









distribution as separate services running on a packet-switched network, enabling even small factories to tap into new technology and best practices.

This combination of digitized distribution, digitized production, and new manufacturing platforms—aka the “Internet of Goods”—will allow the creation of new business models for manufacturing capable of eF(e)61nw thmarackss producties. Tpresult 27wilbe 6(a ipack)18unnind netwole of a a

While manufacturing reS(emains a very)10( )]TJEMCT/S











This next wave of manufacturing is usually called Industry 4.0, but it is more descriptive to call it the Internet of Goods.<sup>5</sup> The result: anticipate a thickening network of small-batch and custom factories taking hold around the country. The new business models will give a sustained competitive advantage against foreign













But that is not the whole story. If we look at “multifactor productivity,” manufacturing’s problems go back much further. Multifactor productivity takes into account the usage of purchased services, capital, and energy.

Take the machinery industry, which includes everything from agriculture88 Bo818uction and minthine machinery,

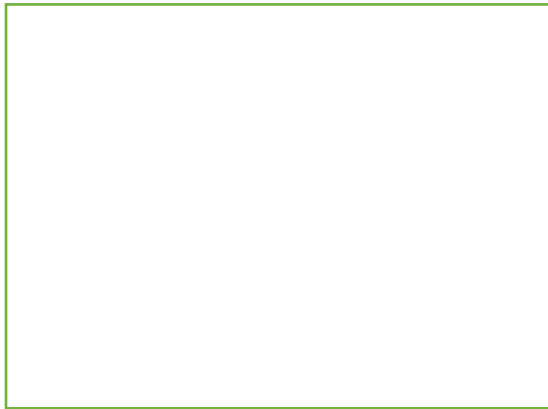
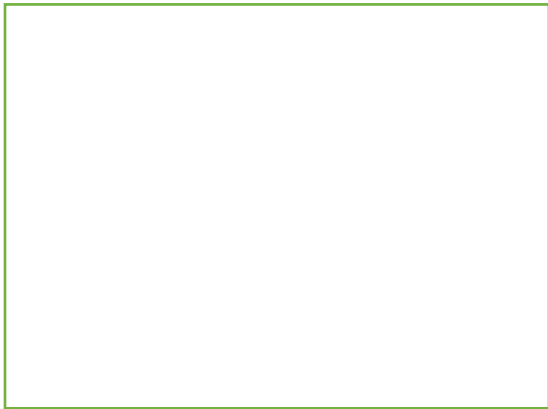
The next question, of course, is why the information revolution has not generated a productivity bonanza thus far for manufacturers. We first observe that manufacturers have far behind in the digitization race. There is a large disparity in investment in IT equipment and software for manufacturing and the tech/telecom sector. For this analysis, the manufacturing sector omits computer and electronic manufacturing, which is included in the tech/telecom sector. We use data from the BEA, which tracks software investment and tech equipment investment by industry.



By contrast, the producer price of U.S. finished goods (except energy) has risen roughly 30% over this stretch. The implication, if we take these numbers seriously, is that the price gap between U.S.-made goods and Chinese imports has been widening. This is consistent with the fact that







The use of cloud computing to build a **manufacturing platform** that treats design, production, sales, and







anywhere open. The system keeps track of their location  
much like modern random-access digital memory systems  
keep track of the location of information. Moreover, it allows



And the range of materials that can be 3D printed is











## OBSTACLES

Several issues may impede the shift to the Internet of Goods. Cost is one potential obstacle. A survey by McKinsey suggested that companies expect about 40-50 percent of the

Just as the internet would not be possible without fast connections, the Internet of Goods would not be possible without digital distribution.

It is suggested in this report that a new vision for digitizing manufacturing requires the combination of digitized distribution, digitized production, and new types of manufacturing platforms. The result will be a new geography of manufacturing. Many factories will make customized or small batches and serve regional rather than national or global markets. Production facilities will cluster with ecommerce fulfillment centers to make manufacturing/distribution hubs.

As the Internet of Goods takes hold, three factors will play a pivotal role in determining the success of the new geography of manufacturing:

1. Is the local workforce prepared for the new model of digitized manufacturing and distribution?
2. Is there support available for local entrepreneurs to start new digitized manufacturing businesses, or digitize and expand existing ones?
3. Is the local regulatory environment conducive to new manufacturing facilities?

Each of these three factors can be affected by state and local policy. Let's examine each of these in turn.

means there will be a role for states and localities to support manufacturing entrepreneurship.

This support can come in two forms. First, capital in the form of loans or grants should be made available to local manufacturing startups. Second, and perhaps equally important, potential entrepreneurs need a chance to experiment with the capabilities of the new technology. States that want to encourage manufacturing entrepreneurs should set up centers with the latest 3D printing and robotics equipment. That will give everyone an opportunity to get in











# Thank You to Our Underwriters





