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How many of your daily tasks could be automated?

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Organizations that manage the transition to a more highly automated business model can build strong advantages, write Michael Chui, James Manyika, and Mehdi Miremadi in *Harvard Business Review*.

A sea of ink and hours of video have been dedicated to the looming battle between humans and machines, often concluding that the machines win and human workers lose. It is a nearly irresistible narrative, which has been captured in books such as Martin Ford's *Rise of the Robots* and *The Second Machine Age*, by Erik Brynjolfsson and Andrew McAfee. It has also has inspired scholarship by academics such as Carl Benedikt Frey and Michael Osborne of Oxford University, who estimate that 47% of occupations in the United States could be automated within 20 years, and David Autor of MIT, who argues that the ability of machines to take on human jobs is vastly overstated.

At McKinsey, we are conducting our own research into the impact of automation on jobs and organizations and recently published a brief

paper previewing some of our findings. The most important insight has been that it is far more useful to think about the activities that can be automated rather than entire occupations—handing over discrete bits to machines, like pulling out the most useful data from an analyst's report, generating a report on the latest sales figures, or moving products around a warehouse. Smart machines have already demonstrated the ability to see patterns in information, understand what humans are saying (answering a question like "show me where sales rose the most last week"), and manipulate physical objects. Once these capabilities are applied to various work activities, few occupations or organizations will remain untouched.

Let's look at what happens if we approach automation at the level of activities, rather than occupations. Take, for example, the role of a marketing manager or executive in a consumer products company. A marketing manager is well educated and well compensated—he or she plays a critical role in driving sales by tailoring corporate strategies to specific products and markets. Today, this involves several time-consuming activities such as reviewing data from the field to inform pricing decisions and generating estimates of material costs for production. These activities can be automated with currently demonstrated technology, completing the analysis more quickly and accurately than the manager ever could. Further, when big data analytics and artificial intelligence are combined, computers can "learn" how to create offers and content that are customized for thousands of individual consumers—something no marketing manager could do alone.

We estimate that activities that account for 10% to 15% of the marketing executive's time can be automated by adapting currently demonstrated technology. And here's where the possibilities—and the challenges for organizations—get really interesting: how can the time freed up by off-loading activities to machines be used most effectively? When you're bringing in automation you need to think

about two kinds of payoff—returns you get by using machines rather than labor for activities (investments in automation can generate benefits worth three to ten times the cost, we estimate, much of it from better performance rather than reductions in labor costs), plus the value derived from activities that employees carry out in the time that formerly used for work that is now automated. In the case of the marketing manager, this could mean more time to work on new product ideas, supervise direct reports, collaborate with managers in other functional areas, or develop new strategies.

To pinpoint the opportunities, we have looked at about 2,000 activities that are performed in various occupations across the U.S. economy. We find that, from a technical standpoint, work that occupies 45% of employee time could be automated by adapting currently available or demonstrated technology. However, less than 5% of jobs could be fully automated—that is, every activity could be handled by a machine.We estimate, that for 60% of existing US jobs, 30% or more of current work activities can be automated by with available or announced technologies. In other words, for the majority of US jobs, a day and a half's worth of activities in each work week can be automated. A key finding in our research is the degree to which machines can perform work of highly skilled employees, such as the marketing manager described above, as well as the routine work of low-skill employees. This includes a surprising number of activities associated with high-level positions, including those of C-suite executives. To see where your job stands, find it on this newly published interactive graphic that displays the estimated percentage of time associated with activities that could be automated for 750+ US occupations.

The over-arching implication from our research into automating tasks is that roles will be redesigned and organizations will have to become very good at understanding where machines can do a better job, where humans have the edge, and how to reinvent processes to

make the most of both types of talent. The largest benefits of information technology accrue to organizations that analyze their processes carefully to determine how smart machines can enhance and transform them—rather than organizations that simply automate old activities. This is a lesson that it took us a long time to learn in earlier IT revolutions and that bears repeating.

Organizations that manage the transition to a more highly automated business model can build strong advantages. By maximizing performance of machines and employees, companies can simultaneously become more efficient and more innovative, raising both top- and bottom-line performance. Automation also enables massively scaled organizations that can grow rapidly yet remain agile and responsive. The consequences of errors could also grow, which means that companies will need to be very adept at modeling and experimentation—again relying on smart machines and access to critical data. In the age of the highly automated organization, top leaders will need to develop a rich understanding of digital technology and find talent that can manage in a human/machine workforce. Some of those managers, by the way, may be machines.

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