcher and Benzing concluded by noting that the job data postings findings did not point to any actionable recommendations for AI-specific curriculum development. However, the small number of job postings mentioning AI experience could be an indication of low levels of technology adoption, and having a trained workforce in AI may enable technology adoption in the future. The job posting data also reiterated the need for workers with Bachelor's degrees in Engineering and Computer Science.

Industry Direction in Automation & AI - Employer Panel
- **Brendan O'Donnell - Global Category Director - Nuts, TOMRA Sorting, Inc.**
- **Gabe Youtsey - Chief Innovation Officer, UC Agriculture and Natural Resources**
- **Dirck Schou - Chief Executive Officer, Taqtile**

Technical & Emotional/Communication Skills - The employer panel stated that they continue to look for workers with a multidisciplinary background, including electrical, mechanical and computer engineering or knowledge. Additionally, panelists placed a high emphasis on finding workers who can employ effective communication skills. These communication skills include writing for business, understanding brevity and conciseness, and the ability to write emails or other communications on a technological topic that is easily understood. The panel also mentioned a desire for workers who could understand on a deeper level why customers would be willing to invest millions of dollars into equipment, and what that would mean for their company.

Application of Skills within Roles - Panelists noted that communication skills and understanding of electrical and mechanical engineering could aid workers in multiple roles at their company. These roles include Sales Application Engineer, which requires a four-year degree in a science-related field, and a basic understanding of electrical and mechanical engineering. Panelists noted a need for an increased sales force - one that can aptly communicate with customers, build relationships, and understand the technology being sold through an engineering and electrical lens. Environmental sustainability is a point of interest which can draw incoming workers, and can also result in profitability for companies. Employers noted that advancements in technology could help draw young workers to these jobs; as equipment becomes more advanced, it minimizes food waste, and ultimately becomes more sustainable.

Pathways for Community Colleges & K12 - The employer panel stressed the need for community colleges to help build a pathway for students to acquire a four-year degree. Panelists acknowledged a challenge: high school students do not have knowledge of careers that are now emerging, or know the skill sets they will need for the future. According to panelists, the introduction to this information currently begins at the community college level. To combat this, employers recommended forging a relationship with local high schools. Employers expressed giving high school students a vision of the types of careers that are surfacing, and information about the skills they may need for these careers may better inform them for their future in the workforce. Panelists also advocated for increased partnerships between community colleges and four year universities in order to lay the groundwork for increased educational levels needed in the future. They also recommended creating a condensed program to provide the skills necessary that are currently only taught in four-year degree programs which slows down the pipeline and is not timely enough to keep up with the needs of this industry. To improve this, California State Universities and UCs will need to work closely with community colleges to provide shortened courses and other novel training programs that will blend schoolwork and experience to provide employers with a skilled workforce that is prepared for newly created jobs.

Advertising Automation & AI Careers - Employers suggested that community colleges can attract students to Automation and AI careers by showing them how exciting the business can be. The panelists agreed that some of their best employees shared one particular attribute: being passionate about the business. The employer panel explained that a career in automation and AI is working for the good - by reducing food waste, sponsoring initiatives to clean the ocean, and feeding children in need in South

Sudan and North Kenya. Panelists remarked that many employees hold value and pride in this work, and that exposing this side of the business will help bring in more workers.

AI in Higher Education - Panelists noted that AI is a newly emerging concept, and as a result, it has been difficult to get community colleges and four-year university students connected and dedicated to these programs, especially if students have had no exposure to AI. The University of California Davis is currently working on fellowship programs with a variety of different technologies and science-related internship programs to expose students to different areas of AI and see what they would be interested in learning, and provide exposure. Panelists used this UC program as an example, and suggested community colleges implement similar programs to inform students about careers in AI fields before they make the transition to four year universities.

AI and Machine Learning Programs within Community Colleges

There are emerging programs at colleges within California and nationwide which are forging a pathway for students interested in AI. Colleges with these programs include: Maricopa Community College (which has a partnership with Intel), Coastline Community College, Bellevue College, and Houston Community College.

Conclusion

To close out the presentation, attendees were encouraged to reach out to Regional Directors for Employer Engagement in the North/Far North region for opportunities to connect in the future. Their contact information is listed below:

- Carrie Peterson - Agriculture, Water, and Environmental Technology |cpeterso@yccd.edu
- Cornelius Brown - Information & Communication Technologies | BrownC@crc.losrios.edu
- Jeff Briggs - Advanced Manufacturing | JeffBriggs@sierracollege.edu