

Automation Risk for Jobs in the Capital Region



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In partnership with:

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Supported by:

Sacramento Employment and
Training Agency (SETA)
Golden Sierra Job Training Agency
North Central Counties Consortium
Yolo Works

March 2020



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Executive Summary

In the fall of 2019, Valley Vision, a civic leadership organization in the Sacramento region, enlisted the North/Far North Center of Excellence for Labor Market Research to provide data analysis on how artificial intelligence and automation will impact jobs in the region, while informing local workforce development agency plans for displaced workers. The Capital Region is served by four workforce development agencies: Golden Sierra Job Training Agency, North Central Counties Consortium, Sacramento Employment and Training Agency (SETA), and Yolo Works. The Center of Excellence study set out to answer several questions:

What is the composition of the region's workforce?

In 2018, there were 1.2 million jobs in the region. Half of those jobs were concentrated in six sectors: health, retail, accommodations and food services, construction, administrative, and professional services. Approximately 640,000 workers, about half of those 1.2 million jobs, were employed in only 50 occupations ranging from janitors to managers and personal care aides to teachers and lawyers. The entry-level wages for the six sectors varied from minimum wage to more than \$35 per hour.

How will artificial intelligence and automation impact the region's workforce?

Of the 1.2 million jobs in the region, 32% are at high risk of automation, 29% at medium risk of automation, and 39% are at low risk of automation. Industries most at-risk of automation in the region are retail trade, accommodations and food services, and construction. In 2018, these industries accounted for nearly 300,000 jobs, or a quarter of all jobs in the area. Jobs in these three sectors are projected to grow by 8%, adding another 23,500 jobs by 2023.

Of the 50 occupations that employ the most workers in the region, 13 occupations are most at risk of automation, including office clerks, administrative assistants, retail salespersons, accountants, and restaurant cooks. The 13 occupations identified by the study employ nearly 233,700 people, or 19.5% of all workers in the region, and pay, on average \$12.36 per hour.

Women in the region are at a slightly higher risk of being impacted by automation than men because they are disproportionately employed in high automation risk occupations, including office administration, retail, and food service. In addition, historically minoritized workers are at a higher risk of being impacted by automation. Of all ethnic and racial groups, historically minoritized workers are most at-risk of being impacted by automation due to the disproportionate concentration of these workers in high and medium automation risk occupations.

What can the region do to prepare for the impending skills shift?

- *Employers should invest, or continue to invest, in workforce training to not only preserve and retain workers, but to ensure that businesses can hire the skilled workers they need.*
- *Postsecondary training providers should respond to these future changes by examining and changing the way education and training is delivered.*
- *Workers and businesses should adopt and promote a constant learning mindset.*
- *Education and training should include a focus on developing interpersonal skills, as well as other uniquely human skill sets.*
- *Workforce and economic development partnerships should create and implement a regional plan focused on continuous learning.*

Introduction

With the acceleration of technological development, the widespread adoption of automation and artificial intelligence is expected to reshape the American workplace, shifting the role of workers and changing the skills and knowledge employers most value.

There has been much research and reporting on how disruptive the expansion of automation and artificial intelligence could be for workers. For example, a report by McKinsey and Company estimates that 50% of work activities are technically automatable and up to one third of the nation's workforce may need to find new occupations by 2030.¹

Others point out that even with the rise of digitization, automation, robotics, and artificial intelligence, employers will continue to need workers, and that this need may outstrip the number of displaced workers. After all, the United States has weathered such shifts in previous decades, such as the shift from being an agrarian economy to the industrial age.

The benefits from automation and artificial intelligence are expected to fuel adoption. It is thought that automation and artificial intelligence will boost economic growth by transforming business processes, increasing efficiencies, and increasing productivity. Other anticipated benefits include improved quality of goods and services, enhanced consistency in output, reduced costs, and improved worker safety.

Areas that involve predictable work are expected to be vulnerable to automation. These include office administration, production, transportation, and food preparation.² A 2018 report by PwC, which predicts similar areas will be most impacted by automation, also finds that workers with low education levels would be most adversely affected.³

Some occupations will not decline and could experience a rise in demand. These are occupations that are not easily automatable and in which humans have a clear advantage, such as health care occupations, managers and executives, creatives, tech professionals, and educators.⁴ Areas that involve STEM, business services, and personal interaction, may undergo job creation.⁵

Research indicates that attention needs to be directed toward upgrading workforce skills and equipping workers with the knowledge needed to excel in the age of automation and artificial intelligence. Forecasted skill shifts show that cognitive skills, technological skills, and social and emotional skills, such as leadership and managing others, will be sought by employers.⁶

Given the array of research findings indicating that many jobs are expected to change in coming years, it makes sense at a regional level to examine which jobs will be impacted to jumpstart planning for the future. In the Capital Region, there are questions that need answering: What is the composition of region's workforce, and how will it be affected by automation and artificial intelligence? And what can we do to prepare for the impending skill shift?

¹ James Manyika et al., "Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages," November 2017, McKinsey and Company, <https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages>.

² Mark Muro et al., "Automation and artificial intelligence: How machines are affecting people and places," The Brookings Institution, January 24, 2019 https://www.brookings.edu/wp-content/uploads/2019/01/2019.01_BrookingsMetro_Automation-AI_Report_Muro-Maxim-Whiton-FINAL-version.pdf.

³ "Will robots really steal our jobs? An international analysis of the potential long term impact of automation," PwC, February 2018. <https://www.pwc.co.uk/economic-services/assets/international-impact-of-automation-feb-2018.pdf>.

⁴ James Manyika et al., "Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages," November 2017, McKinsey and Company, <https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages>.

⁵ Ibid.

⁶ Jacques Bughin et al., "Skill shift automation and the future of the workforce," McKinsey Global Institute, May 2018, <https://www.mckinsey.com/~media/McKinsey/Featured%20Insights/Future%20of%20Organizations/Skill%20shift%20Automation%20and%20the%20future%20of%20the%20workforce/MGI-Skill-Shift-Automation-and-future-of-the-workforce-May-2018.ashx>

Location will be a key factor determining which communities benefit from automation and AI and which ones suffer. Some regions may experience an economic boost from adoption, while other communities or segments of workers will be negatively affected. Locations with industries whose workers have adapted to automation are expected to be desirable places for employers to grow jobs. For example, a 2018 report on automation released by the World Economic Forum finds that “when determining job location decisions, companies overwhelmingly prioritize the availability of skilled local talent as their foremost consideration, with 74% of respondents providing this factor as their key consideration.”⁷

Given the impending challenges and opportunities that will accompany the rise of automation and artificial intelligence, this study looks at the likelihood of certain jobs in the Capital Region being impacted by automation. Occupations discussed in this report are ranked as to whether they have a low, moderate, or high risk of automation. Analysis also considered educational attainment, wages, and populations disproportionately affected.

⁷ “The future of jobs report 2018,” Centre for New Economy and Society, the World Economic Forum, 2018, http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf.

Methodology

Data sources

Data on the automation potential of occupations comes from Burning Glass Labor Insights, which based its analysis on the 2013 study “The Future of Employment: How Susceptible are Jobs to Computerization?” by Oxford researchers, Carl Benedikt Frey and Michael A. Osborne.

Occupational data, including wages, gender, and racial composition, for the nine-county Capital Region comes from Emsi, and covers the period from 2008 to 2023. The occupational job counts represent employed and self-employed workers. The identification of relevant occupations used the Standard Occupational Classification (SOC) system.

Certain occupations were excluded from this study:

Occupations with fewer than 10 jobs in 2018—This includes 40 occupations that collectively total 151 jobs, about 0.01% of all jobs in the nine-county region. (Appendix A lists these occupations and their risk of automation.) Of these, only one occupation was projected to have more than 10 jobs by 2023, SOC 51-9051 Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders. The North/Far North Center of Excellence research team chose to exclude the occupation due to its small size.

Occupations without an assigned automation risk—This includes three occupations: legislators, military, and unclassified occupations, which collectively totaled 4,659 jobs in 2018. (Appendix B lists employment and occupational projections for these three occupations.)

The excluded occupations account for less than 1% of all jobs in the region. As a result, the study focuses on 733 occupations with nearly 1.2 million jobs, about 99.5% of all jobs in the region.⁸

The nine-county Capital Region is defined as Alpine, Colusa, El Dorado, Glenn, Placer, Sacramento, Sutter, Yolo, and Yuba counties. County population data was sourced from the California Department of Finance Demographic Research Unit, while demographic and educational attainment data was derived from the U.S. Census Bureau American Community Survey. Labor force data, including employment and unemployment statistics, came from the California Employment Development Department (EDD) Labor Market Information Division. The section of this report that discusses automation risk by industry used the North American Industry Classification System (NAICS) to identify appropriate industry sectors for analysis.

Defining automation and risk of automation

Automation is the substitution of human labor with machine labor. According to a report by the Brookings Institution, the primary purpose for this substitution is to increase the quality and quantity of output at a reduced cost.⁹

In this study, the rankings of automation risk describe the potential and technical feasibility that certain occupations can be automated using technologies available today. As mentioned earlier, the 2013 study “The Future of Employment: How Susceptible are Jobs to Computerization?” established an accepted process for determining automation risk. The process involves evaluating the ability of computers to perform tasks associated with a given occupation. Based on that work, automation risk is defined in the following ways:

⁸ For more information on the occupations studied, please contact the North/Far North Center of Excellence.

⁹ Mark Muro et al., “Automation and artificial intelligence: How machines are affecting people and places,” The Brookings Institution, January 24, 2019 https://www.brookings.edu/wp-content/uploads/2019/01/2019.01_BrookingsMetro_Automation-AI_Report_Muro-Maxim-Whiton-FINAL-version.pdf.

- High risk occupations are in the top quartiles of risk, with a minimum probability score of 0.85.
- Medium risk occupations are in the second quartile of risk, with a probability score between 0.5 and 0.85.
- Low risk occupations are in the bottom two quartiles, with a score of less than 0.5.

