Executive Summary

The Growth Game-Changer:
How the Industrial Internet of Things can drive progress and prosperity

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In the shift from an industrial to a digital economy, many countries are targeting the Industrial Internet of Things (IIoT) as a means to deliver faster growth. But without establishing the right enabling conditions, they will not fully capture the opportunity. To make this happen, countries need to understand their “national absorptive capacity” (NAC)—their ability to weave innovations into their economic and social fabric—and how that influences their ability to grow.

The IIoT has the potential to deliver trillions of dollars in economic growth in the coming decades. It can boost productivity, drive the emergence of new markets, and encourage innovation.

To understand what is at stake, we modeled the IIoT’s potential impact on the gross domestic product (GDP) of 20 developed and emerging economies that generate over three-quarters of the world’s economic output. Our analysis shows that, based on current policy and investment trends, the IIoT could add around US$10.6 trillion to the cumulative GDP of these economies over the next 15 years. In 2030, under these conditions, the IIoT could result in GDP being 1 percent higher than it otherwise would be (under trend forecast).

However, our analysis shows that the potential for growth could be even greater. By taking additional measures to improve their capacity to absorb IIoT technologies and increase IIoT investment, countries could generate up to an estimated US$3.6 trillion in additional value over and above the indication of current trends, for a total of US$14.2 trillion. For the countries we studied, this could lift real GDP by 1.5 percent in 2030 over trend projections.
What is the Industrial Internet of Things?

The Industrial Internet of Things is the industrial application of a network of physical objects, that contain embedded technology to communicate and sense or interact with their internal states or the external environment. In manufacturing, connected sensor networks already monitor logistics movements and machines such as mining equipment and entire utility plants, helping organizations reduce costs through more efficient operations. In agriculture, similar networks deployed across farmlands are improving the use of natural resources and contributing to better harvests. Our analysis also includes some consumer applications such as digital health and "connected lifestyle" products.

Figure 1: Cumulative GDP impact of IIoT (US$ trillion)

In the 20 countries we analyzed, current policy and investment trends in IIoT products and technologies point to cumulative real GDP contributions of US$10.6 trillion by 2030. With greater investment and the enactment of key measures to absorb IIoT technologies, that figure could rise to US$14.2 trillion.
The challenge of economic diffusion

Optimism regarding the IIoT’s potential to drive economic growth at the global level is relatively high. However, the prospect of growth becomes less certain at the national level, where some countries have historically outperformed others when it comes to capitalizing on the economic potential of new technologies.

The introduction of electric power in the industrialized world at the turn of the 20th century offers a clear example of this dynamic in action. While many countries stood at about the same technological starting line in this race, the US became the world leader in electrification. Why? Because it more rapidly embedded the new technology in the wider economy and altered production and organizational structures to take advantage of it.

Many governments today hope that the IIoT can have a similarly transformative effect on their economies. But such growth will only materialize if governments and businesses can create the right enabling conditions to cascade that technology across the wider economy. These enabling conditions are captured in a country’s NAC—a measure of its ability to turn a new technology to its economic advantage.
Creating the enabling conditions

Based on our research into previous eras of technological revolution and interviews with experts from the technology, economics and business disciplines, we have identified four pillars that underlie a country’s NAC. The impact and strength of the IIoT’s economic diffusion depend on the relative strength of these four pillars:

**Business commons**

The “business commons” describes the business climate and pool of resources on which companies can draw to carry out their operations. Key components of the business commons include an educated workforce, a reliable financial system, and a robust network of suppliers and distributors—all bounded by good governance policies and rule of law.

**Take-off factors**

“Take-off factors” help to transform a technological advance into usable applications, products and services beyond niche markets and players. The presence of hi-tech firms, the strength of the science, technology, engineering and mathematics (STEM) workforce, government support for R&D in IIoT technology, coupled with the degree of urbanization and the growth rate of the middle class, are all factors that will play a role in the IIoT’s “take-off.”

**Transfer factors**

“Transfer factors” enable a technology to become far more deeply ingrained in an economy—inducing wider changes in the behavior of businesses, consumers and society. Key transfer factors include the exchange of knowledge as well as shifts in social and company norms that make harnessing the new technologies possible.

**Innovation dynamo**

The “innovation dynamo” is when a technology produces self-sustaining innovation and development. Companies’ market strategies, the health of the research ecosystem and presence of technology clusters, as well as the strength of entrepreneurialism are all factors that contribute to the innovation dynamo.
Five ways to win

What will it take to succeed in an IIoT-driven economy? Every country must take specific actions based on its national absorptive capacity (NAC). In addition, there are some guiding principles that can help nations to get a head start in IIoT-led growth.

Play to a country’s strengths

In emerging markets with large agricultural sectors, the IIoT will look quite different than in a mature industrialized economy such as Germany or Japan. The former can make use of IIoT technology to monitor environmental conditions that improve crop yields, while the latter will likely want to find IIoT solutions that streamline manufacturing processes.

Create a chain reaction across industries

Building product-service ecosystems rather than one-off IIoT products will be a key growth area in the IIoT. As a result, policymakers need to encourage businesses to look beyond their own industries and build new partnerships that enable the creation of new products, services and business models.

Combat resource deficiencies

Deficiencies in skills, capital, and technology may confront policymakers trying to integrate the IIoT into their economies. Policy leaders can follow “make-or-buy” strategies to counter resource gaps. For example, governments can create incentives for investment in home-grown IIoT technology solutions. But it may be more expedient in some cases to encourage technology transfer via foreign direct investment in the country.

Join the dots to connect and collaborate

To spur innovation in the IIoT, governments can draw on their powerful networks of stakeholders (such as industry, academia and non-government organizations) to share ideas and leading practices, and identify areas of mutual interest for further research. Governments can also play a part in increasing collaboration and partnerships among global and large regional companies, small and medium enterprises, and start-ups.

Shorten the investment lag

While 79 percent of the business leaders we surveyed have developed strategies for the IIoT, just a little over one-third are investing in them. Business and policymakers can work to turn strategy into reality by promoting experimental, pilot and demonstration projects in IIoT applications.
For nations seeking breakthrough growth in the digital age, the advent of the IIoT could be a game-changer. But without the critical enabling conditions, that opportunity may not materialize. Nations can make the right start by understanding the pillars of national absorptive capacity (NAC) and how they can catalyze IIoT-led economic growth. Armed with such knowledge, they can set their economies on a better path for economic progress and prosperity.

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