The Speed of Disruption and Impact on Business
The Fourth Industrial Revolution Has Begun
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Advances in automation, artificial intelligence and robotics are coming—fast and furiously. These advances will result in job losses as businesses in many countries incorporate artificial intelligence and/or robotics into their operations to cut costs and improve efficiencies. Some refer to this economic shift as the fourth industrial revolution.

Even the experts couldn’t see the changes coming so fast. In 2014 Andrew McAfee, an MIT principal research scientist, co-authored a New York Times best seller about the coming of “The Second Machine Age.” Three years later, he is now saying, “We badly underestimated the scope and the pace of technological process. I would feel bad about that, except everybody else did, too.”

The speed and impact of the disruption on businesses, created by technological advances, was a major theme of the 2017 CEO Summit in Davos. Meg Whitman, Chief Executive of Hewlett Packard Enterprise, said, “Jobs will be lost, jobs will evolve and this revolution is going to be ageless, it’s going to be classless and it’s going to affect everyone.”

American businessman and Dallas Mavericks’ owner Mark Cuban recently said, “The biggest difference between now and the past is the speed of change. I don’t think people realize just how quickly this is happening.” He also commented that major companies in the Fortune 500, S&P 500 and Dow 30 are going to employ fewer people “to get a lot more done.”

IDC, the global intelligence firm, predicts that spending on artificial intelligence (AI) technologies by companies is expected to grow to $47 billion in 2020 from a projected $8 billion in 2016. Business Insider believes that enterprise robotic shipments will nearly triple between 2015 and 2021.

Are insurers examining how the disruption of so many classes of business might impact their book of business?
Robots and Automation

U.S. Forecasts

We have no precedent for the speed or the all-encompassing nature of this disruption. In the past people could move from one kind of routine job to another. But what’s coming means that when one kind of routine job becomes obsolete, those other routine jobs will be performed by robots. In June last year The Economist noted that Martin Ford, a software entrepreneur and the bestselling author of “Rise of the Robots,” expressed concern about the speed with which software can be deployed today in contrast to the technological shift in agriculture that developed over a few decades. Ford said, “This time many workers will have to switch from routine, unskilled jobs to non-routine skilled jobs to stay ahead of automation.”

In 2013 a University of Oxford study concluded that nearly half of U.S. jobs were at risk for automation, and a 2015 report by Forrester Research predicted that by 2019, some one-quarter of all job tasks will be off-loaded to software robots, physical robots, or customer self-service automation.

A more recent survey by Boston Consulting Group recently found that 44% of U.S. manufacturers plan to install autonomous robots and other automation systems within the next five years.

A January 2017 report by McKinsey & Company found that 45%–47% of job activities in the U.S. could already be automated “by adopting currently demonstrated technologies.” The report also states that automation could be particularly high in certain sectors (see chart).

Global Forecasts

Economies in other countries may be even more susceptible to job loss from AI and robotics. The 2013 University of Oxford study found that “77% of all jobs in China are at risk of automation and 57% of all jobs across the 35-member Organization for Economic Co-Operation and Development.” Boston Consulting Group reports that 66% of German manufacturers plan to install autonomous robots and other automation systems within the next five years.

Among the findings of a recent study by the International Labour Organization, which examined five export-oriented industry sectors across the Association of Southeast Asian Nations:

> In the automotive and automobiles sector, over 60% of salaried workers in Indonesia, the Philippines, Thailand and Vietnam were at high risk from robotic automation.

> In the textile, clothing and footwear sectors, 88% of workers in Cambodia, 86% of workers in Vietnam and 64% in Indonesia face job disruption due to body-scanning tech and 3D printing.

A prediction by Forrester Research estimates that some 25% of all job tasks will be off-loaded to AI or robots by 2019.
Disruption in Specific Classes of Business

The timing of any potential disruption is difficult to estimate. The McKinsey report describes two scenarios: early adoption and late adoption. In their early adoption scenario, the disruption began in 2016. The late adoption scenario expects adoption beginning around 2030. Something close to the early scenario makes sense as adoption has already begun. Matthew Rendall, CEO of OTTO Motors, a division of Clearpath Robotics, made an important distinction, noting that “from 2000 to 2010 alone, 5.6 million jobs disappeared [in the U.S. and Canada]. Interestingly, though, only 13% of those jobs were lost due to international trade. The vast remainder, 85% of job losses, stemmed from ‘productivity growth’—another way of saying machines replacing human workers.”