Interpreting the data

Automation risk only speaks to the potential that tasks within a particular occupation may be automated; thus, the data analysis in this report only addresses the possibility of tasks becoming automated given today's technological advances. However, automation risk does not equate with eventuality. According to a 2019 Brookings' report on automation and artificial intelligence, jobs that can have some tasks automated will not necessarily be fully displaced.¹⁰ Automation is much more likely to change jobs rather than eliminate them altogether.

In a 2017 report on the future of work, McKinsey and Company estimates that across the U.S.:

- About 50% of all current work tasks are potentially automatable using present day technologies.
- Six out of 10 current occupations engage in tasks where more than 30% of those activities are potentially automatable.
- Up to 30% of workers could potentially be displaced by automation by 2030.
- And, up to 14% of workers would need to change occupations due to displacement by automation by 2030.¹¹

These projections imply that there is a need for workers in at-risk occupations to continually upskill in order to keep pace with the changing job tasks of their occupation. As a result, this study focuses on how automation will potentially impact tasks associated with an occupation and estimates risk level based on tasks alone.

Furthermore, while automation and artificial intelligence will affect tasks across all occupations and jobs, those effects will vary in intensity and will be drastic only for some workers. Some jobs will be displaced, some will change, and new jobs will be created while others expand. It should be noted, this report does not predict which jobs and occupations will be lost due to automation, nor does it focus on the impact of future job creation.

¹⁰ Mark Muro et al., "Automation and artificial intelligence: How machines are affecting people and places." The Brookings Institution, January 24, 2019.

¹¹ James Manyika et al., "Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages," November 2017, McKinsey and Company.

The Capital Region

The nine-counties comprising the Capital Region cover nearly 10,000 square miles (or 6%) of California. The data analysis in this report will inform local workforce development agency's dislocated worker strategies. This area is served by four workforce development agencies:

- Golden Sierra Job Training Agency, which serves the Alpine, El Dorado, and Placer counties;
- North Central Counties Consortium, which serves Colusa, Glenn, Sutter, and Yuba counties,
- Sacramento Employment and Training Agency (SETA), which serves Sacramento county;
- And Yolo Works, which serves Yolo county.

Regional population

The term "total population" refers to the number of people who consider a region to be their primary residence. Population counts do not include incarcerated individuals or people who live in the area but do not consider the region their primary place of residence. The data used in this report are annual estimates provided by the California Department of Finance and represent a point-in-time estimate for January 1 of each year since the 2010 census. Population counts are important because they serve as the basis for determining a region's labor availability.

The region's population grew faster than the state's population between 2010 and 2018 (Exhibit 1). Between 2010 and 2018, the region's population grew at a rate of more than 8%, adding nearly 200,000 individuals. Most of this population growth occurred in four counties: Placer, a 12% population increase; Yolo, a 10% increase; and Sacramento and Yuba, each with an 8% increase. Population growth in most other counties was below the average growth rate of California.

Exhibit 1. Total population by county in the Capital Region¹²

County	2010 Population	2018 Population	2010 - 2018 Change	2010 - 2018 % Change
Alpine	1,161	1,101	(60)	(5.2%)
Colusa	21,436	21,627	191	0.9%
El Dorado	181,138	190,681	9,543	5.3%
Glenn	28,126	28,047	(79)	(0.3%)
Placer	350,032	393,155	43,123	12.3%
Sacramento	1,421,404	1,540,982	119,578	8.4%
Sutter	94,753	96,807	2,054	2.2%
Yolo	201,092	220,393	19,301	9.6%
Yuba	72,349	78,041	5,692	7.9%
Capital Region	2,371,491	2,570,834	199,343	8.4%
California	37,320,745	39,557,149	2,236,404	6.0%

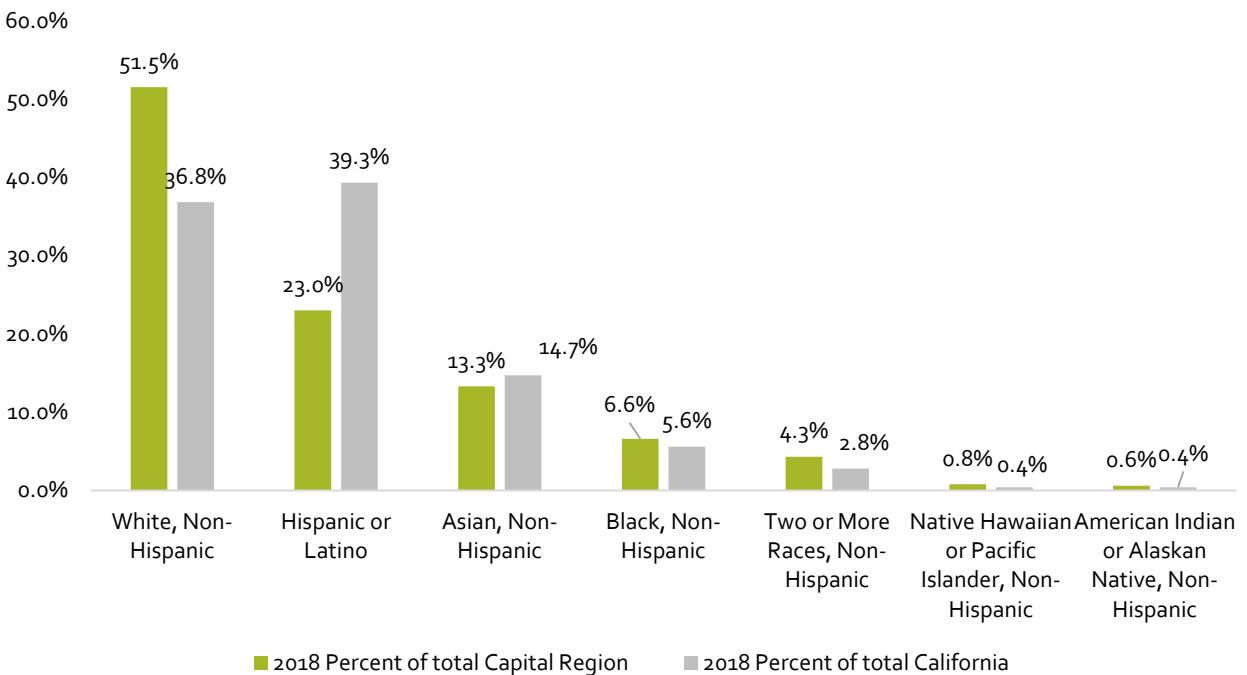
¹² State of California, Department of Finance, E-1 Population Estimates for Cities, Counties, and the State - January 1, 2018 and 2019, <http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-1/>.

Regional demographics

Overall, the Capital region is less diverse than California. In 2018, the largest proportion of the region's population identified as white (Exhibit 2). According to U.S. Census Bureau 2018 estimates, 51.5% of the region's population identifies as non-Hispanic white, 23.0% as Hispanic or Latino, and 13.3% as Asian (Exhibit 2). The smallest populations by race/ethnicity are 6.6% Black, 4.3% two or more races, 0.8% Native Hawaiian or Pacific Island, and 0.6% American Indian.

While much of California has undergone significant demographic shifts, especially in the white and Hispanic/Latino populations, similar shifts are occurring in the Capital region, but at a slower rate (Exhibit 3). Much of the demographic change in the region can be attributed to the large growth in two key populations. The region's Asian and Hispanic/Latino populations have increase between 17% and 24% since the 2010 census. Other populations that have experienced significant growth include Native Hawaiians/Pacific Islanders, whose population increased from 16,600 to just over 20,000 individuals between 2010 and 2018. The population of individuals identifying as two or more races also increased by 25% between 2010 and 2018.

Exhibit 2. Population by race/ethnicity as a percent of total in the region, 2018¹³



¹³ U.S. Census Bureau, 2017 American Community Survey 5-Year Estimates, Table CP05, generated using American FactFinder, <https://factfinder.census.gov/>.

Exhibit 3. Population by race and ethnicity in the region¹⁴

Race/Ethnicity	Capital Region		Percent of total in 2018		2010-2018 % change	
	2010	2018	Capital Region	California	Capital Region	California
White, Non-Hispanic	1,317,615	1,323,309	51.5%	36.8%	0.4%	(3.0%)
Hispanic or Latino	503,664	590,233	23.0%	39.3%	17.2%	10.0%
Asian, Non-Hispanic	274,255	342,463	13.3%	14.7%	24.9%	20.0%
Black, Non-Hispanic	156,120	169,355	6.6%	5.6%	8.5%	2.0%
Two or More Races, Non-Hispanic	87,262	109,368	4.3%	2.8%	25.3%	20.0%
Native Hawaiian or Pacific Islander, Non-Hispanic	16,602	20,289	0.8%	0.4%	22.2%	9.0%
American Indian or Alaskan Native, Non-Hispanic	15,973	15,817	0.6%	0.4%	(1.0%)	(1.0%)
Total	2,371,491	2,570,834	2,570,834	39,557,149	8.4%	6%
			100%	100%		

In terms of age demographics, the Capital Region’s age distribution is similar to the state (Exhibit 4). In 2018, the largest proportion of the region’s population by age were individuals under 14 years old.

Both the region and California have experienced significant declines in certain age groups. While most age groups have increased in size over the last eight years, declines have occurred among 15-to-19-year-olds and 40-to-49-year-olds (Exhibit 5). Between 2010 and 2018, compared to the state, 15-to-19-year-olds declined in the region at a slower rate, nearly 6%, or 10,061 individuals. During the same time, 40-to-49-year-olds declined in the region at a similar rate to California, 4.1%, or 13,527 individuals.

