2017 AUTOMATION AND THE FUTURE OF WORK

For many years, the Value of Jobs coalition has undertaken analyses of economic trends, industry profiles, and job and wage data through economic reports compiled by ECONorthwest in collaboration with the Portland Business Alliance. In this 2017 report, based on recent technological innovations, researchers predict the impacts of increasing automation and what that means for Oregonians and their jobs. The next wave of automation, and the future of work, have risen to the top of economic and policy discussions. Some experts, called techno-optimists, believe an acceleration of technological change will displace large numbers of workers, leading to revolutionary ideas, like robot taxes and a universal basic income. Others, called techno-pessimists, believe there will be a slower evolution, noting that past predictions of mass unemployment failed to materialize and that technology is a complement to labor rather than its substitute.

This report looks to the past to anticipate an uncertain future. It adopts the view of neither the techno-optimist nor the techno-pessimist about the scope and pace of change, instead taking a middle-of-the-road approach to evaluate the impacts of automation on the future of work in Oregon. Regardless of the scenario, Oregon policymakers — and their federal partners — should be preparing an expansive, flexible and focused policy response that can keep pace with rapidly changing conditions.

Oregon's story

In 2013, two Oxford University engineers assessed the risk of computerization for more than 700 detailed U.S. occupations. They looked within occupations for tasks that were "computerization bottlenecks" — tasks that required social intelligence (e.g., social perception, negotiation, persuasion, caregiving), creative

For Oregonians to be able to broadly share in future prosperity, it is critical that state and regional policymakers redouble efforts to boost the skills of workers who will face the ever more complex future of work.

For the full report, including detailed data, history and the complete policy agenda visit: **www.portlandalliance.com/automation.**

REPORT AT A GLANCE

144,200
Number of Oregon jobs in 2016 at high-risk of automation in the Accommodation and Food Service industry.

93
Percentage of Oregon jobs at high-risk of automation in the Food Preparation and Serving Related occupation in 2016.

12
Percentage of Oregon jobs in 2016 at high-risk of automation in the Health Care Practitioners and Health Care Support occupations.
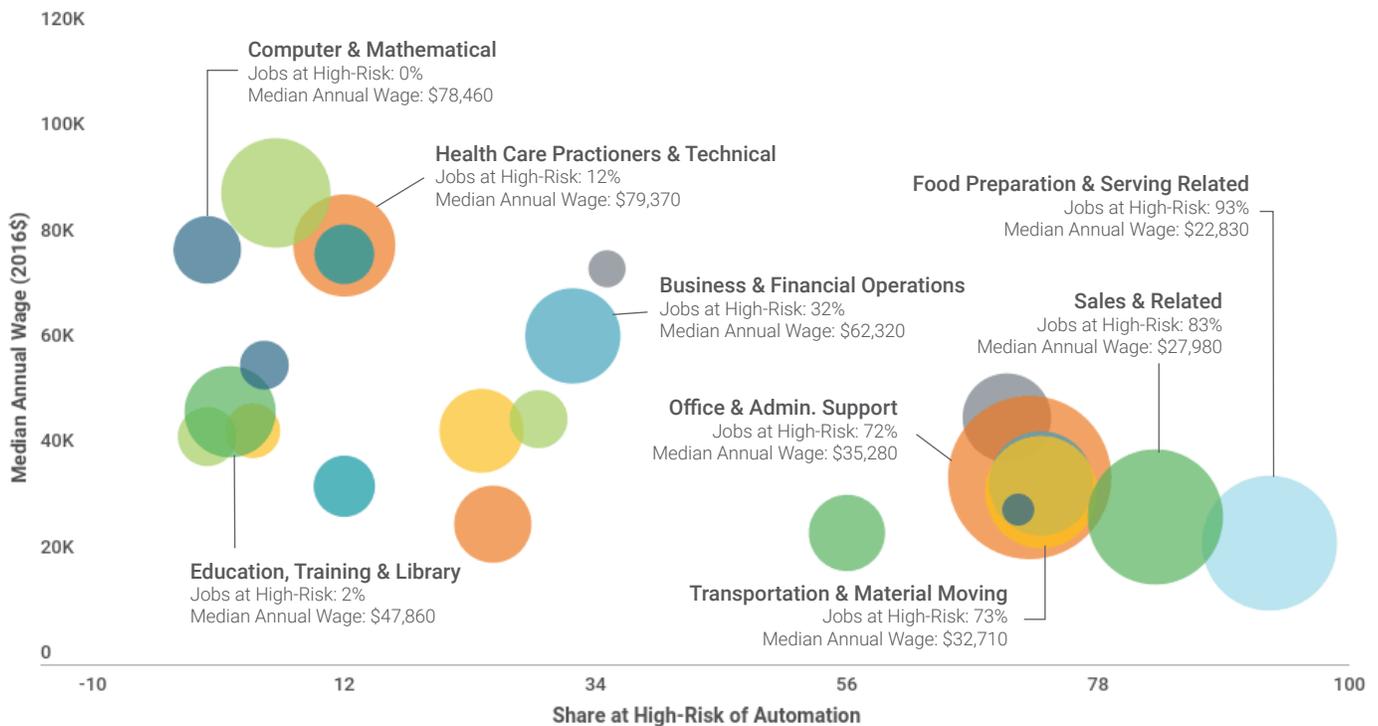
59.5
Percentage of Oregon jobs at high-risk of automation in the South Coast non-metro region in 2016.

