



THE CAUCUS

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As technology and the Fourth Industrial Revolution change the employment landscape, tens of thousands of Pennsylvanians could lose their jobs over the next decade.

Are we ready?

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OVERHEARD ON 3RD



Why was Lt. Mike Stack, whose behavior is under scrutiny, charging the public to put him up in Philadelphia hotels when he had a home there? **PAGE 4**

THE INTERVIEW



House Majority Leader Dave Reed has decided not to run for governor in 2018. But he's set a more ambitious, albeit more person, goal. **PAGE 12**

POLITICAL HISTORY



Learn about Liberty Day, which was founded as a holiday this week in 1918 by former Gov. Martin Brumbaugh. **PAGE 14**

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AUTOMATION NOW

Robots could displace tens of thousands of Pennsylvania workers over the next several decades. Are we prepared for the coming tectonic shift in our workforce?

» SAM JANESCH

Technology can cook a hamburger and deliver the mail. It can analyze X-rays and manufacture cars. It can replace cashiers and delivery drivers. So where, exactly, does that leave the people who do those jobs now?

Automation and artificial intelligence are driving innovation at a faster rate than any previous economic force, economists and scientists say. And the rapid changes will require nothing short of the mass retraining and education of those workforces for different, and likely higher-skilled, roles in the economy.

But how soon will it be before that sort of highly advanced technology charges into the labor force in a significant way, leaving the jobs that employ millions of people — including hundreds of thousands in Pennsylvania — automated?

Is Pennsylvania prepared for what is commonly referred to as the

Fourth Industrial Revolution?

It doesn't appear so. Pennsylvania officials have not commissioned any studies of the potential effects of automation in the state. A lengthy plan for workforce development through 2020 approved last fall doesn't even mention automation.

And considering the sheer speed of technological change,

economists and other experts say job training and education need to be more strategic and better-funded to prepare for what's to come.

"We're training people for a job that, when they're 30 ... won't exist," said John Jordan, a Penn State Smeal College of Business professor of supply chain and information systems. "How do you train somebody for a job that won't exist?"

At the same time, the national narrative on creating jobs — led by a new billionaire populist president who worked in real estate — is dominated by a desire to bring manufacturing positions back from overseas and reignite long-faltering industries such as coal and steel.

OUR AUTOMATED FUTURE

The World Economic Forum describes the three previous industrial revolutions as power, and electronics and information technology.

The fourth, which the organization says has no historical precedent in its speed or impact, is one that is "blurring the lines between the physical, digital, and biological spheres."

Experts and educators including Jordan talk about the inevitable offices where humans and robots work alongside each other, fundamentally altering how workplaces operate. In many areas of manufacturing and business, such workspaces already exist.

"Whether it's reading mammograms, complex welding in factory scenarios, whether it's picking stocks — computers will do a better job than people, and more every year," Jordan said.

Gary Fedder, a robotics expert and vice provost for research at Carnegie

Mellon University, said the right approach is not about racing against the machine — because you'll lose. It's about racing to work alongside them.

The number of jobs at risk for automation in the next two decades varies. One widely reported study last year by the consulting firm McKinsey & Company found that technology in place now could automate 45 percent of the activities people are paid to do for work.

The analysis was of more than 2,000 work activities that constitute 800-plus occupations. Very few occupations were expected to be eliminated entirely by automation within the next decade, but as many as 60 percent of them could see about a third of their activities automated with just the technology available at the time of the report.

Another study, from two University of Oxford experts in 2013, ranked 702 occupations from "least- to most-computerisable."

Comparing this list with Pennsylvania's labor

data reveals the occupations that might just be most at risk in the Keystone State.

For example, the Oxford report shows that the jobs of a retail salesperson and a cashier are two of the most "computerisable" occupations — a conclusion shared by other research.

According to Pennsylvania Department of Labor & Industry data, there were 195,950 employed retail salespeople in the state in 2014, with a projected growth up to more than 202,000 by 2024. Employment of cashiers was projected to remain steady over that period, at about 147,000 people.

There were 262,000 general office clerks and secretaries in Pennsylvania in 2014. Those jobs could be almost entirely automated, the study found.

Technology's ability to automate doesn't stop at office clerks and secretaries, though. It could displace food prep workers and servers, laborers and "freight, stock and material movers."

The list goes on.

Data shows lower-skilled, highly-routine jobs are most at risk. But technology is also wide-reaching, economists say.