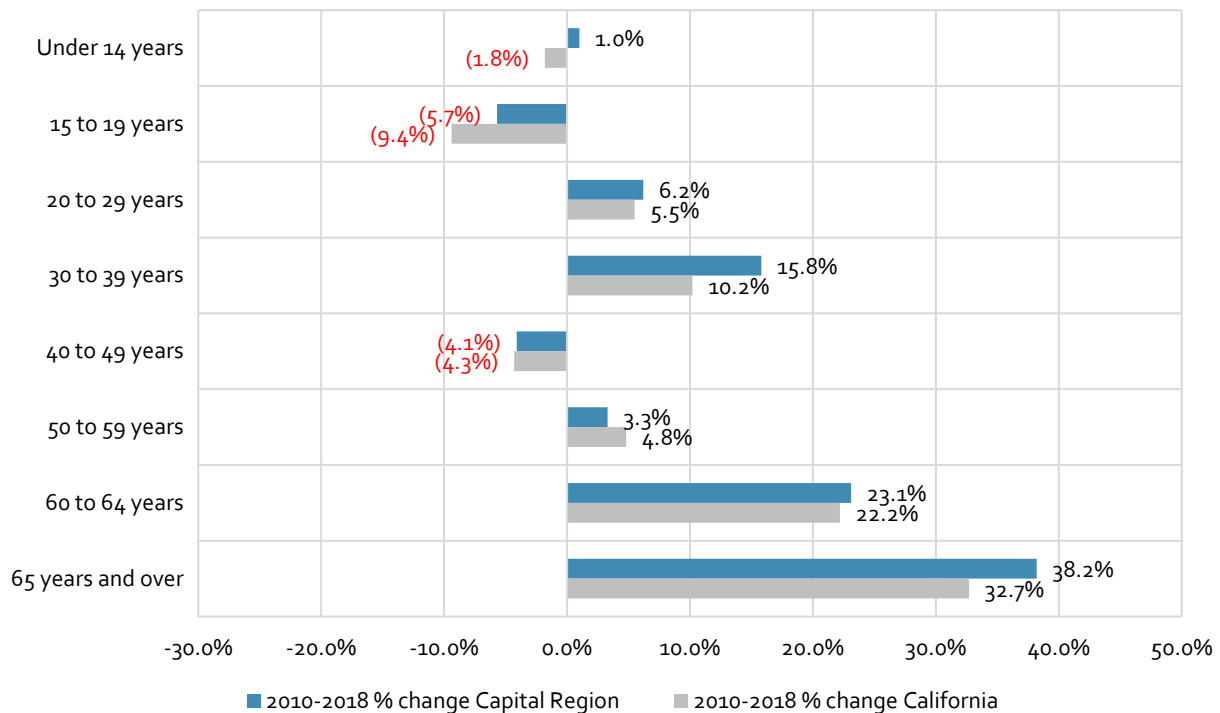
Both the region and California experienced large growth in populations aged 60 years and older. Between 2010 and 2018, 60-to-64-year-olds in the region increased by 23%, while those aged 65 years and older increased by 38%.

¹⁴ Ibid.

Exhibit 4. Population by age in the region¹⁵

Age Range	Capital Region		Percent of Total in 2018		2010-2018 % Change	
	2010	2018	Capital Region	California	Capital Region	California
Under 14 years	489,838	494,712	19.2%	18.9%	1.0%	(1.8%)
15 to 19 years	177,194	167,133	6.5%	6.4%	(5.7%)	(9.4%)
20 to 29 years	339,299	360,184	14.0%	14.8%	6.2%	5.5%
30 to 39 years	306,622	355,126	13.8%	14.3%	15.8%	10.2%
40 to 49 years	329,636	316,109	12.3%	12.8%	(4.1%)	(4.3%)
50 to 59 years	317,275	327,598	12.7%	12.7%	3.3%	4.8%
60 to 64 years	125,749	154,788	6.0%	5.7%	23.1%	22.2%
65 years and over	285,877	395,184	15.4%	14.3%	38.2%	32.7%
Total	2,371,490	2,570,834	2,570,834	39,557,149	8.4%	6%
			100%	100%		

Exhibit 5. Population by age in the region, 2010-2018 percent change¹⁶



¹⁵ Ibid.

¹⁶ Ibid.

Regional Labor Force

Labor force is defined as the number of people living in a region who are considered willing and able to work. In this report, the labor force analysis examines employment and unemployment counts and is based on the California Employment Development Department’s definition of labor force as “all individuals over the age of 16 who are either currently working or currently receiving unemployment benefits.”¹⁷ Changes in employment and unemployment affect the size of the labor force, and this data can be used to identify the number of working age adults (aged 16 to 65) who are not in the workforce. Individuals who are unemployed and no longer seeking work (i.e., discouraged workers) are not included in the labor force estimates. The data in this section represents annual averages of monthly estimates from the California EDD.

Labor force close-up

The size of the region’s labor force fluctuated significantly between 2008 and 2018 (Exhibit 6). This fluctuation was caused by the Great Recession in 2007. Between 2008 and 2009, the region’s labor force grew by less than 1% on average. By the end of 2010, the region began to experience the impact of the Great Recession; the region’s labor force declined from 1.15 million to 1.14 million, or 0.76% overall (Exhibit 7). By the end of 2015, the capital region’s labor force had recovered from recession losses. By 2018, the region’s labor force added more than 400,000 workers and totaled 1.19 million.

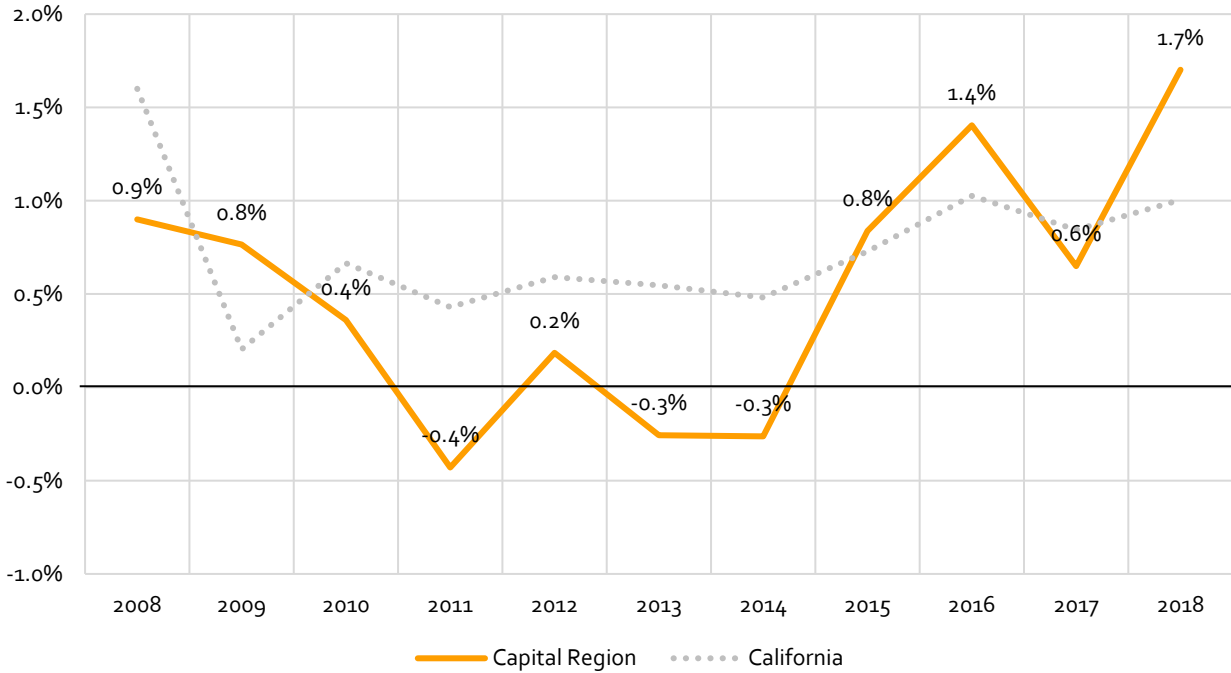
Exhibit 6. Labor force size in the region and California¹⁸

Year	Labor Force		Year-over-year Change	
	Capital Region	California	Capital Region	California
2008	1,137,250	18,178,100	0.9%	1.6%
2009	1,145,950	18,215,100	0.8%	0.2%
2010	1,150,080	18,336,300	0.4%	0.7%
2011	1,145,140	18,415,100	(0.4%)	0.4%
2012	1,147,260	18,523,800	0.2%	0.6%
2013	1,144,310	18,625,000	(0.3%)	0.5%
2014	1,141,300	18,714,700	(0.3%)	0.5%
2015	1,150,870	18,851,100	0.8%	0.7%
2016	1,167,030	19,044,500	1.4%	1.0%
2017	1,174,610	19,205,300	0.6%	0.8%
2018	1,194,600	19,398,200	1.7%	1.0%

¹⁷ State of California, Employment Development Division, Labor Market Information Division, Annual Averages Unemployment Rate and Labor Force Data Table, <https://www.labormarketinfo.edd.ca.gov/>.

¹⁸ Ibid.

Exhibit 7. Labor force annual percent change in the region and California, 2008-2018¹⁹



Regional employment

Employment data comes from the California EDD and represents the average count of all individuals who either worked at least one hour for a wage, were self-employed, or worked at least 15 unpaid hours in a family-run business or on a family-operated farm during the time period reported. Increasing employment typically means more potential jobs for workers, and workers will have an easier time finding work.

Employment in the region rapidly declined from 2008 to 2010, before beginning to recover from recession losses (Exhibit 8). By the end of 2011, the region's number of employed individuals had leveled out. From 2012 to 2014, employment increased. Overall, the number of employed individuals in the region increased by 94,650 individuals by the end of 2018, surpassing employment at the beginning of the recession in 2008.

¹⁹ Ibid.