13
Percentage of prime-age males (ages 25-54) in 2016 not working in Oregon.

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Figure 2: Occupational Group by Median Annual Wage and Share at High-Risk of Automation

Computer & Mathematical
Jobs at High-Risk: 0%
Median Annual Wage: $78,460

Health Care Practioners & Technical
Jobs at High-Risk: 12%
Median Annual Wage: $79,370

Food Preparation & Serving Related
Jobs at High-Risk: 93%
Median Annual Wage: $22,830

Business & Financial Operations
Jobs at High-Risk: 32%
Median Annual Wage: $62,320

Sales & Related
Jobs at High-Risk: 83%
Median Annual Wage: $27,980

Office & Admin. Support
Jobs at High-Risk: 72%
Median Annual Wage: $35,280

Education, Training & Library
Jobs at High-Risk: 2%
Median Annual Wage: $47,860

Transportation & Material Moving
Jobs at High-Risk: 73%
Median Annual Wage: $32,710

Median Annual Wage (2016$): 0, 20K, 40K, 60K, 80K, 100K, 120K

Share at High-Risk of Automation: -10, 12, 34, 56, 78, 100

Source: ECONorthwest analysis of IPUMS CPS data.

intelligence (e.g., originality, fine arts), or perception and manipulation (e.g., fine motor skills, manual dexterity, working in cramped/awkward positions). Occupations with none of these so-called bottlenecks had a higher risk of computerization. Their analysis deemed about 47 percent of U.S. employment at high-risk. **See Figure 1 online.**

The distribution of their risk predictions makes some intuitive sense. Most transportation occupations fall in the high-risk category — unsurprising given the recent investment in autonomous vehicles. Sales work, also at high-risk, has seen recent losses as brick-and-mortar retailers give way to online shopping. On the low end of the scale, occupations consist of tasks that humans are uniquely able to do: Persuasion and negotiation in legal matters; compassion and caring in health care; creativity in engineering and design.

The Oxford risk-of-automation analysis plays out differently across states and regions within states. Applying the Oxford findings to Oregon's mix of occupations yields a number of important insights.

Oregon's overall risk of automation is similar to that of the nation's. However, the mix of occupations that get us to that average differs. Oregon has a typical share of workers employed in occupations with the highest risk of automation. Our concentrations of easier-to-automate jobs — sales, office and administrative support — are

similar to those in other states. But for low-risk of automation occupations, Oregon differs from the U.S. in offsetting ways. Though Oregon has higher concentrations of architects, engineers, personal care providers, and community and social-service workers, we have lower than typical concentrations of other hard-to-automate jobs like teachers, health care professionals and lawyers.

