The Moment For Industry

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The vision:

You already know that software is eating the world. But the revolution has only just begun.

So far, attention has been focused on the consumer Internet, where connected products have already transformed the way we live: from shopping to moving around town, from managing our home systems to organizing a holiday. The power of data and software has become obvious to us all. And its economic value has become clear, recognized in the valuation of the best companies operating in the consumer Internet space.

But now the spotlight is shifting to industry, because this is where the biggest transformation is taking place—and where the greatest value will be created over the coming decade.

Three years ago, we argued that the Industrial Internet would bring about a new industrial revolution. We estimated that if connected machines and advanced analytics could help make industry just 1% more efficient, the sheer scale of industrial operations across the globe would translate into substantial aggregate economic gains, valued in hundreds of billions of dollars. We stressed that we considered our "Power of 1%" to be a lower bound—the very least that we believed to be within reach.

Since then, we have developed and deployed a number of Industrial Internet applications across different sectors. These applications help wind farms produce more clean power; they help airplanes consume less fuel; they help doctors diagnose patients with more precision and fewer unnecessary tests.

These applications have improved performance substantially beyond 1 percent. We estimate that the solutions developed so far bring performance gains of 20% across our industries. These performance gains improve competitiveness and profitability for companies across sectors. And they will deliver a substantial economic gain in terms of stronger growth in jobs and incomes.

But we are just at the beginning. The challenge is to achieve speed and scale in using software to transform industry and infrastructure. To do this, we are set to follow a trail already blazed by the consumer Internet: leveraging the power of the app economy.

The industrial app economy

The consumer Internet has been powered by the exponential growth of app development over the past decade, creating an "app economy" that today is even larger than Hollywood. The number of developers doubled between 2013 and 2014, reaching 5.5 million. They created 2.6 million apps, for an estimated $300 billion in value. Vision Mobile projects that by 2017 there will be about 8 million developers and 4 million apps, for a total value of nearly $700 billion[1].

This app economy has unleashed more value for the consumer Internet, especially as mobile devices have come to play an increasingly important role. It has also given the consumer Internet scale, allowing it to spread quickly across the globe. South and East Asia together have as many developers as North America; other emerging regions, including CEE and CIS, MENA and SSA, and LatAm, also have a significant numbers of developers. The geographic spread of developer talent is important because it can accelerate the creation of apps tailored to the specific needs and conditions of different markets.

But the pace of software innovation is in turn dependent upon the speed at which apps can be developed and deployed at scale.

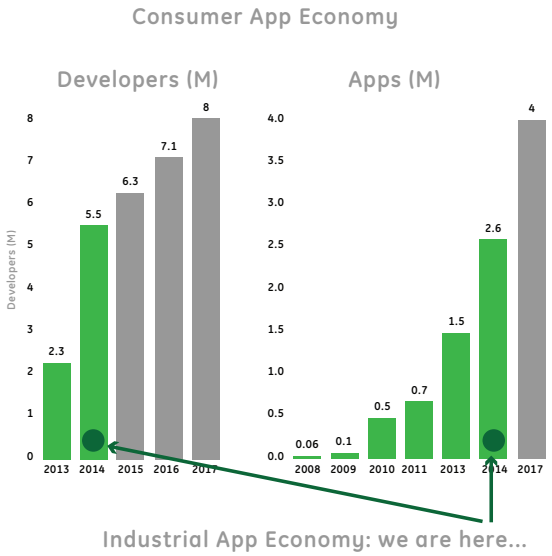
Platforms—like Google's Android or Apple's iOS operating systems—are a key component of this. As we argued last year[2], platforms are essential to accelerate the development of the apps and solutions that can unlock the full value of interconnected systems, and guarantee the high degree of interoperability necessary to scale both the solutions and the benefits.

We now have a platform for industry. GE's Predix has a set of software services that help developers quickly build apps for the Industrial Internet.

And just like the development of mobile applications and services is powering that revenue-rich consumer app economy, the rise of the Industrial Internet will be powered by the growth of an industrial app economy. The platform—in this case, Predix—is the foundation.

The industrial app economy is just getting started; the platform has just been launched. We estimate that there will be approximately 20,000 developers building on Predix in the next year. The industrial app economy is today where the consumer app economy was ten years ago.