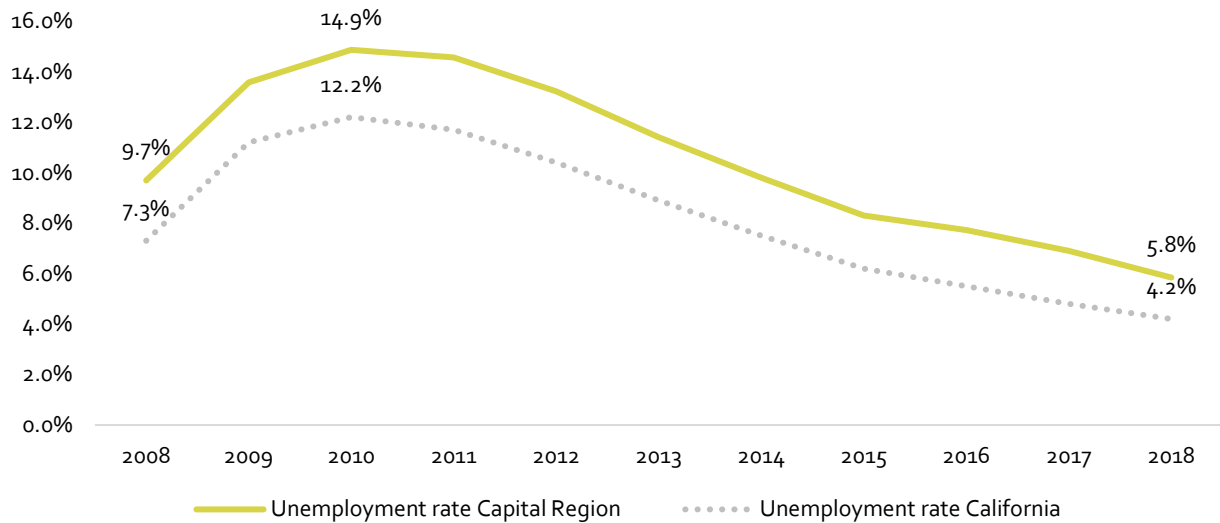
Exhibit 8. Employment in the region and California²⁰

Year	Employment		Year-over-year Change	
	Capital Region	California	Capital Region	California
2008	1,051,860	16,854,500	(1.1%)	(0.5%)
2009	1,016,370	16,182,600	(3.4%)	(4.0%)
2010	1,002,170	16,091,900	(1.4%)	(0.6%)
2011	1,003,800	16,258,100	0.2%	1.0%
2012	1,022,900	16,602,700	1.9%	2.1%
2013	1,039,650	16,958,400	1.6%	2.1%
2014	1,054,870	17,310,900	1.5%	2.1%
2015	1,079,000	17,681,800	2.3%	2.1%
2016	1,100,810	18,002,800	2.0%	1.8%
2017	1,117,080	18,285,500	1.5%	1.6%
2018	1,146,510	18,582,800	2.6%	1.6%

Regional unemployment

Unemployment consists of estimated counts of individuals who are actively seeking work, those who are not working at least one hour per week for pay, and those who are not self-employed. Compared to California, unemployment rates were higher in the capital region during the recession (Exhibit 9). Unemployment in the region increased steadily beginning in 2008 and peaked at 14.9% in 2010, before entering a period of steady decline from 2011 to 2018. Overall, the number of unemployed individuals in the region decreased by 37,100 individuals by 2018 and is nearly 4% lower than 2008 (Exhibit 10).

Exhibit 9. Unemployment rate in the region and California²¹



²⁰ Ibid.
²¹ Ibid.

Exhibit 10. Unemployment in the region and California²²

Year	Unemployment		Year-over-year Change	
	Capital Region	California	Capital Region	California
2008	85,380	1,323,600	33.4%	37.7%
2009	129,770	2,032,600	52.0%	53.6%
2010	147,810	2,244,300	13.9%	10.4%
2011	141,340	2,157,000	(4.4%)	(3.9%)
2012	124,370	1,921,100	(12.0%)	(10.9%)
2013	104,660	1,666,600	(15.8%)	(13.2%)
2014	86,430	1,403,800	(17.4%)	(15.8%)
2015	71,970	1,169,200	(16.7%)	(16.7%)
2016	66,020	1,041,700	(8.3%)	(10.9%)
2017	57,330	919,800	(13.2%)	(11.7%)
2018	48,280	815,400	(15.8%)	(11.4%)

²² Ibid.

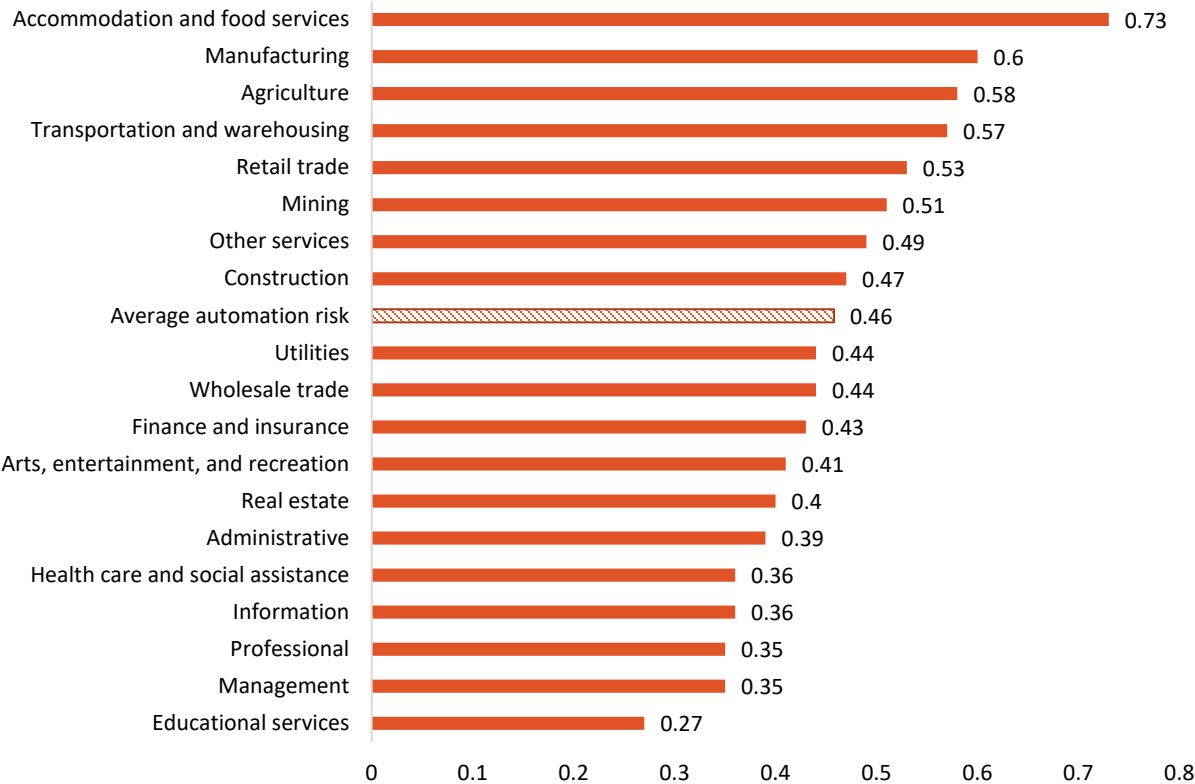
Regional Labor Market Automation Risk

Which industries are most at-risk?

In 2016, McKinsey & Company released a report that looked at which industries in the U.S. were most susceptible to being automated.²³ The report utilized data from the U.S. Department of Labor to estimate the share of time workers in various industries spent doing different tasks, and which of those tasks, theoretically, could be automated using current-day technologies. McKinsey noted that certain tasks are more likely to be automated. Tasks like physical activities in a predictable environment, like assembly line work and basic data processing, could be automated using today’s technology. Other tasks, like managing employees or applying expertise, could be harder to automate with current technology.

Exhibit 11 shows the automation risk and employment counts of industry sectors in the Capital Region. Industry sectors are organized according to 2-digit NAICS codes. The larger the automation risk score, the more likely an industry sector is to be impacted automation. According to the McKinsey report, accommodation and food services has the most potential to automate, with a score of 73%. This is largely due to a sizable proportion of workers in the industry spending a significant amount of time doing predictable physical tasks, which in turn are tasks most likely to be automated.²⁴ Other industries that are highly likely to be impacted by automation include manufacturing, agriculture, transportation and warehousing, retail trade, and mining (Exhibit 11).

Exhibit 11. Automation potential across industry sectors in the U.S.²⁵



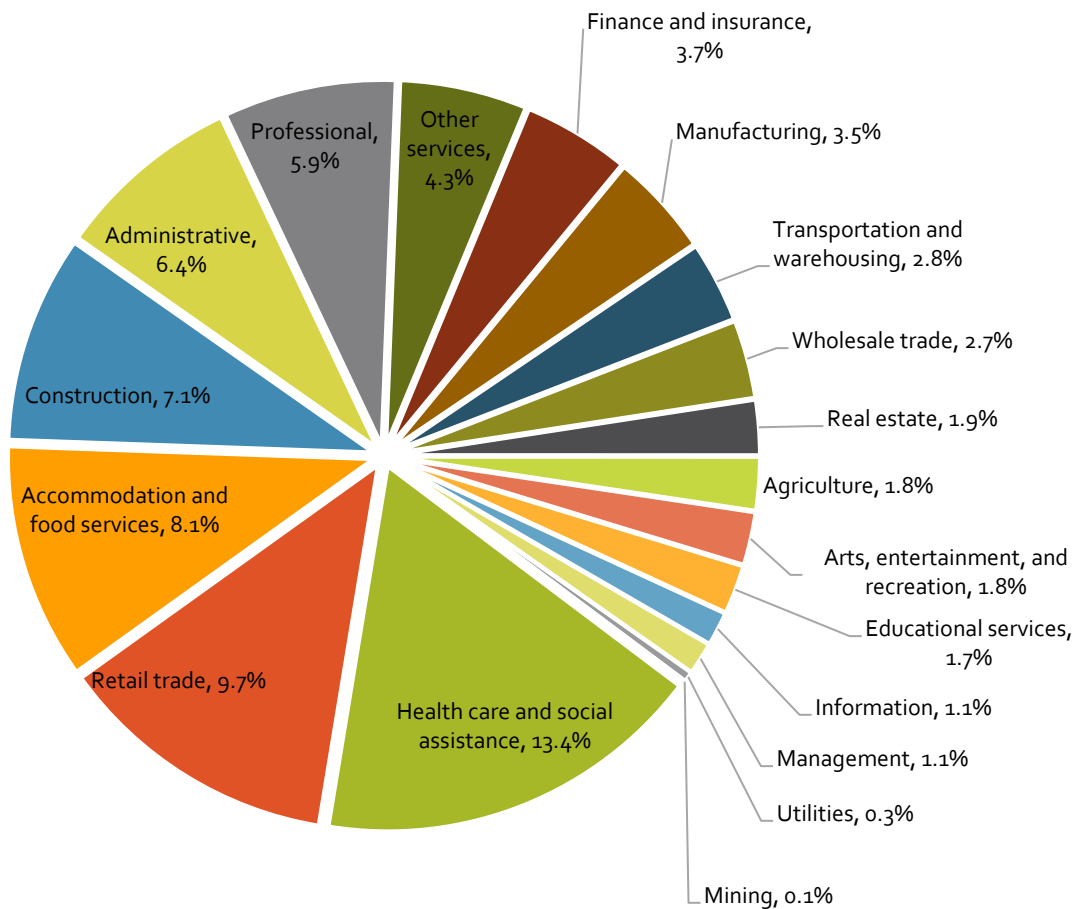
²³ Manyika et al., “A Future that Works: Automation, Employment, and Productivity,” McKinsey Global Institute, January 2017, <https://www.mckinsey.com/~ /media/mckinsey/featured%20insights/Digital%20Disruption/Harnessing%20automation%20for%20a%20future%20that%20works/MGI-A-future-that-works-Full-report.ashx>.

