



“ARTIFICIAL INTELLIGENCE, INNOVATION AND THE WORKFORCE: WHAT SHOULD CONGRESS KNOW AND DO”

OCTOBER 1, 2019

A Compendium of select news articles



**Financial Services
Innovation Coalition
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How AI Is Transforming Agriculture

Kathleen Walch - Contributor

July 5, 2019

Forbes

COGNITIVE WORLD Contributor Group



Agriculture and farming is one of the oldest and most important professions in the world. Humanity has come a long way over the millennia in how we farm and grow crops with the introduction of various technologies. As the world population continues to grow and land becomes more scarce, people have needed to get creative and become more efficient about how we farm, using less land to produce more crops and increasing the productivity and yield of those farmed acres. Worldwide, agriculture is a \$5 trillion industry, and now the industry is turning to AI technologies to help yield healthier crops, control pests, monitor soil and growing conditions, organize data for farmers, help with workload, and improve a wide range of agriculture-related tasks in the entire food supply chain.

AI helping analyze farm data

With the help of AI, farmers can now analyze a variety of things in real time such as weather conditions, temperature, water usage or soil conditions collected from their farm to better inform their decisions. For example, AI technologies help farmers optimize planning to generate more bountiful yields by determining crop choices, the best hybrid seed choices and resource utilization.

What is known as precision agriculture

Precision agriculture uses AI technology to aid in detecting diseases in plants, pests, and poor plant nutrition on farms. AI sensors can detect and target weeds and then decide which herbicides to apply within the right buffer zone. This helps to prevent over application of herbicides and excessive toxins that find their way in our food. Farmers are also using AI to create seasonal forecasting models to improve agricultural accuracy and increase productivity. These models are able to predict upcoming weather patterns months ahead to assist decisions of farmers. Seasonal forecasting is particularly valuable for small farms in developing countries as their data and knowledge can be limited. Keeping these small farms operational and growing bountiful yields is important as these small farms produce 70% of the world's crops.

In addition to ground data, farmers are also taking to the sky to monitor the farm. Computer vision and deep learning algorithms process data captured from drones flying over their fields. From drones, AI enabled cameras can capture images of the entire farm and analyze the images in near-real time to identify problem areas and potential improvements. Unmanned drones are able to cover far more land in much less time than humans on foot allowing for large farms to be monitored more frequently.

Today In: [Innovation](#)

AI tackles the labor challenge

With less people entering the farming profession, most farms are facing the challenge of a workforce shortage. Traditionally farms have needed many workers, mostly seasonal, to harvest crops and keep farms productive. However, as we have moved away from being an agrarian society with large quantities of people living on farms to now large quantities of people living in cities less people are able and willing to tend to the land. One solution to help with this shortage of workers is AI agriculture bots. These bots augment the human labor workforce and are used in various forms. These bots can harvest crops at a higher volume and faster pace than human laborers, more accurately identify and eliminate weeds, and reduce costs for farms by having a round the clock labor force.

Additionally, farmers are beginning to turn to chatbots for assistance. Chatbots help answer a variety of questions and provide advice and recommendations on specific farm problems. Chatbots are already being used in numerous other industries with great success. Through the use of AI and cognitive technologies farms across the world are able to run more efficiently, with less workers than before while still meeting the world's food needs. There is no more fundamental need than the need of food, and this will never go away. Fortunately, the use of AI will allow farms of all sizes to operate and function keeping our world fed. Through the use of agricultural AI and cognitive technologies, farms across the world are able to run more efficiently to produce the fundamental staples of our dietary lifestyles.