According to a March 2017 report entitled, “Robots and Jobs: Evidence from U.S. Labor Markets” by the National Bureau of Economic Research, from 1990-2007 each robot added to the U.S. workplace led to 6.2 job losses. It’s important to note that the robotics looked at by this study may reflect the impact of earlier, less sophisticated robotics. The AI and robotics being deployed in 2017 may actually replace a greater number of workers than what’s reflected in this study.

Other examples supporting the early adoption scenario include the following sectors:

Automated Vehicles

Job losses arising from automated vehicles are perhaps the most frequently discussed topic in the press. While 10 years ago many people believed that driverless vehicles were nothing but a pipe dream, today many auto and truck manufacturers are pushing to have fully automated vehicles for sale by 2020 or shortly thereafter. A few companies can already install driverless technology in existing cars and trucks. Estimates are that more than 3 million truck and public livery driving jobs could be eliminated in the U.S. by these advances.

FedEx, for example, is investing in AI as well as in autonomous trucks and smaller autonomous vehicles. FedEx has partnered with Daimler and Volvo on driverless technology. Starship Technologies has already developed cooler-sized delivery robots that drive themselves at speeds up to 10 miles per hour on sidewalks. The delivery robots, which can carry up to 50 pounds of goods, are undergoing trials in several cities including London and Washington D.C.

Warehousing

- Amazon already has 45,000 robots working in 20 of its warehouses—a 50% increase over the previous year.
- IAM Robotics is engaged in a pilot program using their robots at Rochester Drug Cooperative warehouses. Rochester is one of the largest healthcare distributors in the U.C.
- Target is using robots made by Symbiotic LLC in one of its California distribution centers. The Wall Street Journal reported that these “autonomous robots that can travel untethered among storage racks in a distribution center. They can move up and down aisles to stack and retrieve cases. They coordinate with more conventional robots that perform simpler tasks.”
- Robots at Quiet Logistics, an e-commerce “fulfillment provider” (i.e., warehouse), expects to see an 800% increase in productivity due to the addition of robots.
- One market intelligence firm’s recent report stated that warehousing and logistics robot unit shipments will increase globally by more than 15 times over the next few years—from some 40,000 in 2016 to 620,000 units annually by 2021.

For more on the potential for eliminating the need for small business warehouses, and warehouse-related jobs, see box at end: “Other Technological Innovations–3D Printers and Drones.”

Agriculture

- Several companies have developed prototypes or are bringing driverless tractors to market (e.g., CNH Industrial, Kinze). A 120-acre fruit and vegetable farm in Michigan purchased a $132,000 machine that harvests three times as many apples per hour than farm laborers, allowing them to reduce the number of workers.

> Other Technological Innovations–3D Printers and Drones.”
A California vineyard added mechanical leaf pullers to automated harvesters, allowing the owner to reduce his workforce for harvesting from 300 to 15.26

A UK family carrot farm, which produces 70,000 tons of carrots annually, recently replaced 22 workers with a carrot-grading machine. The manufacturer of an agricultural robot, which was designed to weed in between crops, claims it can replace 30 farm laborers.27

Another agricultural robot manufacturer has created the “Lettuce Bot,” which is reportedly capable of thinning 5,000 plants per minute with quarter-inch spacing while running at four miles per hour.28

Construction/Mining
> Mining firms already employ driverless earthmovers and heavy driverless trucks. Several companies (e.g., Caterpillar, Komatsu) are now selling driverless bulldozers.

> Fastbrick Robotics, an Australian firm, has reportedly created a machine that lays 1,000 bricks per hour and can build the shell of a house made of 15,000 bricks in two days with only one or two human contractors.29

> A host of demolition robots is now available that can replace human contractors in some of the most dangerous work conditions.

Food Sector
> Amazon has opened a grocery store in San Francisco, called Amazon Go, with no cashiers and no checkout. Customers just walk out the door with their groceries and are charged via a phone app.30

> Momentum Machines reportedly has created a fully autonomous robotic hamburger maker that can make 400 made-to-order burgers per hour. “The robot can slice toppings, grill a patty and assemble and bag the burger without any help from humans.”31

> Robotic coffee baristas have begun operations in coffee kiosks in California and Hong Kong. The robots reportedly make and serve the coffee, cappuccinos, lattes, etc. within seconds of an order being placed.32

Manufacturing
> Nike reportedly adopted robotics that resulted in increased profits, the elimination of 106,000 contract workers and closure of 125 of its least efficient factories.33

> A Chinese mobile phone manufacturer installed robotics, allowing the company to reduce the number of workers at the facility from 650 employees to 60 and increase production 250%.34

> A Chinese maker of smart metering and smart power distribution equipment has installed robotics, resulting in a 45% improvement in productivity and a 25% decrease in operational costs. Workers who were previously on the assembly line were retrained for other “value-added positions.”35 In addition, the product defect rate dropped by over 50%.