²⁴ Ibid. pg7.

²⁵ Ibid.

In the region, 50% of all workers are concentrated in six industry sectors: health care, retail trade, accommodations and food services, construction, administrative, and professional (Exhibit 12). Three of those sectors have above-average automation risk scores: retail trade, accommodations and food services, and construction. This equates to nearly 300,000 jobs, or a quarter of all jobs in the region at moderate to high risk of automation based on their industry sector grouping (Exhibit 13). Jobs in these three sectors are projected to grow by 7.9%, adding another 23,500 jobs by 2023.

Exhibit 12. Share of jobs by industry sector in the region, 2018²⁶



²⁶ Emsi 2019.4; QCEW Employees, Non-QCEW Employees and Self-Employed.

Exhibit 13. Automation potential by industry sector in the region²⁷

Industry Sector	2018 Jobs	Share of 2018 Jobs	National Automation Risk Score	2023 Jobs	Share of 2023 Jobs
Health care and social assistance	160,557	13.4%	0.36	186,978	14.5%
Retail trade	115,936	9.7%	0.53	119,909	9.3%
Accommodation and food services	96,866	8.1%	0.73	105,687	8.2%
Construction	85,126	7.1%	0.47	95,878	7.5%
Administrative	76,373	6.4%	0.39	83,461	6.5%
Professional	70,828	5.9%	0.35	75,410	5.9%
Other services	52,129	4.3%	0.49	54,307	4.2%
Finance and insurance	43,870	3.7%	0.43	44,474	3.5%
Manufacturing	42,238	3.5%	0.60	45,003	3.5%
Transportation and warehousing	33,222	2.8%	0.57	38,012	3.0%
Wholesale trade	32,017	2.7%	0.44	34,460	2.7%
Real estate	22,563	1.9%	0.40	24,689	1.9%
Agriculture	21,897	1.8%	0.60	22,409	1.7%
Arts, entertainment, and recreation	21,723	1.8%	0.41	23,579	1.8%
Educational services	19,960	1.7%	0.27	22,495	1.7%
Information	13,786	1.1%	0.36	13,658	1.1%
Management	13,156	1.1%	0.35	13,713	1.1%
Utilities	4,080	0.3%	0.44	4,982	0.4%
Mining	627	0.1%	0.51	611	0.0%
Other industry sectors ²⁸	273,189	22.8%	N/A	276,233	21.5%
Total	1,200,144	100.0%	--	1,285,950	100.0%

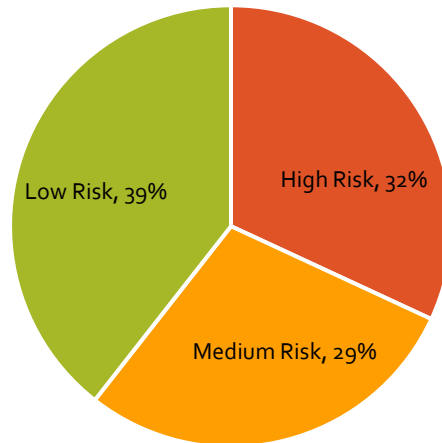
²⁷ Ibid.

²⁸ Note: Other industry sectors includes government (NAICS 90) and unclassified industries (NAICS 99). These sectors did not have automation scores and were excluded from the McKinsey report.

How many jobs are at risk of automation?

There were 1.2 million jobs in the nine-county region in 2018. About 30%, or 381,390 jobs, are at high risk of automation (Exhibit 14). Another 342,640 (29%) are at medium risk of automation. Nearly 40%, 471,300 jobs, are at low risk of automation.

Exhibit 14. Share of jobs at risk of automation in the region²⁹



Which jobs are most at risk?

Key finding: Low-paid jobs are most at risk

The jobs at high risk of displacement due to automation tend to pay less, on average, when compared to the wages of low risk jobs (Exhibit 15). The average entry-level wage of workers in the more than 200 high-risk occupations is \$14.50 per hour. At the same time, the average entry-level wage for workers in the more than 300 low-risk occupations is nearly \$9 more per hour, \$23.19. This wage differential increases as workers gain more employment experience and earn more pay. The average experienced wage for low-risk occupations is nearly double the average experienced wage of high-risk occupations, \$60.01 per hour compared to \$31.99 per hour.

Exhibit 15. Average hourly wages by risk level in the region³⁰

Automation Risk	Average Entry-level Wage	Average Median Wage	Average Experienced Wage
High Risk	\$14.50	\$21.19	\$31.99
Medium Risk	\$15.73	\$23.73	\$36.15
Low Risk	\$23.19	\$38.05	\$60.01
Overall Average	\$18.82	\$29.61	\$45.98

²⁹ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool," <http://www.burning-glass.com>, 2019.

³⁰ Emsi 2019.4; QCEW Employees, Non-QCEW Employees and Self-Employed. Please note that entry-level and experience level wages correspond to the 10th and 90th percentile hourly earnings as reported in EMSI.

Regardless of automation risk, a significant proportion of workers in the region work in jobs that pay less than \$14.50 per hour (Exhibit 16). About 58% of all jobs in the region, more than 694,000 jobs, pay less than \$14.50 per hour. This includes 318,210 high-risk jobs, 251,678 medium-risk jobs, and 124,845 low-risk jobs (Exhibit 17). Eighty-three percent of high-risk jobs and 73% percent of medium-risk jobs pay less than \$14.50 per hour, compared to 26% of low-risk jobs.

Exhibit 16. Share of jobs paying above or below \$14.50/hour in the region³¹

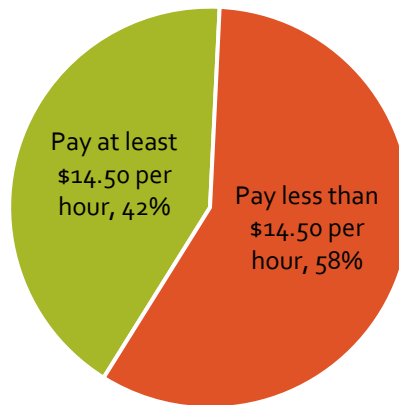
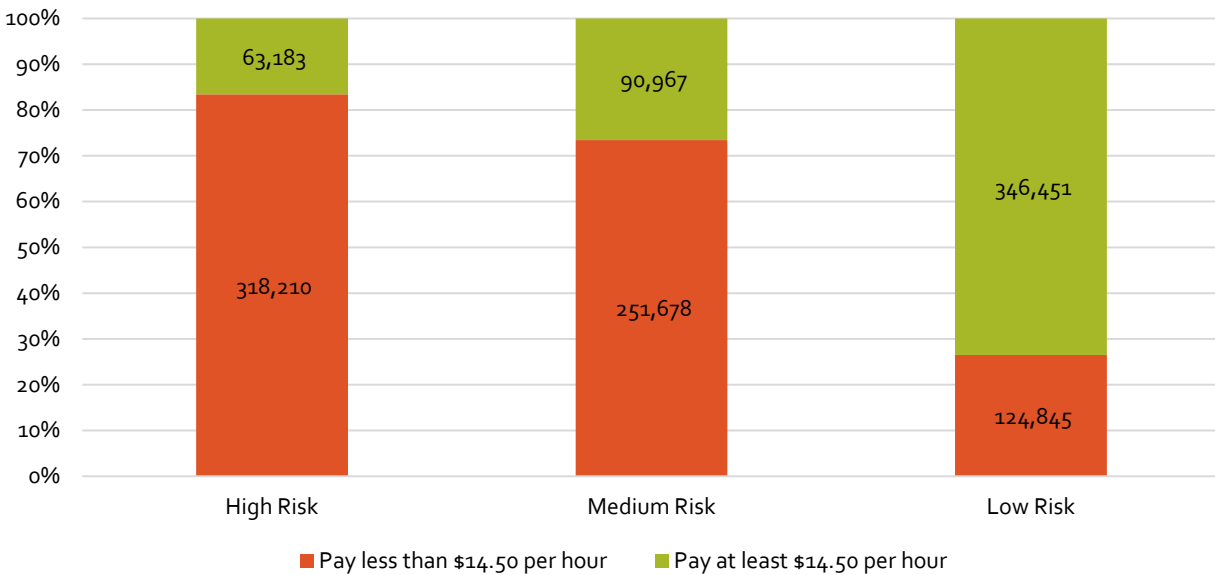


Exhibit 17. Automation risk for occupations paying above or below \$14.50/hour in the region³²



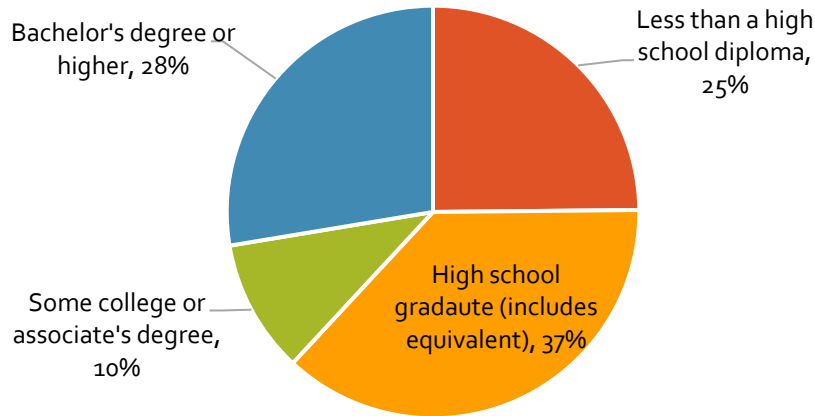
³¹ Ibid.

