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COMMENTARY

# Robots Will Save the Economy

The problem today is too little technology. Physical industries haven't kept up.



A student assembles a 3-D printed prosthetic hand in Tyler, Texas, March 21. PHOTO: CHELSEA PURGAHN/ASSOCIATED PRESS

*By Bret Swanson and Michael Mandel*

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Some anxious forecasters project that robotics, automation and artificial intelligence will soon devastate the job market. Yet others predict a productivity fizzle. The Congressional Budget Office, for instance, expects labor productivity to grow at the snail's pace of 1.3% a year over the next decade, well below the historical average.

There's reason to reject both of these dystopian scenarios. Innovation isn't a zero-sum game. The problem for most workers isn't too much technology but too little. What America needs is more computers, mobile broadband, cloud services, software tools, sensor networks, 3-D printing, augmented reality, artificial intelligence and, yes, robots.

For the sake of explanation, let's separate the economy into two categories. In digital industries—technology, communications, media, software, finance and professional services—productivity grew 2.7% annually over the past 15 years, according to the findings of our report, “The Coming Productivity Boom,” released in March. The slowdown is concentrated in physical industries—health care, transportation, education, manufacturing, retail—where productivity grew a mere 0.7% annually over the same period.

Digital industries have also experienced stronger job growth. Since the peak of the last business cycle in December 2007, hours worked in the digital category rose 9.6%,

compared with 5.6% on the physical side. If health care is excluded, hours worked in physical jobs rose only 3%.

What is holding the physical industries back? It is no coincidence that they are heavily regulated, making them expensive to operate in and resistant to experimentation. The digital economy, on the other hand, has enjoyed a relatively free hand to invest and innovate, delivering spectacular and inexpensive products and services all over the world.

But more important, partially due to regulation, physical industries have not deployed information technology to the same extent that digital industries have. The physical category makes up 75% of private-sector employment and 70% of output—but only 30% of all IT investments. This is also because it's taken longer to figure out how to apply info-tech to physical processes like transportation and mining, compared with inherently information-based sectors like finance and media.

Information technology not only makes existing processes more efficient, it empowers entirely new business models, products and platforms. The physical category's "information gap" is a drag on growth and helps explain the productivity paradox: Many workers seem not to have benefited from apparent rapid technological advance.

Fortunately, many physical industries are poised for dramatic transformations into digital industries—if we let them.

The shale oil and gas boom is an IT story, since 3-D modeling of underground formations enables horizontal drilling and hydraulic fracturing in the right places. This shift to digitized mining has not destroyed jobs. Rather, hours worked in oil and gas rose 17% since 2007.

Or consider the digitization of retail and distribution. E-commerce has added 397,000 jobs since December 2007, which more than makes up for the 76,000 full-time-equivalent jobs lost at bricks-and-mortar stores.

What about the automation of bus and truck driving, the new employment scare story? Because robo-trucks won't have to pull over for naps or bathroom breaks, they'll be able to put on many more miles. Thus, they will require many more highly trained mechanics, who on average earn substantially more than truck drivers.

Manufacturing is another case where job losses more often have resulted from too little technology. Outside of computer and electronics manufacturing, productivity has mostly stagnated, and the most unproductive factories are the most vulnerable to low-wage foreign competition.

Perhaps no industry needs a productivity revolution more than health care. But one appears to be on the way. Soon sensors on and in our bodies may help patients communicate with doctors and nurses, reduce office visits, and flood databases with information needed to better diagnose, prevent, and cure disease. With computational bioscience, scientists will design new therapies in the cloud, tailoring them for individuals and slashing development costs. Robots will assist in more surgeries, body imaging will get better and cheaper, and 3-D printed pills and artificial organs will be added to the doctor's tool kit.

Americans would benefit significantly from unlocking the physical economy to leverage technology and encourage breakthrough business models. If U.S. productivity growth in the physical sector were to return merely to its rate of the late-1990s, U.S. output would

be \$2.7 trillion larger in 2031 (in 2016 dollars). Closing the information gap should thus be job one.

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