"When factories were offshoring it was mostly blue-collar jobs lost," Jordan said. "Now, with automation, you have equity analysts, call center workers, paralegals and even entry-level lawyers, mammogram readers ... so there's no class uniformity in jobs that are being lost."

Anywhere from 360,000 to 670,000 U.S. jobs were lost to robots between 1990 and 2007, according to new research from economics professors Daron Acemoglu of MIT and Pascual Restrepo of Boston University.

If the most "aggressive scenario" for the next few years becomes a reality, the number of robots will quadruple by 2025 — leading to a decrease in employment-to population-ratio of 0.94 to 1.76 percent and wage growth that is 1.3 to 2.6 percent lower than it is now, according to Acemoglu and Restrepo.

Still, many economists and scientists are wary of prophesying a dystopian society via robot overload. The recent decades of technological advancement haven't led to widespread unemployment. For the many jobs that have become automated, enough others have been added exactly because of those advancements.

In other words, someone has to program the technology and create the infrastructure to support innovation.

And just because a job can become automated doesn't mean that it will.

"None of this is going to put people dramatically out of work, as the fear is," said Zoann Parker, vice president of academic affairs at Thaddeus Stevens College of Technology.

Parker said she disagrees with the notion that skillsets taught now to college-age students won't be of use by the time they turn 30.

However, she added, those skills might be out dated "possibly by the age of 50."

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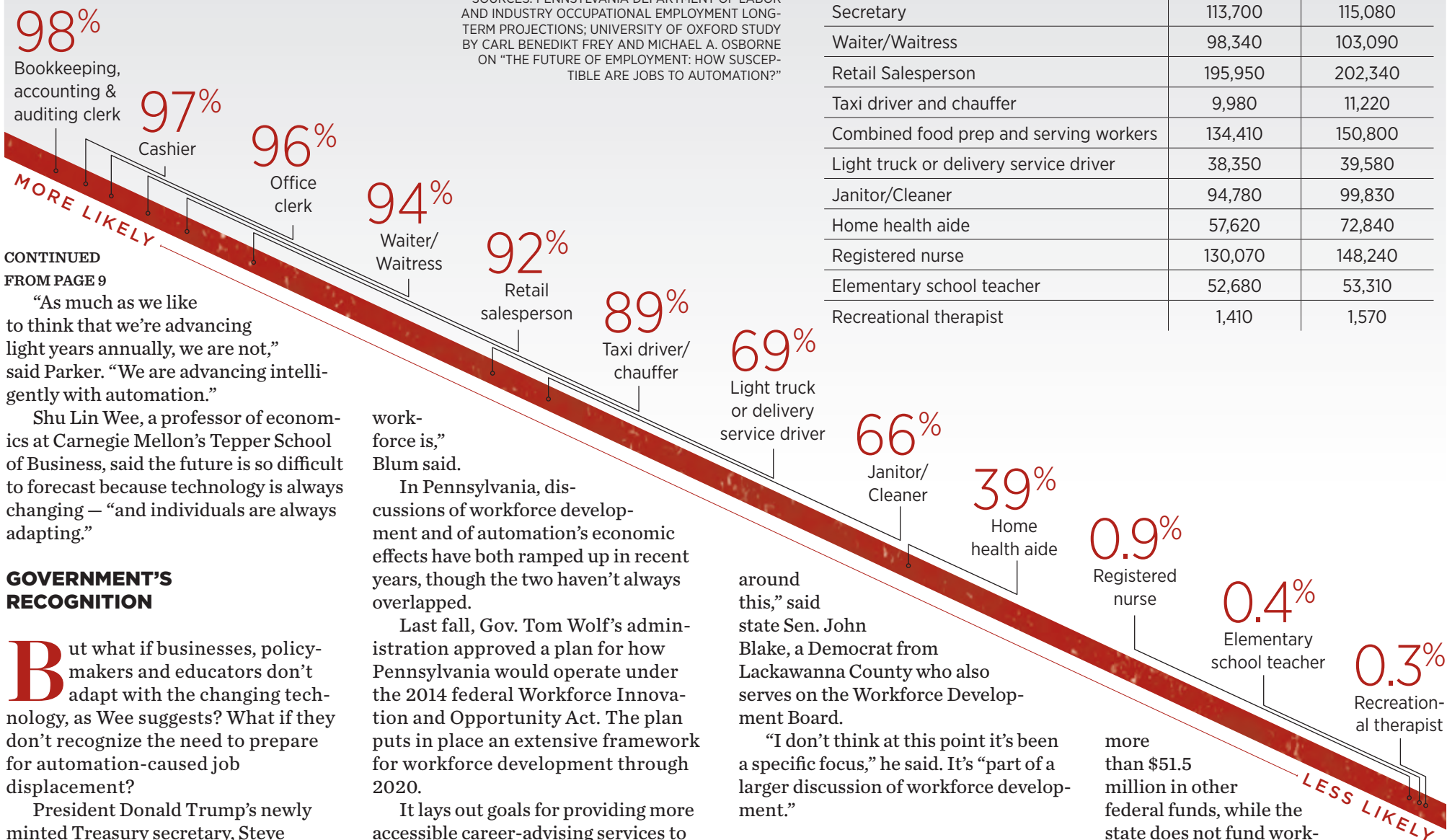
WILL IT BE AUTOMATED?