Automation is a bigger threat to occupations that pay low and middle wages. Exceptions include health care support, building and ground maintenance, and installation and repair work that are at the lower ends of both the wage and risk scales. How to address low-wage, non-routine work that is at risk of automation and the likely changes that will occur will be central to Oregon's policy debates going forward. **See Figure 2.**

Accommodation and food service, retail trade and manufacturing have sizable numbers of employees at risk. The finding for manufacturing is unsurprising because technology for years has already allowed the industry to produce more output with fewer workers. The future of food service, accommodation and retail trade jobs are a little more speculative. Those occupations blend routine work with social interaction skills, which means occupations could shift emphasis rather than disappear entirely. **See Figure 3.**

Figure 3: Oregon Industries by Level of Automation Risk
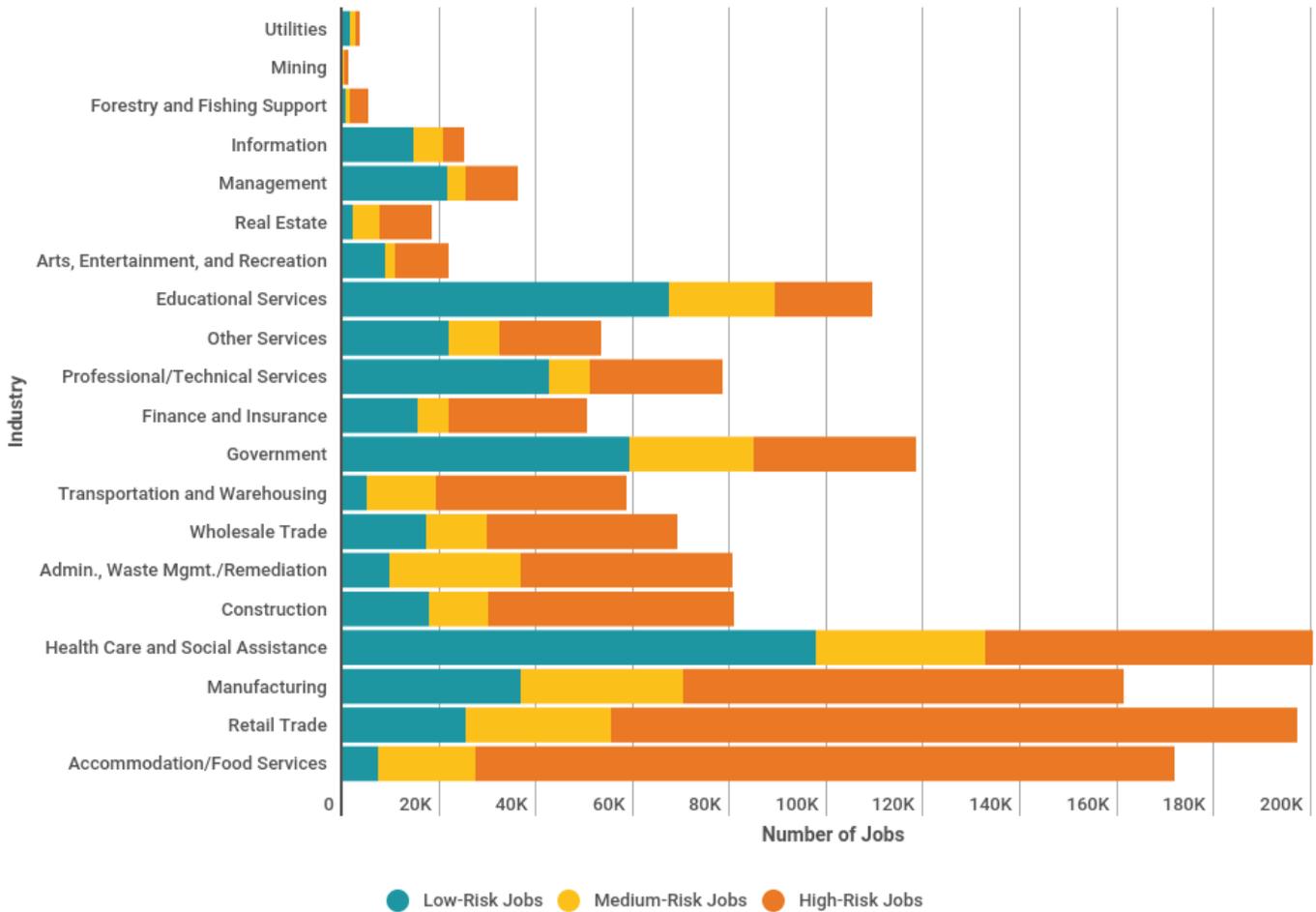
Source: ECONorthwest analysis of Frey et. al. and Bureau of Labor Statistics data