³² Ibid.

Key finding: Jobs requiring lower levels of education are most at risk

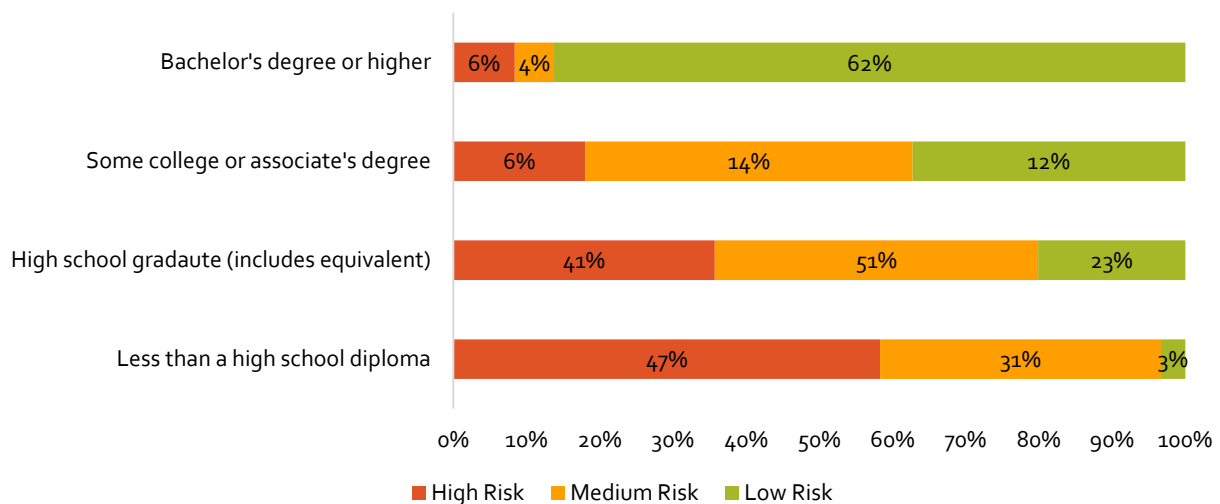
Of the 1.2 million jobs in the capital region, 25% of all jobs (297,049 jobs) require no formal education credential, 37% (442,897 jobs) require a high school diploma, 10% (125,312 jobs) require some college or an associate’s degree, and 28% (330,075 jobs) require a bachelor’s degree or higher (Exhibit 18).

Exhibit 18. Share of jobs by required education level in the region³³



Among all workers in the region, those in jobs requiring lower levels of education have the highest risk of automation (Exhibit 19). This is particularly true for workers in jobs requiring a high school diploma or less. Between 41% and 47% of all jobs requiring a high school diploma or less are at high risk of automation. Only 6% of all jobs requiring a bachelor’s degree have a high risk of automation. The reverse is true for low risk jobs. For example, 62% of all jobs requiring a bachelor’s degree are at low risk of automation, compared to 26% of jobs that require a high school diploma or less.

Exhibit 19. Automation risk by education level for occupations in the region³⁴

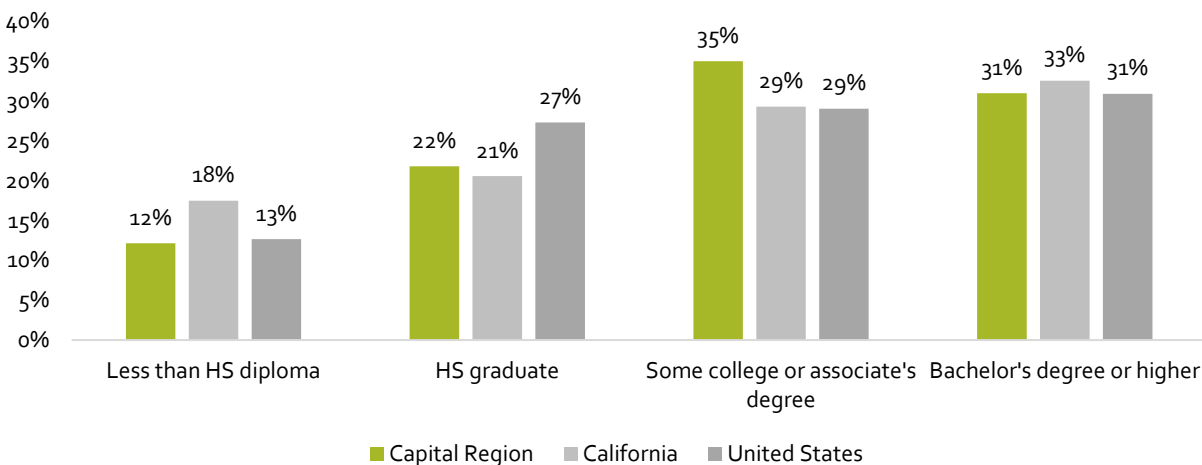


³³ Ibid.
³⁴ Ibid.

While 62% of jobs in the capital region require a high school diploma or less, the region’s level of educational attainment seems to offer a protective benefit (Exhibit 20). Across the United States, between 2012 and 2017, 87% of people aged 25 years and older held at least a high school diploma, and 31% held a bachelor’s degree or higher. In the capital region, 88% had at least a high school diploma, and 31% held a bachelor’s degree or higher. For comparison, 83% across California held at least a high school diploma and 33% held a bachelor’s degree.

The capital region is unique in that 35% of people aged 25 years and older have completed some college or hold an associate degree, compared to 29% in California and the U.S.

Exhibit 20. Educational attainment in the region, California, and United States³⁵



Key finding: Women are most at risk

Occupations at high risk of automation in the region disproportionately employ women (Exhibit 21). Women constitute 58% of workers in high-risk occupations in the region. Moreover, women tend to aggregate and dominate in occupations associated with office administration, retail, and food service:

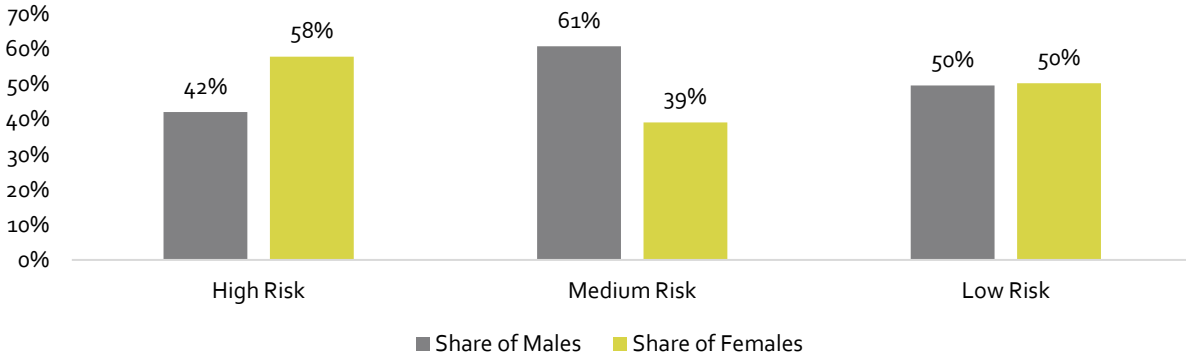
- **Office clerks, general**—In 2018, 32,185 people were employed as office clerks in the region, an occupation with an automation risk score of 96%.³⁶ In the same year, women comprised 83% of office clerk jobs.
- **Cashiers**—Of the 25,554 cashier jobs in the region in 2018, 70% were held by women.
- **Fast food workers**—Women comprised 64.5% of fast food workers in 2018.³⁷
- **Secretaries and administrative assistants**—95% of all secretarial and administrative roles were held by women in 2018.

³⁵ U.S. Census Bureau, 2017 American Community Survey 5-Year Estimates, Table S1501, generated using American FactFinder, <https://factfinder.census.gov/>.

³⁶ Carl Benedikt Frey and Michael Osborne, “The Future of Employment: How Susceptible are Jobs to Computerisation?” Oxford University, September 2013.

³⁷ Note: Fast food workers refers to combined food preparation and serving workers, including fast food (SOC 35-3021).