Occupations and their probability of computerization by 2024

STUDIES DIFFER ON WHETHER JOBS WILL BE EITHER FULLY OR PARTIALLY AUTOMATED based on how routine or complex their tasks are. A 2013 study by University of Oxford professors ranked 702 occupations by their probability of “computerisation.” Below is a selection of those occupations that represent hundreds of thousands of jobs in Pennsylvania.

Occupation	Jobs in PA in 2014	Projected jobs in PA in 2024
Bookkeeping, accounting & auditing clerk	71,160	66,880
Cashier	147,700	146,970
Office clerk	131,500	133,850
Secretary	113,700	115,080
Waiter/Waitress	98,340	103,090
Retail Salesperson	195,950	202,340
Taxi driver and chauffer	9,980	11,220
Combined food prep and serving workers	134,410	150,800
Light truck or delivery service driver	38,350	39,580
Janitor/Cleaner	94,780	99,830
Home health aide	57,620	72,840
Registered nurse	130,070	148,240
Elementary school teacher	52,680	53,310
Recreational therapist	1,410	1,570

SOURCES: PENNSYLVANIA DEPARTMENT OF LABOR AND INDUSTRY OCCUPATIONAL EMPLOYMENT LONG-TERM PROJECTIONS; UNIVERSITY OF OXFORD STUDY BY CARL BENEDIKT FREY AND MICHAEL A. OSBORNE ON “THE FUTURE OF EMPLOYMENT: HOW SUSCEPTIBLE ARE JOBS TO AUTOMATION?”



CONTINUED FROM PAGE 9
“As much as we like to think that we’re advancing light years annually, we are not,” said Parker. “We are advancing intelligently with automation.”

Shu Lin Wee, a professor of economics at Carnegie Mellon’s Tepper School of Business, said the future is so difficult to forecast because technology is always changing — “and individuals are always adapting.”

GOVERNMENT’S RECOGNITION

But what if businesses, policymakers and educators don’t adapt with the changing technology, as Wee suggests? What if they don’t recognize the need to prepare for automation-caused job displacement?

President Donald Trump’s newly minted Treasury secretary, Steve Mnuchin, said in an interview in March that the time frame for artificial intelligence taking American jobs was “so far away ... 50 or 100 more years.”

That was just a few months after President Barack Obama’s White House released a report on artificial intelligence and automation that concluded: “Responding to the economic effects of AI-driven automation will be a significant policy challenge for the next Administration and its successors.”

Throughout the 2016 presidential election, the candidates rarely uttered the terms “automation” and “artificial intelligence” when speaking about growing the American economy.

Instead, Trump led the way in talking about free and fair trade, of “bringing back jobs” from overseas and getting people back to work.

More jobs, he said during campaign visits to the Keystone State, would come as he brought back the glory days of steelmaking and coal mining.

“The reason people don’t have jobs is they haven’t been trained for the new economy,” said Lenore Blum, a distinguished professor of computer science at Carnegie Mellon. “The talk of bringing coal back is going in sort of the head-buried-in-the-sand direction.”

Workforce training — not reinventing older industries — is what will aid the “huge transformation in what the

workforce is,” Blum said.

In Pennsylvania, discussions of workforce development and of automation’s economic effects have both ramped up in recent years, though the two haven’t always overlapped.

Last fall, Gov. Tom Wolf’s administration approved a plan for how Pennsylvania would operate under the 2014 federal Workforce Innovation and Opportunity Act. The plan puts in place an extensive framework for workforce development through 2020.

It lays out goals for providing more accessible career-advising services to the unemployed, promoting apprenticeship programs and engaging employers.

Eileen Cipriani, deputy secretary for workforce development at the Department of Labor & Industry, said automation has been a “high consideration” both with the development of the plan and independent of it.

