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ARTIFICIAL INTELLIGENCE

# OK computer: why the machine age still needs humans

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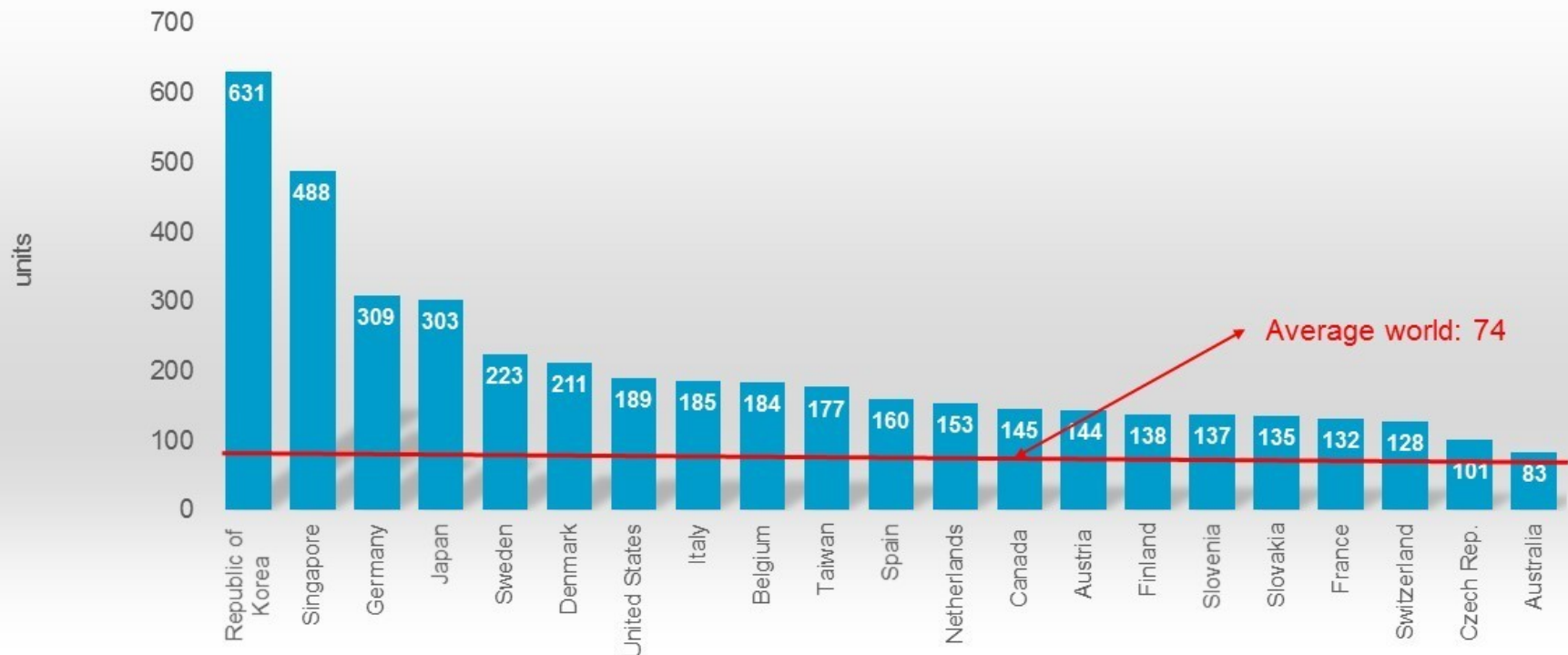
moved from a part-time time associate on the third shift to a time supervisor, where he now oversees 33 general assembly workers. Occasionally, one of his workers will come to him with an article about a nearby Indiana plant that plans full automation, and ask Tony if robots will take their jobs as well.

Fortunately, Tony knows the numbers. The [International Federation of Robotics](#) projects ~250,000 industrial robots will be deployed globally every year. Economists from the [National Bureau of Economic Research](#) estimate that one robot displaces 5.6 jobs. That adds up to 1.5 million jobs lost to robots globally. Annually.

And that would be a scary number, except Tony knows the numbers that the headlines don't report nearly as often: There are at least 345 million people employed on factory floors worldwide (of which 13 million are in the US), according to the [Bureau of Labor Statistics](#). The annual displacement rate is less than half a per cent!

Robotics

Number of installed industrial robots per 10,000 employees in the manufacturing industry 2016



Source: World Robotics 2017

Beyond the numbers, Tony also knows the reality on the factory floor. He's seen the sporadic advances in robot technology over the years, particularly the slow pace of developing "end effectors" that can approach the flexibility and dexterity of the human hand, and the absence of powerful robot motion-programming environments that can speed up getting the robots to do what they are really good at doing. He's been on lines

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consumer market.