Exhibit 21. Automation risk by gender in the region³⁸



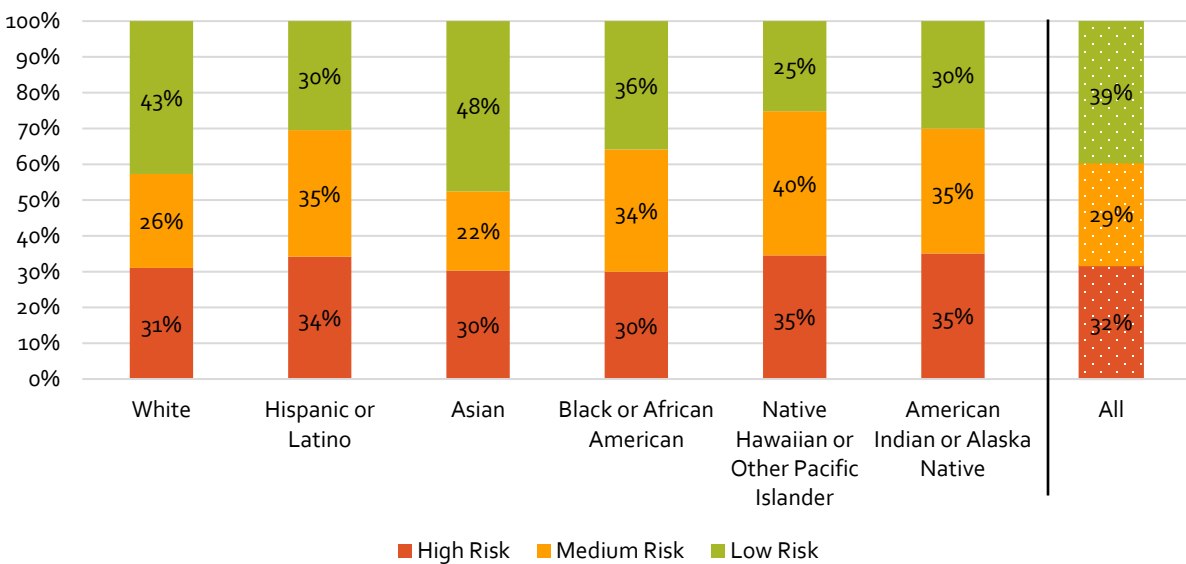
Key finding: Historically minoritized workers are most at risk

In the region, certain ethnic and racial groups are more at risk of automation than others. While all ethnic and racial groups share a near similar proportion of workers in high-risk automation jobs, particular groups are employed at higher than average proportions.

For instance, between 34% and 35% of Hispanic/Latinx, Pacific Islander, and American Indian workers in the region are employed in high-risk occupations. For comparison, across all racial and ethnic groups, 32% of all workers are employed in high-risk occupations (Exhibit 22).

Similarly, between 43% and 48% of white and Asian workers are employed in low-risk automation occupations. Only 30% or fewer of Hispanic/Latinx, Pacific Islander, and American Indian workers are employed in low-risk occupations. While Black workers tend to occupy a smaller than average share of high-risk automation occupations, a larger than average share of Black workers are employed in medium-risk occupations.

Exhibit 22. Automation risk by race/ethnicity in the region³⁹



³⁸ Emsi 2019.4; QCEW Employees, Non-QCEW Employees and Self-Employed.

³⁹ Ibid.

Automation Risk for Occupations

Fifty occupations in the Capital Region employed just over half of all workers, a total of 638,355, in 2018. (Appendix C lists these occupations, their automation risk, employment numbers, and wages.) Given the large number of jobs associated with these 50 occupations, this section discusses the occupations that are most at risk and least at risk of displacement due to automation.

Occupations most at risk

Of the 50 occupations that employ the most workers in the region (or about half of all workers), the 13 occupations in Exhibit 23 are most at risk of automation. These 13 occupations employ nearly 233,700 people, or 19.5% of all workers in the region, and pay, on average \$12.36 per hour. These occupations typically require a high school diploma or less for entry-level work. The exceptions are accountants and auditors; and bookkeeping, accounting, and auditing clerks.

Accountants and auditors, as well as bookkeeping, accounting, and auditing clerks, have high automation risk scores of 94% and 98%, respectively. This is due to the large share of time that workers in these occupations spend doing potentially automatable tasks. Some of these tasks include collecting and processing data, tasks which have high automation potential scores.⁴⁰

Exhibit 23. Occupations most at risk of automation in the region

Occupation	2018 Jobs	Entry-level Hourly Wage	Typical Entry-level Education
Office Clerks, General	32,185	\$11.21	HS Diploma
Retail Salespersons	29,464	\$11.00	No formal educational credential
Combined Food Preparation and Serving Workers, Including Fast Food	27,127	\$11.00	No formal educational credential
Cashiers	25,554	\$11.00	No formal educational credential
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	17,139	\$12.49	HS Diploma
Waiters and Waitresses	16,307	\$11.01	No formal educational credential
Accountants and Auditors	12,759	\$22.80	Bachelor's degree
Construction Laborers	12,332	\$14.05	No formal educational credential
Landscaping and Groundskeeping Workers	12,180	\$11.39	No formal educational credential
Bookkeeping, Accounting, and Auditing Clerks	11,987	\$13.86	Some college, no degree
Cooks, Restaurant	9,907	\$11.04	No formal educational credential
Insurance Sales Agents	7,579	\$11.32	HS Diploma
Receptionists and Information Clerks	6,749	\$11.15	HS Diploma
Total	233,669	\$12.36	--

⁴⁰ ⁴⁰ Manyika et al., "A Future that Works: Automation, Employment, and Productivity," McKinsey Global Institute, January 2017.

Occupations least at risk

Of the 50 occupations that employ the most workers in the region (or about half of all workers), the 15 occupations in Exhibit 24 are least at risk of automation. These 15 occupations employed 185,700 people, or 15.5% of all workers in the region in 2018. The average entry-level wage is \$20.51 per hour, and the most commonly required entry-level education is a bachelor's degree.

Exhibit 24. Occupations least at risk of automation in the region

Occupation	2018 Jobs	Entry-level Hourly Wage	Typical Entry-level Education
Management Analysts	23,387	\$24.43	Bachelor's degree
Registered Nurses	20,358	\$33.13	Bachelor's degree
General and Operations Managers	15,506	\$22.96	Bachelor's degree
Elementary School Teachers, Except Special Education	10,797	\$22.63	Bachelor's degree
Postsecondary Teachers	10,700	\$20.07	Doctoral or professional degree
Business Operations Specialists, All Other	10,554	\$20.32	Bachelor's degree
First-Line Supervisors of Office and Administrative Support Workers	10,518	\$19.35	High school diploma or equivalent
First-Line Supervisors of Retail Sales Workers	10,320	\$12.93	High school diploma or equivalent
Childcare Workers	8,866	\$11.13	High school diploma or equivalent
Managers, All Other	8,060	\$25.57	Bachelor's degree
Computer Systems Analysts	7,856	\$30.83	Bachelor's degree
Sales Representatives, Services, All Other	7,657	\$13.67	High school diploma or equivalent
Lawyers	7,620	\$35.86	Doctoral or professional degree
Secondary School Teachers, Except Special and Career/Technical Education	7,535	\$24.99	Bachelor's degree
Medical Assistants	6,975	\$13.09	Postsecondary nondegree award
Total	185,700	\$20.51	--

Conclusion and Recommendations

The rise of automation is changing how jobs are carried out by workers and the skills most needed in the workplace. As a result, this study set out to identify how the widespread adoption of automation may impact the workforce in the Capital Region. The study examined industry sectors vulnerable to automation and occupations that are of low, moderate, and high risk of automation. Occupational analysis delved into how low educational attainment, low wages, and certain population demographics, such as gender and race/ethnicity, are associated with jobs susceptible to automation.

The findings of this analysis point toward the need for a resilient workforce that is able to adapt to the changes that artificial intelligence and automation could bring to the region. The analysis highlights that workers in lower-paid jobs requiring little educational attainment are most at risk of automation. And as these jobs change, workers without the know-how to reskill may not be ready to meet those impending shifts.

One of the study's most startling findings is that **a quarter of all jobs in the Capital Region are concentrated in industry sectors with an above average risk of automation**. Fifty percent of all workers are concentrated in six industry sectors in the region, and three of those sectors have an above average risk of automation: retail trade, accommodations and food services, and construction. These three sectors contained about 300,000 jobs in 2018 and are projected to grow by 7.9%, adding another 23,500 jobs by 2023.

In addition, **32% of all jobs are at high risk of automation in the region**. This equates to more than 380,000 workers at risk of shifting job requirements or job displacement due to automation. Another 343,000 jobs have a moderate risk of automation while 471,300 jobs are low risk.

Wages are an important indicator of jobs that are vulnerable to automation. **Workers who earn less than \$14.50 per hour and have lower levels of educational attainment are most at risk of job loss**. Jobs at high risk of automation tend to pay less than \$14.50 per hour, and nearly 60% of all jobs in the region pay less than \$14.50 per hour (the average entry-level wage for high-risk occupations). Additionally, **up to 47% of jobs requiring a high school diploma or less are at high risk of automation**.

Additional key findings:

- **Workers who identify as women are most at risk.** Working women in the region tend to dominate occupations associated with office administration, retail, and food service, which have a high risk of automation.
- **Historically minoritized workers are most at risk.** American Indian, Pacific Islander, Hispanic/Latinx, and Black workers are most at risk of automation. These workers tend to work in high-risk occupations at a larger than average share and are less likely to work in low-risk occupations.
- **The 13 occupations most at risk in the region tend to pay less and have lower entry-level education requirements.** Thirteen high-risk occupations employed nearly 20% of all workers in the region in 2018. The average hourly wage for these occupations was \$12.36 per hour and the most common entry-level education requirement was a high school diploma.
- **Accountants and bookkeeping/accounting clerks are at high risk.** Even though these occupations pay well and have higher entry-level education requirements, they are at high risk due to the amount of time workers spend doing tasks with a high automation potential.
- **The occupations least at risk in the region tend to pay more and have higher entry-level education requirements.** The 15 occupations identified by the study employed 15.5% of all workers in the region in 2018, and paid, on average, \$20.50 per hour. The most common entry-level education for these occupations is a bachelor's degree.

Recommendations

Given this study's findings, it is imperative to begin preparing existing workers and those just entering the workforce to meet impending changes resulting from automation and artificial intelligence. With this in mind, the recommendations are as follows:

- **Employers should invest in workforce training opportunities** to not only preserve and retain workers, but to ensure that businesses have the skilled workers needed.
- **Postsecondary training providers should respond to these future changes by examining and changing the way education and training is delivered.** These shifts will require training providers be nimble and responsive. Existing workers in occupations that become automated will need targeted and flexible training that will enable them to re-enter the workforce as quickly as possible. Future workers will need the mindset and the know-how for navigating the workforce of the future.