“Everywhere we travel, talking with manufacturers especially ... we know people have been displaced through manufacturing primarily due to automation,” she said.

State Rep. Ryan Mackenzie, a Republican from Lehigh County who serves on the Workforce Development Board, said discussions of automation as it relates to jobs have been more frequent in just the last two years.

Still, the 358-page Workforce Innovation and Opportunity Act plan uses the term “automation” not a single time to describe the future demands of employers or the market.

Any kind of targeted research on automation and the workforce in the state has been nonexistent, said Cipriani, noting the significant amount of national research on the topic.

In legislative circles, there has also been little if any discussion of the topic.

“I can’t say that the dialogue in the Legislature has been looking at this that much. I don’t see legislative activism

around this,” said state Sen. John Blake, a Democrat from Lackawanna County who also serves on the Workforce Development Board.

“I don’t think at this point it’s been a specific focus,” he said. It’s “part of a larger discussion of workforce development.”

GOVERNMENT’S ROLE

Blake sees the topic coming to the forefront if lawmakers find the state is “losing ground” in workforce development and overall employment.

Where that might start, it appears, is at the funding level.

Trump, in his first federal budget plan, proposed a 21-percent cut in appropriations for the U.S. Department of Labor. Democrats on the U.S. House Appropriations Committee estimated other areas of his budget would lead to a 35 percent cut for the Workforce Innovation and Opportunity Act.

“One of the things really on our mind right now is the initial conversation about the federal government in our budget,” said Cipriani.

She said the state received \$93 million in federal funding for the program last year, and a 35-percent drop would be “devastating” to training programs and local CareerLink locations that aim to support adults, youth and dislocated workers.

The adult programs focus on those with the highest barriers to employment such as longtime unemployment, ex-offenders, individuals with disabilities, veterans, workers needing a GED and English as a second language.

The state labor department receives

more than \$51.5 million in other federal funds, while the state does not fund workforce training through Labor & Industry, Cipriani said.

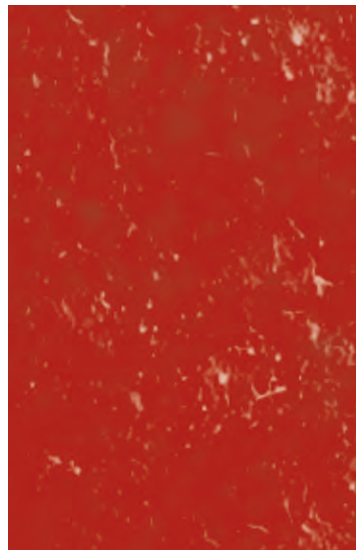
The state does, however, provide job training funding through Department of Community and Economic Development programs such as WEDnet.

Appropriated through the Pennsylvania First line item, Wolf’s proposed 2017-18 budget would retain the \$20 million. The Republican-led budget proposal, on the other hand, would eliminate the line item.

Wolf’s budget also includes new efforts to build a “21st century workforce” through a new \$12 million manufacturing initiative, a new apprenticeship program, \$5 million for a manufacturing training-to-career grant program and the creation of a Middle Class Task Force.

In a recent meeting with LNP’s editorial board, he emphasized the need for what he said was \$50 million for workforce development in his budget, and creating programs that help people learn and adapt.

“When I say schools that teach, what you want is an education that’s accessible, affordable and relevant,” Wolf said. “And that means not just, ‘What am I going to need to know to get this job.’ [It means], ‘What am I going to need to know in terms of being a lifelong learner, to be able to adapt for the next 30 or 40 years while I’m in this job.’”



Robotics and jobs

POLICYMAKING

The White House report released in December outlines three major policy areas in which to respond to the looming automated future.

They are:

- Investing in artificial intelligence for its many benefits.
- Educating and training workers for the jobs of the future.
- And providing a modernized social safety net so workers can explore and survive in the new labor force.

Those tenets include encouraging development policies to address the low levels of proficiency in basic math and reading for millions of Americans, and spending more in general on labor market policies. Relative to the overall economy, the U.S. spends less than half of what it did on such programs 30 years ago, the report states.

The White House report also includes proposals many consider to be radical, such as replacing the the current social safety net with a universal basic income.

The report does not recommend pursuing the measure, but it's worth mentioning because a universal basic income has been "a staple of some technologists' policy vision for the future" — a future where other efforts can't keep up with the speed of technology.