In a factory full of robots, a product changeover can take months, as high-priced, hard-to-find roboticists are required to reprogram every machine – even if a simulation package was used to generate potential paths. In direct contrast, line associates can switch tasks with little training, so a product changeover can happen overnight. And in this market, the demand is for higher product variability and more frequent, rapid changeover.

Machines are great for highly repetitive, simple tasks that have low variability. They're especially well suited to roles that would otherwise pose a threat to human safety. But for the [majority of factory jobs, humans still perform best](#). So Tony can reassure his line workers that until robots can think, act and adapt on their own – something that won't happen in our lifetimes – their jobs in general assembly are safe.

## When bits meet atoms

Automation stealing jobs has been a key talking point in the media since well before the Terminator lowered himself into molten metal to prevent the advent of Skynet. And in some instances, automation will displace jobs: It's relatively easy to automate jobs where bits meet bits. For example, paralegals search for information online, add context to it and summarize it for a lawyer's assessment. The input and output are both electronic, so that role is easier to automate than when a bit meets an atom – something physical – like in manufacturing.

That's why manufacturing is so primed for AI: It provides an opportunity to implement the new tech in a way that augments jobs, rather than replaces them. And in doing so, it follows one of the key principles of lean manufacturing, a proven practice that's effective at increasing productivity and improving quality in the factory:

## Why focus on machines instead of people?

It's simple: Because machines are much easier to measure. They produce data and communicate with each other efficiently. For example, it's relatively simple to get outputs on efficiency, accuracy and precision from an industrial 3-D printer. Overall Equipment Effectiveness measurements on various machines on the factory floor are easily available.

Try doing that with people. The data to help understand [how well humans are performing simply doesn't exist](#). The best manufacturers have to work with is a tiny sample set gathered with a stopwatch and clipboard while observing a line on the floor. Too many skilled industrial engineers, who were educated and trained to make key operations decisions that improve plant metrics, are spending time gathering this data.

Working with another World Economic Forum partner, A.T. Kearney, we found that more than a third of these engineers' working day is spent on time and motion studies, which are inefficient, inaccurate, biased and frankly, boring. Industrial engineers didn't sign up to be big brother; they want to make improvements and influence business's bottom lines.

## Technology can improve human effectiveness

Early in my career, with General Motors, I led the GM team that developed the world's first collaborative robots (or cobots). They've since made their way into the factory in greater volumes, not because they're taking the place of humans, but because they make excellent human co-workers. When working with cobots, the human does the cognition while the machine provides the muscle. With AI solutions, like Drishti, there's a reversal of roles: The

There are plenty of examples of humans being augmented by technology in our daily lives. Consider Waze, the navigation app. I have a tendency to zone out while I'm driving, and sometimes I miss my turn. Luckily, Waze is there to get me back on track by recalculating the route and moving me toward my destination. It doesn't do the job for me – Waze doesn't drive the car, and I still have the ability to override its recommendations. But working together, I'm much better at getting to my destination than left to my own devices.

The same is true for an early example of machines augmenting humans: spellcheck. I write a lot of emails and often misspell words. The Jesuits who taught me would be upset! But, luckily for me, spellcheck has my back. The red squiggly line nudges me: "Ahem, you may want to revisit this word." It doesn't change the word for me, but it gives me a chance to right the error before I hit send. No one needs to know that I'm not a perfect speller!

## **Driving a cultural shift**

The imperative for humans and machines working together is clear. That doesn't mean the constant media hype about robot overlords doesn't have an impact – workers hearing about their jobs being displaced on a regular basis may still have reservations about machine co-workers.

So manufacturers need to facilitate a cultural shift toward the "human + machine" mindset. There are a few ways that organizations can drive this change, to the benefit of their workers:

- **Education:** Machines introduce change. In some cases, they introduce new and greater volumes of data than workers are used to. Educating workers on how to interpret and apply the data to their jobs is crucial to acceptance.

solutions like DMSM give workers back 50%+ more time in their day. Helping them use that time for higher value activities removes fear about the excess time and turns it into a growth opportunity.

● **Appreciation:** The best machines aren't very useful without context, and humans bring to the equation what machines can't: experience, context and deep domain knowledge. Expressing appreciation and need for these skills helps alleviate concerns from long-timers.

● **Focus:** Employees are more willing to accept change when they see technology that focuses on solving process problems rather than calling them out on every mistake. By shifting the conversation from "How can we make Jim work faster?" to "How can we improve this station so the entire line functions more efficiently?" workers feel like they are a part of the solution, not being targeted as the problem. Especially when they see that making the line work more efficiently helps protect their jobs.

It's easy to get bogged down in the idea that we'll all be jobless in a few years, and machines will run the planet. Particularly in manufacturing, the hype all points to massive layoffs as a result of automation.

But the reality doesn't measure up to the fiction: In truth, machines are helping humans by extending their natural potential. They're making humans more efficient, accurate and error-free than ever before. The winning equation is human + machine for the foreseeable future.