While the analysis may hint that simply training workers for jobs requiring a bachelor's degree will avoid the challenges facing high-risk automation jobs, it's not that simple. While the occupations least at risk of automation tend to require higher levels of education for entry-level work, they also engage in tasks that require uniquely human skill sets and have the least potential for automation. Workers in jobs that spend more time in tasks involving managing and supervising others, social interactions, and content expertise are least likely to be displaced due to automation.⁴¹

- **Workers, businesses, and other workforce stakeholder should adopt and promote a constant learning mindset.** As artificial intelligence and automation are incorporated into tasks with a high potential for automation, workers, businesses, and other stakeholders will need to constantly adjust and upskill.
- **Education and training should focus on developing interpersonal skills,** as well as other uniquely human skill sets. These are skills that are difficult to automate and will most likely play a protective role in deferring automation potential and job risk.

Overall, there is a need for a cohesive strategy focused on continual learning across the region.

- **Workforce and economic development partnerships should develop and implement a regional plan focused on continuous learning.** The Capital region needs a clear and cohesive strategy for promoting the continual upskilling and re-training initiatives that will need to happen as automation is adopted across the region. This strategy should focus on addressing the challenges and benefits that automation will bring. Such a strategy could serve to align multi-stakeholder automation response initiatives across the region.

⁴¹ Multiple sources. See Frey and Osborne.

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Appendix A. Excluded occupations with fewer than 10 jobs in 2018

Exhibit A1. The automation risk for the 39 occupations with fewer than 10 jobs in 2018 that were excluded from the study

SOC	Description	Automation Risk
13-1074	Farm Labor Contractors	Low Risk
29-1024	Prosthodontists	Low Risk
29-2054	Respiratory Therapy Technicians	Low Risk
35-2013	Cooks, Private Household	Medium Risk
39-3021	Motion Picture Projectionists	High Risk
47-2072	Pile-Driver Operators	Medium Risk
47-5011	Derrick Operators, Oil and Gas	Medium Risk
47-5042	Mine Cutting and Channeling Machine Operators	Medium Risk
47-5049	Mining Machine Operators, All Other	Medium Risk
47-5061	Roof Bolters, Mining	Medium Risk
47-5099	Extraction Workers, All Other	Medium Risk
49-9045	Refractory Materials Repairers, Except Brick Masons	Medium Risk
49-9093	Fabric Menders, Except Garment	High Risk
49-9095	Manufactured Building and Mobile Home Installers	Low Risk
51-2021	Coil Winders, Tapers, and Finishers	Medium Risk
51-2093	Timing Device Assemblers and Adjusters	High Risk
51-4051	Metal-Refining Furnace Operators and Tenders	High Risk
51-4052	Pourers and Casters, Metal	High Risk
51-4061	Model Makers, Metal and Plastic	High Risk
51-4062	Patternmakers, Metal and Plastic	High Risk
51-4071	Foundry Mold and Coremakers	High Risk
51-4192	Layout Workers, Metal and Plastic	High Risk
51-6042	Shoe Machine Operators and Tenders	High Risk
51-6061	Textile Bleaching and Dyeing Machine Operators and Tenders	High Risk
51-6062	Textile Cutting Machine Setters, Operators, and Tenders	High Risk
51-6063	Textile Knitting and Weaving Machine Setters, Operators, and Tenders	High Risk
51-6092	Fabric and Apparel Patternmakers	Low Risk
51-7031	Model Makers, Wood	High Risk
51-7032	Patternmakers, Wood	High Risk
51-8011	Nuclear Power Reactor Operators	High Risk
51-9051	Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders	Low Risk
51-9197	Tire Builders	High Risk
53-2031	Flight Attendants	Low Risk
53-4012	Locomotive Firers	High Risk
53-4041	Subway and Streetcar Operators	High Risk
53-7031	Dredge Operators	High Risk
53-7033	Loading Machine Operators, Underground Mining	Low Risk
53-7041	Hoist and Winch Operators	Low Risk
53-7073	Wellhead Pumpers	High Risk

Appendix B. Occupations not included in study

Exhibit B1. Employment and projected occupational demand for the three occupations not included in the study due to lack of assigned automation risk

SOC	Occupations	2008 Jobs	2018 Jobs	2023 Jobs
11-1031	Legislators	465	377	391
55-9999	Military-only occupations	4,117	4,282	4,216
99-9999	Unclassified Occupation	0	0	0
Total	3 Occupations	4,582	4,659	4,607

Appendix C. Top Occupations in the Capital Region

Exhibit C1. Automation risk, employment numbers, and wages for the 50 occupations studied by the research team

Occupation	Automation Risk	2018 Jobs	Entry-level Wage
Personal Care Aides	Medium Risk	36,464	\$11.01
Office Clerks, General	High Risk	32,185	\$11.21
Retail Salespersons	High Risk	29,464	\$11.00
Combined Food Preparation and Serving Workers, Including Fast Food	High Risk	27,127	\$11.00
Laborers and Freight, Stock, and Material Movers, Hand	Medium Risk	26,960	\$11.09
Cashiers	High Risk	25,554	\$11.00
Management Analysts	Low Risk	23,387	\$24.43
Registered Nurses	Low Risk	20,358	\$33.13
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	High Risk	17,139	\$12.49
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	Medium Risk	16,469	\$11.06
Waiters and Waitresses	High Risk	16,307	\$11.01
General and Operations Managers	Low Risk	15,506	\$22.96
Carpenters	Medium Risk	14,074	\$16.43
Customer Service Representatives	Medium Risk	13,955	\$12.28
Stock Clerks and Order Fillers	Medium Risk	13,559	\$11.00
Accountants and Auditors	High Risk	12,759	\$22.80
Heavy and Tractor-Trailer Truck Drivers	Medium Risk	12,382	\$14.90
Construction Laborers	High Risk	12,332	\$14.05
Landscaping and Groundskeeping Workers	High Risk	12,180	\$11.39
Bookkeeping, Accounting, and Auditing Clerks	High Risk	11,987	\$13.86
Teacher Assistants	Medium Risk	11,747	\$12.12
Elementary School Teachers, Except Special Education	Low Risk	10,797	\$22.63
Postsecondary Teachers	Low Risk	10,700	\$20.07
Business Operations Specialists, All Other	Low Risk	10,554	\$20.32
First-Line Supervisors of Office and Administrative Support Workers	Low Risk	10,518	\$19.35
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	Medium Risk	10,417	\$11.06
First-Line Supervisors of Retail Sales Workers	Low Risk	10,320	\$12.93
Cooks, Restaurant	High Risk	9,907	\$11.04
Maids and Housekeeping Cleaners	Medium Risk	9,503	\$11.05
Security Guards	Medium Risk	8,914	\$11.28
Childcare Workers	Low Risk	8,866	\$11.13
Cooks, Fast Food	Medium Risk	8,387	\$11.00
Maintenance and Repair Workers, General	Medium Risk	8,342	\$12.07
Managers, All Other	Low Risk	8,060	\$25.57
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Medium Risk	7,885	\$14.53
Computer Systems Analysts	Low Risk	7,856	\$30.83
Sales Representatives, Services, All Other	Low Risk	7,657	\$13.67
Lawyers	Low Risk	7,620	\$35.86
Insurance Sales Agents	High Risk	7,579	\$11.32

Occupation	Automation Risk	2018 Jobs	Entry-level Wage
Secondary School Teachers, Except Special and Career/Technical Education	Low Risk	7,535	\$24.99
Light Truck or Delivery Services Drivers	Medium Risk	7,227	\$11.24
Medical Assistants	Low Risk	6,975	\$13.09
Receptionists and Information Clerks	High Risk	6,749	\$11.15
Medical Secretaries	Medium Risk	6,657	\$14.39
Hairdressers, Hairstylists, and Cosmetologists	Low Risk	6,582	\$11.02
Counter and Rental Clerks	High Risk	6,360	\$11.08
Nursing Assistants	Low Risk	6,325	\$12.47
Substitute Teachers	Low Risk	6,086	\$14.78
First-Line Supervisors of Food Preparation and Serving Workers	Medium Risk	6,045	\$11.52
Food Preparation Workers	High Risk	6,038	\$11.00

MORE ABOUT VALLEY VISION

Valley Vision is a not-for-profit, civic leadership organization that brings communities together to tackle the biggest challenges affecting the livability of our region. By creating common ground built on facts, Valley Vision inspires leaders to think big and collaborate on bold, long-term solutions that improve people's lives. Valley Vision has inspired change for a better, more livable future across California's capital region for 25 years. We shape change by setting a long-term vision to influence a regional agenda that aligns diverse interests to achieve greater impact.

Valley Vision has led, managed or supported hundreds of initiatives dedicated to creating the conditions for improved quality of life, economic growth and community vitality. These include the regional prosperity strategy, a 21st century workforce, digital access and inclusion, and transformative climate readiness. Valley Vision helps governments, businesses, foundations, and community groups better understand our region and its people through high quality research, including public opinion polling, economic and workforce analysis, focus groups, stakeholder assessments, community needs assessments, and more. For more information about Valley Vision and our work, please visit valleyvision.org.

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The Centers of Excellence (COE) for Labor Market Research deliver regional workforce research and technical expertise to California Community Colleges for program decision making and resource development. This information has proven valuable to colleges in beginning, revising, or updating economic development and Career Education (CE) programs, strengthening grant applications, assisting in the accreditation process, and in supporting strategic planning efforts.

The Centers of Excellence Initiative is funded in part by the Chancellor's Office, California Community Colleges, Economic and Workforce Development Program. The Centers aspire to be the leading source of regional workforce information and insight for California Community Colleges. More information about the Centers of Excellence is available at coeccc.net.

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Acknowledgements

The Centers of Excellence acknowledges the research team and contributors:

- Lauren McSherry

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