[1]Vision Mobile (2014), "App Economy Forecasts 2014-2017".
[2]Annunziata, "The Value of Interconnectedness," GE White Paper, October 2014.



Source: Vision Mobile; GE

The consumer app economy has already reaped the low-hanging fruits. The industrial app economy is much further away from maturity and is poised to experience its phase of exponential growth over the next decade.

The industrial app economy will differ in some important respects from the consumer apps economy that we are already familiar with. Compared to the consumer sector, Industrial Internet apps will be more complex, robust and secure. They are aimed at monitoring and controlling the operation of complex industrial machinery, they need to be able to handle industrial-level quantities of data, and they need to satisfy the highest cyber security standards. And the vast majority of industrial app developers will therefore be professionals—unlike in the case of the consumer app economy, where about one-third of developers are classified as hobbyists[3].

But we can tell from the speed and scale of the growth of the consumer economy that the industrial app economy is going to be huge.

The same dynamics will be at play. A common platform will allow a large and fast-growing number of developers to contribute and will make it easier to deploy new applications in different industries and sectors. The fact that, in the industrial sector, all apps will drive improvements in the top line and bottom line of companies will create a powerful economic incentive for developers.

The value

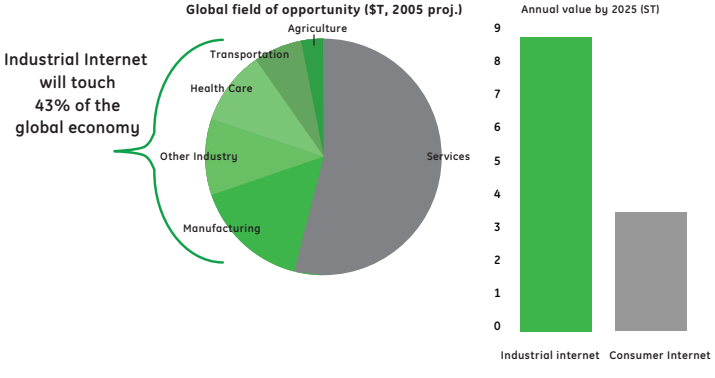
Enabled by Predix, the industrial app economy will give the Industrial Internet speed and scale. New digital solutions will be developed at an accelerating pace. Some will be of very broad applicability. Others will address pockets of inefficiency in specific countries and industries.

And the benefits will rapidly spread across the global economy. Advanced economies will be able to apply the new digital solutions to a larger base of industrial assets already in place. Emerging economies, on the other hand, will have a better chance to leapfrog older technologies with a faster pace of investment—the silver lining of having less capital in place is that you can more rapidly deploy new technologies. Emerging markets will also have a chance to use Industrial Internet solutions to bypass existing limitations in infrastructure and institutions—as mobile payment systems have rapidly taken hold in sub-Saharan Africa, bypassing the limited reach of traditional banking systems.

As we noted three years ago, the Industrial Internet can impact a huge share of the global economy, encompassing manufacturing, other industrial activities, transportation and healthcare. We estimate that by 2025, when the Industrial Internet will have reached a high degree of adoption, these sectors will account for about 43% of the global economy, or approximately $43 trillion.

Assuming that Industrial Internet solutions will continue to deliver at least the 20% performance gains that GE's solutions are today bringing across industries, they would translate into approximately $8.6 trillion in value on an annual basis.

The economic value of the Industrial Internet will then exceed substantially that of the consumer Internet. In a recent report, McKinsey estimates that the Internet of Things could create a total value of up to $11.1 trillion on an annual basis by 2025 and that about 70% of this would be captured by business-to-business solutions—leaving the value of the consumer Internet at about $3.5 trillion[4]. In other words, **the Industrial Internet will be worth more than twice the consumer Internet**[5].