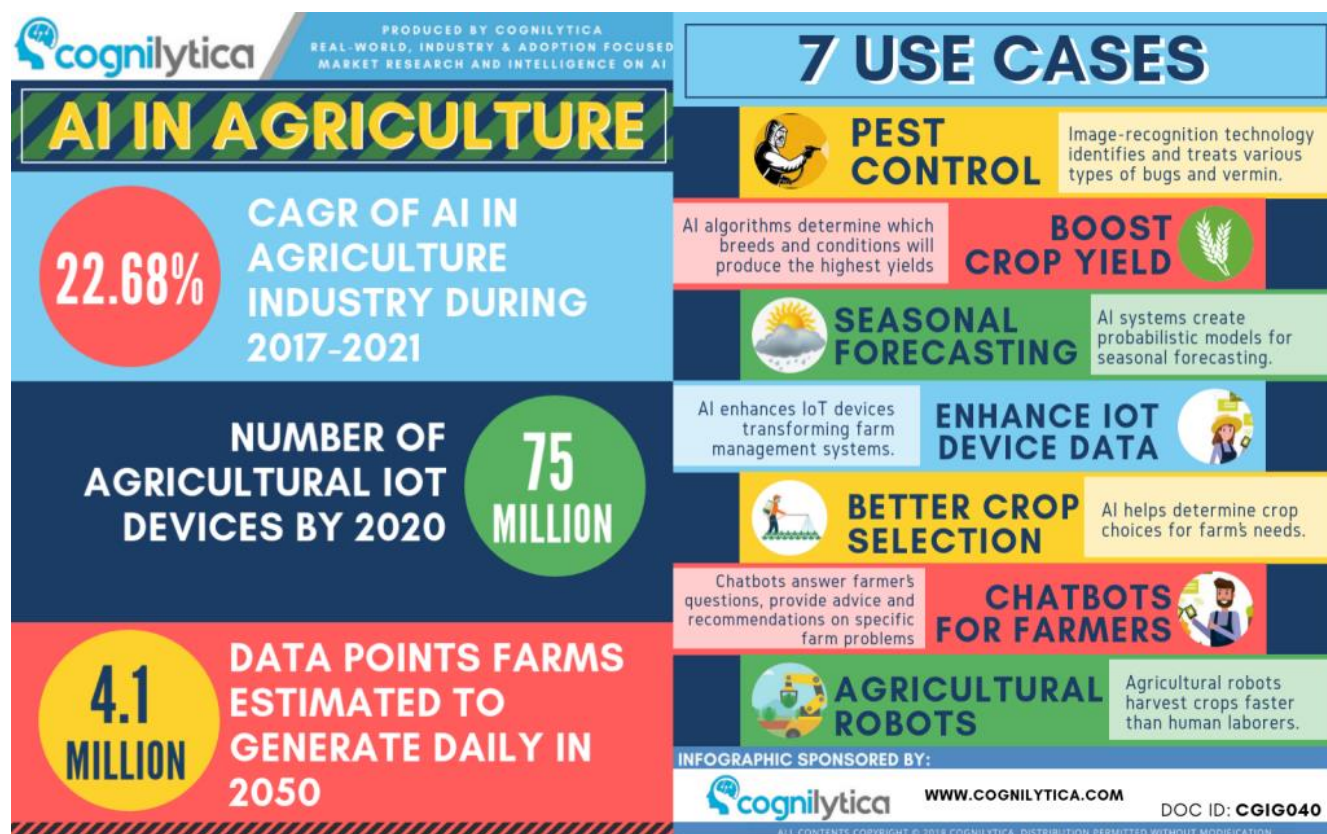
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INFOGRAPHIC: AI in Agriculture

January 31, 2019

Agriculture has come a long way over the millennia in how we farm and grow crops with the constantly improved various technologies introduced. The industry is now turning to AI technologies to help yield healthier crops, control pests, monitor soil and growing conditions, help reduce the workloads, organize data for farmers, and improve a wide range of agriculture-related tasks in the entire food supply chain. In this infographic Cognilytica explores 7 ways AI is helping in agriculture.



How AI can Diversify Human Thinking Rather Than Replace It

Nine in 10 business leaders across the world believe cognitive diversity is important for management and artificial intelligence will enhance decision making



Image credit: Shutterstock



Pooja Singh

Entrepreneur - Asia Pacific

Former Features Editor,

September 11, 2018 4 min read

There is no shortage of debate when it comes to the use of artificial intelligence in the workplace. Some believe the technology will cost them their jobs, while others worry about security. A growing body of research, however, points to the narrative that intelligence will only diversify human thinking, not replace it.

A recent study by Tata Communications, which was based on the inputs of 120 business leaders from across the world, says nine in 10 respondents agree that cognitive diversity is important for management and 93% believe AI will enhance decision making.