White Collar Jobs
Certain white collar jobs will also be affected by the adoption of AI and robotics.

> Automation is already being used in some enterprises to write certain news/sports stories and sift through legal documents many times faster than paralegals.

> The Healthcare sector is seeing a rising demand for surgical, rehabilitation and hospital logistics robots.36

> Robots have also begun to show up in hotels, shopping malls and retail stores. In September 2016 Walmart announced it would lay off some 7,000 accounting and bookkeeping positions as they will be replaced by an automated cash management system.37 According to a recent article in WIRED, “More than 2 million people were employed as accountants, bookkeepers, and auditors in 2015. Until now, these types of information-oriented professions have resisted automation because they require managing unstructured data emanating from the real world, making judgments, and dealing with actual people. What’s different now, however, is that artificial intelligence’s perceptive capabilities have improved. Machines
can now handle images, sounds, and text in a way that enables them to ingest and analyze data at high volume, without making costly mistakes”—and putting these jobs at risk.38

> Scientists and doctors are also using AI to read X-rays, “analyze gene mutations, make better use of scientific studies, and enhance doctors’ clinical knowledge beyond their first-hand experience.”39 AI is also being used to identify diabetic retinopathy in patients and study traumatic brain injuries.

> Wealth management firms are adopting AI, too, which may threaten thousands of brokerage jobs. According to a recent study by Spectrem Group, “Nearly one in three investors says these machines are superior at picking stocks and lessen their risk, and almost as many say the machines are better at selecting investments for retirement than human brokers.”40

> By one estimate, financial services firms employing AI “could cut costs by up to 75%. Not only that, but they would gain a competitive advantage by being faster and more accurate than firms that still use people for the same tasks.”41

> Even technology companies aren’t immune. “According to reports, automation replaced 17,000 ‘roles’ in back office processing at Accenture, a professional services and tech firm over the past year and a half. Thankfully, in this case, no jobs were lost. According to Accenture, automation eliminated menial work, allowing the company’s workforce to do more productive work on behalf of the company.”42

Impact for Insurers


> As some robotics aren’t cheap, property values for farms and other enterprises adopting robotics will increase as they purchase expensive robotic equipment (as shown above) to replace workers. That said, as we’ve seen, the cost of new technology tends to drop quickly. Think flat screen TVs, which used to sell for thousands of dollars and which you can now purchase for about $142, or the Lidar that is going into driverless vehicles that used to cost $75,000 and is soon expected to cost less than $100.

> As automation reduces the number of contractors at various job sites, will rating via payroll still adequately reflect the exposure?

> With fewer workers, maybe fewer occupational injuries will impact Workers’ Compensation results, but there will also be less premium volume. As robotics are perhaps still best at repetitive tasks, will employers see less repetitive stress-type injuries but perhaps more injuries arising from people working in close proximity to mobile robotics?

> With automation increasing productivity, will Business Interruption claims and costs potentially increase?

What about product liability arising from robots gone awry? Many companies’ manufacturing robots are not domiciled in the U.S. China is pushing to become the largest producer of robotics.43 Thus product liability may lie with the importers, which are often the companies adopting the robots. Manufacturing of robots could yet become a growing class of business in the U.S. Time will tell.

Given the current cost of AI and robotics, it could be that larger firms (e.g., large contracting firms, corporate farms, large distribution centers) will be among the early adopters of this technology, but innovation will trickle down to smaller enterprises. Will those who don’t or can’t automate be undercut by those that do not have to pay for the salaries, benefits, taxes, etc. associated with human employees?

Will this same scenario translate to the Property/Casualty industry, where insurers providing coverage for larger risks may see the impacts of AI and/or robotics first, and where smaller carriers may perhaps have more time to adjust?