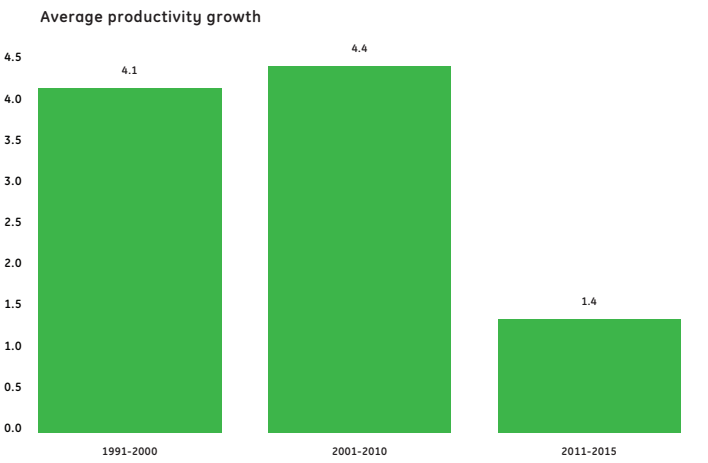
Source: GE; McKinsey Global Institute

[3]Vision Mobile, ibid.
[4]McKinsey Global Institute (2015), "The internet of things: mapping the value beyond the hype."
[5]Note that the McKinsey estimates include the so-called consumer surplus; that is, additional value that accrues to the consumer in terms of greater choice, better quality of products and services, and greater speed and convenience, but is not monetized.

Why will the value of the Industrial Internet dwarf that of the consumer Internet? After all, at least in advanced economies, we are used to thinking of consumption and services as accounting for the lion's share of the economy. There are two reasons why the Industrial Internet will create more value:

1. Most of the value created by Industrial Internet solutions is additive to what already exists in the economy. A power plant will generate more electricity. A hospital will treat more patients. An airline, reducing delays and cancellations, will transport more passengers. By contrast, the bulk of the value in the consumer app economy is in e-commerce, much of which has displaced existing brick and mortar retail activities.
2. Consumption accounts for the largest share of final demand in advanced economies, with investment and net export (the difference between exports and imports) accounting for a smaller fraction. But the Industrial Internet will power the production of a large and growing share of the goods and services that are ultimately consumed.

Industrial Internet innovations will thereby revitalize manufacturing. The manufacturing sector has recently suffered from sluggish productivity growth. In the U.S., productivity growth in the manufacturing sector averaged a meager 1.4% over the past five years – nearly three times lower than in the previous two decades.



Source: Bureau of Labor Statistics

Unsurprisingly, manufacturing companies have lagged behind the high performers of the tech and consumer Internet industry, with the latter enjoying much higher price/earnings multiples and stock market valuations.

This is about to change. The rapid spread of digital innovation will reboot manufacturing productivity growth through a wide range of efficiency-enhancing solutions. The new breed of digital-industrial companies will innovate and grow at a much faster speed.

The future

The Industrial Internet will bring about a profound transformation of the economy. It will blur the traditional distinction between manufacturing and services. Businesses are already rethinking the value they offer to their customers: no longer products, but efficiency, productivity, everything "as a service."

Together with advanced manufacturing, the Industrial Internet will redefine economies of scale, enabling microfactories and the democratization of manufacturing. Together with crowdsourcing and new collaboration tools, it will reshape the way we work and the relationship between employers and employees.

More work is needed to fully understand and more precisely quantify the impact of all these transformations. The estimates we developed above are based on the traditional classification of economic sectors rolling up into total GDP. The Industrial Internet is making that classification obsolete, and its impact will be felt beyond its traditional borders, delivering a greater impact. Indeed, the Industrial Internet is a key driver of the projected growth in the total number of interconnected "things," expected to reach some $50 billion by 2020[6].

As it transforms key infrastructures and services, improving the delivery of energy, transportation, healthcare, education and more, digital innovations will also have a multiplier effect on economic growth and human development—laying the basis for even greater outcomes for society.

The opportunities to generate this productivity are right in front of us. Industry is the engine of economic growth, touching close to one-half of global economic activity—and probably more; and the value created by Industrial Internet solutions is additive. The consumer Internet has so far dominated the stage. But within a decade, the Industrial Internet will be worth more than twice the consumer Internet, and a new breed of digital industrial companies will deliver faster innovation and growth than industry has ever seen before.

[6]Cisco and DHL Trend Report focused on the Internet of Things (IoT), April 2015
http://newsroom.cisco.com/press-release-content?articleId=1621819