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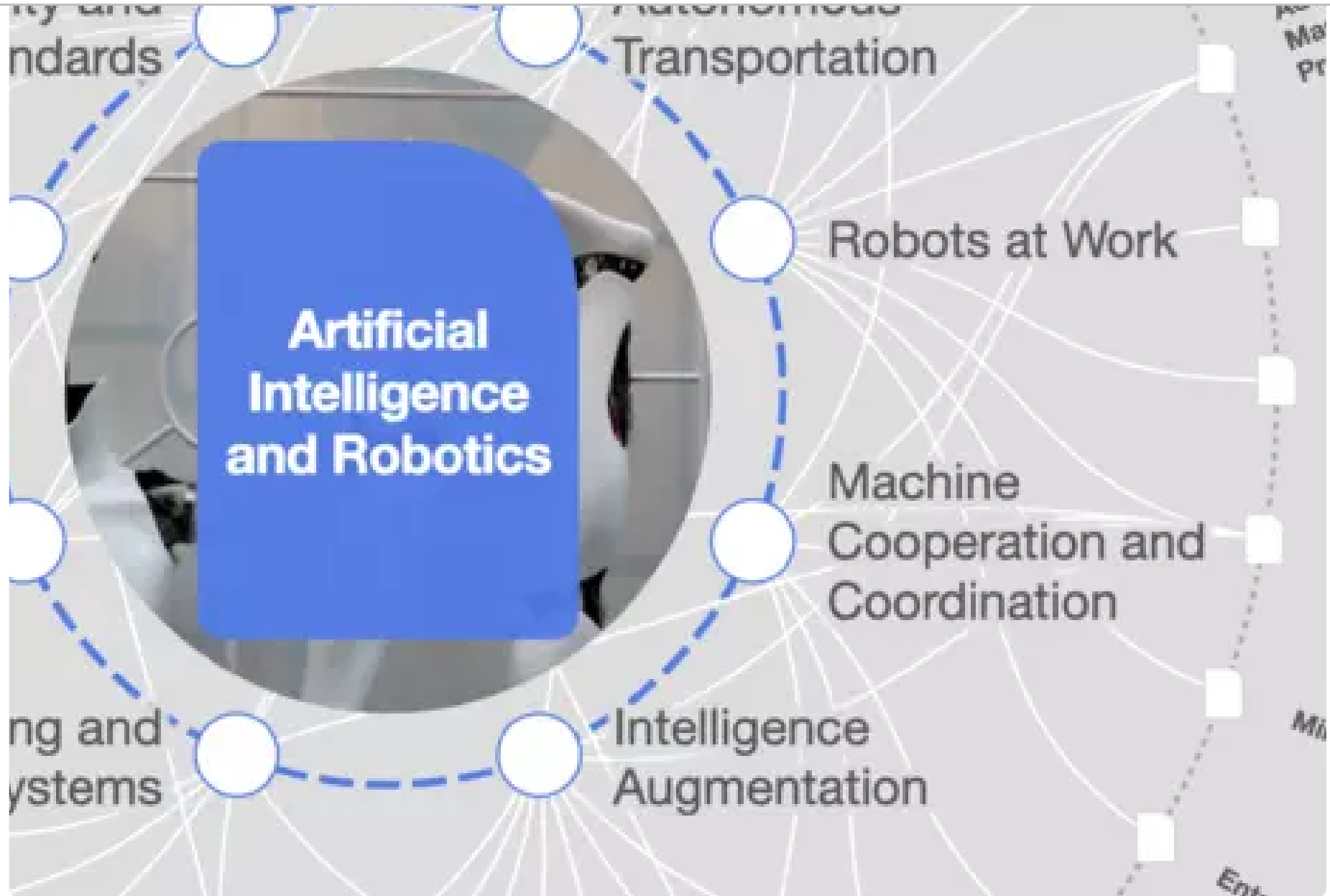
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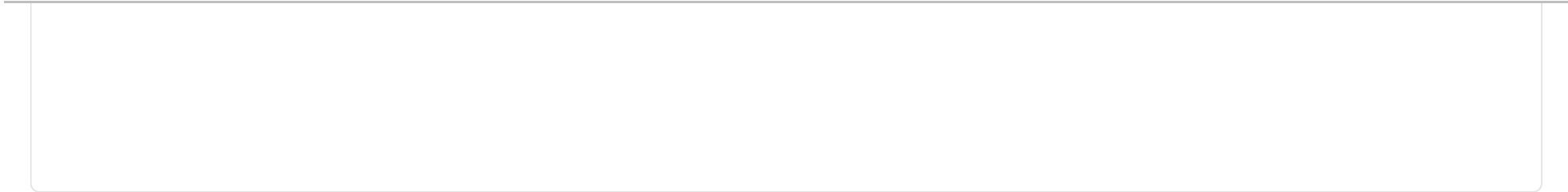
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