One more way insurers could be affected: Insurers may use AI to improve efficiency and/or reduce staff. According to Sam Friedman, insurance research leader with Deloitte’s Center for Financial Services in New York, “[O]ne major initiative [among insurers] drawing attention is the potential for robotic process automation to eliminate a lot of the keystrokes, clicks, and calculations now performed by a variety of clerical and analytical personnel...[W]e are also likely to see the integration of more sophisticated virtual assistants to support and in some cases perhaps supplant live staff in sales, claims administration, and routine customer service.”44

Carrier Management reported that a Japanese insurance company has recently replaced 34 positions—roughly 30% of its claims staff—with artificial intelligence to “make the process of reading medical certificates more efficient.”45 The staff cuts are expected to save the company $1.2 million per year.
Other Technological Innovations—3D Printers and Drones

In addition to AI and robotics, other technological innovations are having an impact on various occupations in many classes of business. Two that jump to mind are 3D printers (a.k.a. additive manufacturing) and drones.

In January 2016 it was reported that a Chinese firm used a large 3D printer to build a 4,305-square-foot home in 45 days, with about half the number of human contractors as would normally be on the job. Another Chinese company reportedly used a large 3D printer to construct a six-story apartment building.51 Many classes of business are using 3D printers of various sizes and capabilities, and they are using a growing list of printing materials to make prototypes, final products and component parts. In 2013 the Bloomberg Editorial Board declared, “For a small business, a 3D printer can eliminate excess production and the need for warehousing, and diminish the costs of distribution.”52 Eliminating the need for warehouses inevitably eliminates warehouse jobs. Diminished distribution costs may also reflect a reduced need for drivers.

Drones are replacing humans for certain tasks, including inspections of rail lines, pipelines, bridges and roofs. Other applications range from police surveillance and search and rescue operations to last mile package deliveries, which convenience store 7-Eleven has been testing in the U.S. since July 2013 and UPS has been testing since September 2016.53 Other examples of how drones are being employed:

> One Virginia-based power utility is using drones in lieu of having workers climb utility poles or scaffolding. The company has reportedly eliminated some “15,000 hours of ‘hazardous work’ in the 10 counties where it has deployed drones since 2014.”54

> Agricultural drones are already being used on farms for such tasks as pest control, monitoring crop health, tracking herds and aiding with safety and security.

In the UK, Zurich Group has a project underway that uses artificial intelligence to review medical reports for evaluating personal injury claims. This has reportedly reduced the review time for 10-100 page documents from 58 minutes all the way down to five seconds. “This one project is expected to free up 39,000 hours of claim handler capacity per year, saving $5 million annually.”46 Based on an eight-hour day, that’s a savings of 4,875 days per year. Doesn’t that sound like Zurich may be able to reduce staff?

According to the Oxford University study previously mentioned, “insurance underwriter” is among the occupations most likely to be automated.47 Similarly, the 2017 McKinsey report maintains that “about 50% of the overall time of the workforce in finance and insurance is devoted to collecting and processing data, where the potential for automation is high. Insurance sales agents spend considerable time gathering customer or product information, as do underwriters on verifying the accuracy of records. As a result, the financial and insurance sector has the potential to automate activities taking up 43% of its workers’ time.”48

On a more positive note for underwriters, as artificial intelligence begins to take on such tasks as the gathering of customer or product information and verifying the accuracy of records and perhaps insurance applications, underwriters will be freed to spend more time on other aspects of their job.

In February 2017 it was reported that InsureTech startup Hippo partnered with AI developer Elafiris to create a virtual agent chatbot. The virtual insurance agent will be used to reduce wait times when customers are filing a claim or purchasing an add-on product, and may even deliver instant coverage quotes.49

Concluding Thoughts for Insurers

On the one hand, MIT economist Andrew McAfee warns that “Anyone making confident predictions about anything having to do with the future of artificial intelligence is either kidding you or kidding themselves.”50 However, given the breadth and potential pace of change, commercial carriers may wish to give these coming changes some thought.

> Will AI and/or robotics improve risk? Shift risk?

> In which lines, and for which classes?
Will premium potentially increase or decrease?

If so, for which classes?

At Gen Re we are preparing for the economic shift brought about by robotics and artificial intelligence. This will impact book composition, and we are monitoring those classes of business that might be impacted first.

Contact us if you have questions about this, or any of the other emerging exposures that may impact the Property/Casualty insurance sector.

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About the Author

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Endnotes


8. Id. at Note 5.


10. Business Insider, Dec. 24, 2016, “Nobel Economist: I don’t think globalisation is anywhere near the threat that robots are.”

11. Id. at Note 8.


22. Business Insider, March 2, 2016, “7 companies that are replacing human jobs with robots.”


26. Ibid.

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