Automation is Key

What's more, three in four business leaders expect AI to produce new positions for their workers. This is in sync with a December report by Gartner that said by 2020, AI will create more jobs than it eliminates.

"Using AI to auto-generate a weekly status report or pick the top five emails in your inbox doesn't have the same wow factor as, say, curing a disease would, which is why these near-term, practical uses go unnoticed," Craig Roth, research vice president at Gartner, had said in the report.

"Companies are just beginning to seize the opportunity to improve non-routine work through AI by applying it to general-purpose tools. Once knowledge workers incorporate AI into their work processes as a virtual secretary or intern, robo-employees will become a competitive necessity."

The Word is Out

The Tata study, which included interviews with entrepreneurs, executives and thought-leaders, concludes that AI can boost cognitive diversity within groups, with 93% of the respondents saying that the technology, which essentially encompasses a broad set of algorithms and mimics human cognition or perception, can "assess each employee's skills and innovation priorities, and suggest activities to spark creative thinking throughout the organizational hierarchy." This can democratize the creative process and increase engagement of all workers, says the study.

AI has the potential to free employees from tedious repetitive tasks, allowing them to focus on communication and innovation, explains the study, titled "New research debunks myths about

artificial intelligence in the workplace". "Work will move from being task-based to strategic, enabling workers to enhance their curiosity and creative thinking," it points out.

'Multiplicity' is the Game

UC Berkeley professor Ken Goldberg, who co-authored the report, says, "The prevalent narrative around AI has focussed on a 'Singularity'—a hypothetical time when artificial intelligence will surpass humans. But there is a growing interest in 'Multiplicity', where AI helps groups of machines and humans collaborate to innovate and solve problems. This survey of leading executives reveals that Multiplicity, the positive and inclusive vision of AI, is gaining traction."

The study's other author Vinod Kumar, the chief executive officer and managing director at Tata Communications, says AI is being viewed as a new category of intelligence that can complement existing categories of emotional, social, spatial, and creative intelligence. "What is transformational about Multiplicity is that it can enhance cognitive diversity, combining categories of intelligence in new ways to benefit all workers and businesses," he says.

Innovation is Here

Tony Blair, executive chair of the Institute of Global Change and former UK Prime Minister, who was one of the 120 leaders, predicts that "AI will allow us to do what it is that we are uniquely meant to do: focus on high-level thinking, strategy, and paving the way for innovation."

The interest in AI has been growing steadily over the past few years. A survey conducted earlier this year by US-based Narrative Science and the National Business Research Institute found that 61 per cent of businesses implemented AI in 2017, up from 38 per cent in the previous year. Here's the break-up, according to the survey, of where AI is being used in the enterprise: Predictive analytics (25%), machine learning (22%), natural language processing or generation (14%), voice recognition and response (14%), virtual personal assistants/chatbots (11%), and diagnosis/recommendation engines (11%).

In a recent forecast, McKinsey said AI will generate \$13 trillion in economic activity across the world by 2030.

"Leading countries could capture an additional 20 to 25 percent in net economic benefits compared with today, while developing countries may capture only about 5 to 15 percent," McKinsey notes in the September report, "Notes From the Frontier: Modeling the Impact of AI on the World Economy".

Automation and AI will disrupt the American labor force. Here's how we can protect workers

Brookings

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Last month, we [released research](#) that suggests the next phases of workplace automation should be manageable for most workers, with only a quarter of the American workforce facing “high” exposure to automation technologies in the coming decades.

But that doesn't mean the problem is insignificant. A quarter of the U.S. workforce consists of some 36 million people who will be highly exposed to automation, and could suffer displacement as a result.

The clear implication: Don't expect this issue to sort itself out on its own. Indeed, even the Trump Administration acknowledged as much in its recent [executive order on artificial intelligence](#) (AI). While the executive order is light on details, it does direct the intergovernmental Select Committee on Artificial Intelligence to provide recommendations “regarding AI-related educational and workforce development considerations.”

What might some of these considerations look like? In our new report, we offer strategies for making the best of the automation era in the form of five major agendas to help maximize the benefits that automation and AI may bring, while mitigating the potential harms.