"The issue is not that automation will render the vast majority of the population unemployable," the report states. "Instead, it is that workers will either lack the skills or the ability to successfully match with the good, high paying jobs created by automation."

As a general rule, the White House report advises policymakers to have a "broad policy response" and "be prepared for a range of potential outcomes" because of the difficulty in predicting what kind of shock technology will be in the economy.

Mackenzie, the state representative who was previously the policy director for the Department of Labor & Industry, said there is "absolutely a role for government" in adjusting to technological changes in labor, but not a prescriptive one.

He said state government has done a good job, and will need to do an even better one, in working with businesses and educational institutions to keep up with what skills are needed as technology advances quickly.

GARY FEDDER IS THE CEO OF Carnegie Mellon's new Advanced Robotics Manufacturing Institute, which started receiving its seven-year, \$80 million federal grant in January.

The institute's goals are ambitious: to transform U.S. manufacturing, to foster innovation and create 500,000 jobs in the process.

Fedder said the governmental and business investment in AI and automation is necessary for a whole host of reasons—making America more competitive in manufacturing, improving national security are just a few, and, in places like Pittsburgh, creating "innovation ecosystems."

Fedder said the 500,000 figure for job growth came from a consulting group that based it partially on comparable advanced manufacturing efforts in other countries, like Germany.

He says a good sign that robotics creates jobs has been in the automotive industry, where manufacturers in the U.S. have added both robots and jobs in recent years. A study from November revealed 135,000 robots had been implemented in the U.S. automotive industry 2010 through 2015, while at the same time adding 230,000 jobs.

Fedder said he doesn't see the change toward a strikingly automated workforce happening overnight. But still, government and educational institutions like CMU should be helping to develop certification programs and basic curricula that can be used to teach the next levels of the workforce.

He envisions an education system that teaches STEM skills and others, assessing how students and trainees are doing "on the fly and then modifying the curriculum to their needs." It's something many have experimented with, but not really in the manufacturing area, he said, "and that's one of the areas we're excited about."



The issue is not that automation will render the vast majority of the population unemployable. Instead, it is that workers will either lack the skills or the ability to successfully match with the good, high paying jobs created by automation.

WHITE HOUSE REPORT

ISSUED IN DECEMBER TO ADDRESS THREE MAJOR POLICY AREAS IN RESPONSE TO THE LOOMING AUTOMATED FUTURE

Roseann Cordelli, director of government and public relations for the Pennsylvania Workforce Development Association, said "it goes without saying" that automation will call for a level of workforce training for both current workers and those who are just coming into the workforce.

"Whether it's the existing workforce or new hires coming in, they're going to require some workforce development training on systems that are either partially or fully automated," Cordelli said.

THE WORKFORCE TODAY

Other than automation, Pennsylvania's labor force faces a number of striking challenges in the immediate and distant future, according to officials and the Workforce Innovation and Opportunity Act report.

An aging population with the sixth-highest percentage of people 65 and over compared to all other states. A slow population growth rate, projected at just 1.7 percent through 2024 compared to 8.2 percent nationally. A 13.4 percent of the working age population with a disability, more than the 11.8 percent nationally. A ranking of 44th among states for the share of adults with more than a high school diploma, and 49th place in share of adults with "some college," according to the Workforce Innovation and Opportunity Act report.

Consider also the large number of veterans (880,000), people who have been incarcerated in state prisons (1 out of every 66 people), impoverished families and those who do not speak English

well or at all, the report explains.

The state's fiscal woes — from the budget deficit to education funding to the pressure on employers to fill pension obligations — complicate labor issues further.

"We just do not have the funding to expand our facilities in order to meet the needs for students who want to come here," said Parker, the administrator at Thaddeus Stevens, which churns out a nearly 100 percent job placement rate for high-paying skills such as welding that are in high demand right now. "We need to have capital dollars to allow us to physically expand so we may support more students."

Many say, unequivocally, that the path to a higher-skilled, better-equipped workforce — for both the automated future and the current labor demands — is better education.

Just about half of Pennsylvanians today have participated in some level of postsecondary education, while 38.5 percent have a high school diploma as their highest degree. Another 9 percent have less than a high school diploma, according to the Workforce Innovation and Opportunity Act report.

Wolf's goal is getting 60 percent of the population to obtain a "college or industry-recognized credential by 2025."

"We need to change what it means to get a skill," Parker said at a recent community forum about workforce needs with Auditor General Eugene DePasquale at Stevens. "We have learned we're at a turning point. We're in yet another industrial revolution."