Oregon's rural counties, specifically the coastal region, are at higher risk of automation. Portland, Corvallis and other metropolitan areas have a lower risk. Rural regions have low concentrations of jobs that are hard to automate (e.g., business managers, engineers, architects, lawyers, artists and designers) and higher concentrations of occupations that lend themselves to automation (e.g., transportation). Bright spots for rural Oregon are community and social service workers, personal care providers, health care workers and scientists (e.g., foresters, soil and plant scientists, agricultural and food scientists). Meanwhile, Oregon's metro areas — especially Portland and Corvallis — benefit from a range of professional and business service work that, for the time being, is outside the grasp of technology. **See Figure 4.**

Figure 4: Risk of Automation in Oregon by Geographical Area
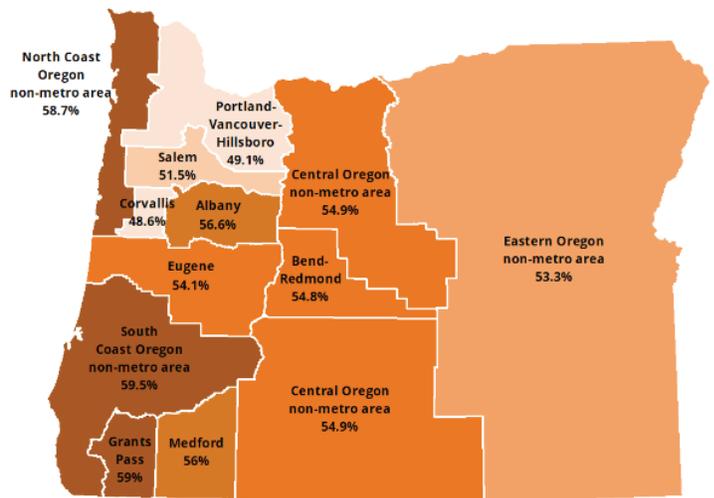
Source: ECONorthwest analysis of Frey et. al. and Bureau of Labor Statistics data.

The decline in workforce participation has played out differently by level of educational attainment. Nationally, only 6 percent of prime-age males (ages 25-54) holding a bachelor's degree or more are outside the labor force; but for those with a high school diploma or less, non-participation has risen to 17 percent. Few statistics make a better case for the need to boost the education and skills of the American workforce. Technology's disruption of work is not a futuristic concern. In Oregon, 13 percent of prime-age males were not working in 2016. **See Figure 5 online.**

What it all means

As we work to influence the development of sound public policy, fiscal reforms and relevant workforce development programs, the findings of this report provide new perspective about the challenges and opportunities ahead, as technology transforms industry sectors.

Setting a policy course is challenging when the outlooks are bound by a gradual expansion of today's labor force on the one hand, and potential mass unemployment on the other. Always keeping the possibility of unprecedented disruption in mind, policymakers should embrace the opportunities and challenges that are right in front of them. Our posture toward job growth, housing, education and social safety net policies will play a significant role in determining whether the state is prepared for the approaching changes in the economy and workforce needs, or whether we face a future of lost opportunities and larger shares of the population out of work and living on the margins.

Embracing innovation and being proactive will ensure Oregon can not only weather the changes that will undoubtedly occur as a result of automation, but actually benefit from them.

Now is the time to prepare.

Policy agenda:

- Support Oregon's innovators and seize economic opportunities
- Address Oregon's housing challenge to attract top talent
- Win the race with technology through education
- Build a social safety net for the future

For the complete policy agenda and full report, visit www.portlandalliance.com/automation.

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About the Value of Jobs coalition

The Value of Jobs coalition, led by the Portland Business Alliance, is based on the premise that, in order to have a prosperous, healthy Portland region with a good quality of life, we need more private-sector jobs. The coalition began with an economic study in the fall of 2010, which showed important trends about the Portland-metro economy. A number of other studies have followed that highlight the region's economic opportunities and challenges. **Learn more at www.valueofjobs.com.**