First among our proposed strategies is for the nation to run a full-employment economy, and, in general, to [embrace growth and technology](#). In doing so, workers will have an easier time maintaining employment or transitioning from one job to another in conditions of widespread hiring. But beyond that, embracing, rather than resisting, the coming generations of digital technology—from automation and data analytics to various forms of AI—will likely help create new jobs and

maintain living standards for many workers. Over the past 30 years, technology has been a significant source of new job creation and opportunity.

Furthermore, new technologies increase the productivity of the workers they do not displace, which in turn raises those workers' wages and increases demand for other work across the economy. For this reason, the U.S. must step up its funding for R&D on emerging technologies like AI, big data, and super-computing, with an emphasis on leading global efforts to develop these technologies ethically and humanely. Through such investment, the U.S. can promote further job creation while securing global leadership in standard settings. That matters doubly because to cede such leadership to autocratic nations like China would be a [disaster for human rights](#).

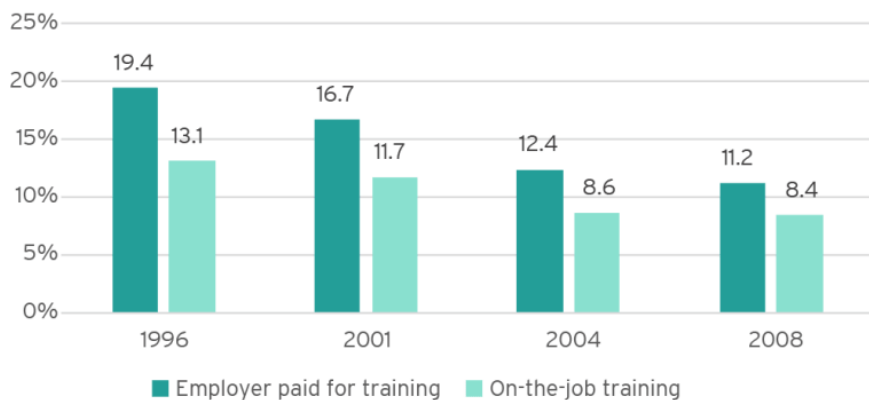
But the nation and its workers will need more than just a sufficient rate of job creation to offset the likelihood of job destruction. Even in the best of times, many, if not most, workers will strain to manage the coming necessary adjustments as automation and AI change or eliminate many jobs, while simultaneously creating new ones. In preparation for the changes to come, the nation needs to make a more serious commitment to helping workers and communities adjust, and to reducing hardships for those who are struggling. Here are four priorities:

[Promote a constant learning mindset](#)

Nearly all workers are likely to see some task change in their jobs—just think of how the emergence and widespread adoption of the personal computer over the past 30 years has affected nearly every worker. To adapt to coming changes, workers will need more support for skill development. Unfortunately, employer-supported training, one of the main forms of skill development for incumbent workers, has been declining over time:

FIGURE 1

Percent of workers receiving employer-sponsored or on-the-job training
1996-2008



Note: Fraction of workers age 18-65 receiving training of any duration in the last year.

Source: Council on Economic Advisers calculations of Census Bureau Survey of Income and Program Participation (Employment and Training Topical Module) data. Council on Economic Advisers, "2015 Economic Report of the President."

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Furthermore, we no longer have a clear idea of how many workers receive on-the-job training. The U.S. Census Bureau's [Survey of Income and Program Participation](#), which has provided this data in the past, did not collect any information about on-the-job or employer-sponsored training in its most recent panel in 2014.

But businesses must not be let off the hook—more firms must do their part to **offer employer-led trainings** or provide tuition or other skill-development benefits. Policymakers, in turn, can take steps to **incentivize companies to increase training efforts**, such as human development tax credits or

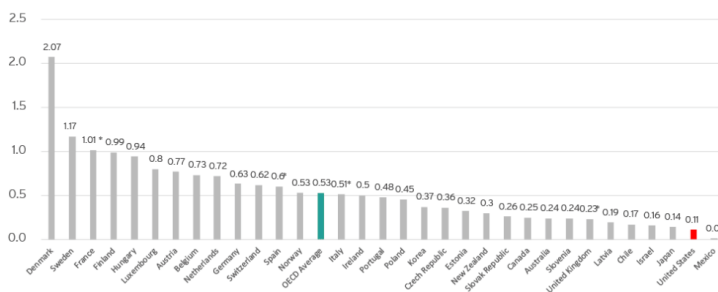
lifelong learning accounts. Policymakers should also **explore the viability of new learning models** such as accelerated learning and experiential learning. And across all levels, education and training efforts should **impart durable skills** to help individuals both work with machines, as well as do what machines cannot.

[Facilitate smoother adjustment](#)

While our analysis shows that just 25 percent of U.S. jobs are highly exposed to automation, that still equates to over 36 million workers. Many of those workers—as well as some workers who are less exposed—may lose their job completely. However, the current worker adjustment system in the United States is wholly inadequate. As a portion of our economy, we spend less than nearly every other industrialized country on so-called active labor market policies (ALMPs) that help train workers and match them to jobs:

FIGURE 2

Public expenditure on active labor market policies (ALMPs), 2016
Percentage of GDP; (* indicates alternate latest year)



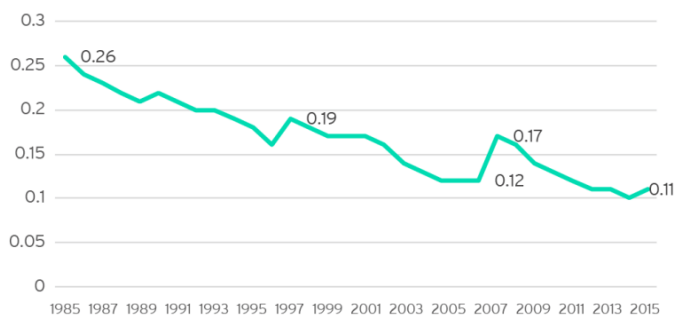
Notes: Greece excluded due to no available OECD data; latest available year data for France, Italy, and Spain from 2015; latest available data from United Kingdom from 2011.
Source: OECD

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Furthermore, we invest less than we used to in these policies—as a percentage of GDP, we spend less than half of what we spent in 1985:

FIGURE 3

U.S. spending on active labor market policies (ALMPs), 2016



Source: OECD

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To reverse this trend, policymakers should **increase funding for active labor market policies**.

However, just increasing funding indiscriminately is not enough. To best support worker adjustment, policymakers should **create a Universal Adjustment Benefit** that would help all displaced workers.

Such a program would be anchored by three core components:

- Automatic enrollment in career counseling for every displaced worker
- Expanded training access for all dislocated workers
- Robust income support for workers in training

[Reduce hardships for workers who are struggling](#)

Automation and AI will exacerbate financial insecurity by forcing many workers into low-wage work. It will be necessary for policymakers to take steps to reduce financial uncertainty and volatility. Policymakers should **expand the earned income tax credit (EITC)** (and [issue payments quarterly or monthly](#)) and **enact a wage insurance program** so workers forced into lower paying jobs can better make ends meet. Meanwhile, policies like **state-run individual retirement accounts (IRAs)**, **paid sick and family leave** for all workers, and **public healthcare options** can provide workers in low-wage jobs a modicum of financial security.

[Mitigate harsh local impacts](#)

For places like the small cities and rural areas that are at the highest risk from automation, even deeper investments will be necessary. Policymakers must help pivot these economies from the industries of the past to the industries of the future. They should **boost the adoption of new, intelligent technologies** by firms in hard-hit regional economies, as well as **expand support for community adjustment efforts**. One way to do so would be to provide extensive support for a group of small-to-medium-sized metros to serve as regional “growth poles.” Finally, policymakers and companies must **future-proof regional workforces** through, for example, specialized training modules that develop the skills that lead to automation-resilient work.

As evidenced by ongoing discussions in the business community, companies have fully committed to a new wave of automation. Doing so makes business sense—it will help bolster firm productivity and improve companies’ bottom lines. However, these decisions will also have significant impacts on the lives of millions of workers. Therefore, policymakers at all levels must step in with new investments to mitigate the worst impacts of automation, and to ensure a just and equitable transition to a 21st century economy. Without urgent and consequential action, we should expect the coming decades to look much like the last: considerable economic benefits for some, but significant strain and disruption for many others.

Prepared by:
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