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# Digital innovation in Europe: narrowing the gap

Innovation is essential for Europe's prosperity, given the continent's relatively high wage costs and low reliance on natural resources, and for decades, Europe has been an important driver of worldwide innovation. European companies still account for one-quarter of the global total of industrial R&D. Yet Europe's embrace of the digital technology revolution—one of the largest change factors in the world over the past 15 years and most likely also the next 15—is less forceful than it could be. Today, the continent is increasingly challenged by the new generation of disruptive technologies, including artificial intelligence (AI), where it risks falling behind both the United States and China.

Already in 2016, research by the McKinsey Global Institute found that European countries were capturing only 12 percent of their full digital potential (defined as weighted deployment of digital assets, labor, and practices across all sectors, compared with the most digitized sector). That was just two-thirds of the captured potential in the United States, which itself has considerable room to grow.

Large Western European companies are continuing to expand their use of early digital technologies. In banking and financial services, for example, European customers are among the most digitally connected in the world, in terms of mobile banking adoption and mobile banking usage. Nordic banks in particular are leading the way in moving to a cashless society. And the “open banking” movement started in the United Kingdom, under which third-party developers are able to build applications and services around a financial institution, is now copied across the globe.

At an aggregate level across all sectors, however, the share of fully digitized companies in Europe increased by less than 10 percent a year between 2010 and 2016. Moreover, in a digital-first world, in which new “superstar” companies are coming to the fore, Europe lacks the global platform companies that have propelled Chinese and American firms to dominance.

Europe's disadvantage in digital diffusion seems likely to spill over into AI. Early digital companies have been the first to develop strong positions in AI, yet only two European companies are in the worldwide digital top 30, and Europe is home to only 10 percent of the world's digital unicorns. Less than half of European firms have adopted one AI technology, with a majority of those still in the pilot stage.

Europe is taking some good steps

Europe can still narrow the digital and AI gap. It has a wealth of talent, with close to six million software developers—over one million more than in the United States. Its public-sector research remains a powerhouse. The number of AI startups has tripled in the past three years and is now relatively comparable to the figure for the United States on a per GDP basis. Early-stage startups are better financed than ever before. Investment in European tech is

at a record high, with \$23 billion invested last year, a five-year increase of 360 percent and an increase of 21 percent compared to 2017.

Investments need to increase—everywhere

To sustain its growth model over the long term, Europe will need to switch into a higher digital gear. Europe invests less than the United States in intangibles like software and databases, intellectual property, and economic competencies like organizational capital and training, which represent major factors for innovation capacity. It also must contend with a fragmentation challenge: Europe's ability to innovate is widely distributed among its member states. In the past decade, EU countries performing at lower levels and those performing at higher levels have not converged; innovation performance has even decreased in 10 out of the 28 EU members.

If Europe is able to develop and diffuse AI according to its current assets and digital position relative to the world, we have estimated that it could add some €2.7 trillion, or 20 percent, to its economic output, resulting in 1.4 percent compound annual growth through 2030. Such an impact would be roughly double that of other general-purpose technologies adopted by developed countries in the past.

To address the digital challenge and reap the potential benefits, Europe will need to focus on six priorities:

- Scale up. Overcoming fragmentation is only part of the scaling challenge. Europe will need to put an emphasis on finding and supporting managers able to take exciting potential and scale it up to world-beating business;
- Continue developing a vibrant ecosystem of deep tech and AI startup firms that will use AI to create new business models
- Raise the pace on the digital transformations within companies, which will need to embrace AI innovation;
- Accelerate progress on the Digital Single Market, which remains incomplete;
- Build the right talent and skills that will be needed to capture the opportunity presented by digital and frontier technologies, including with a renewed focus on education and mid-career training;
- Think boldly about how to guide societies through the potential disruption to work that will likely accompany AI and other frontier technologies, including a fresh look at impediments to worker mobility and adapting welfare systems to the digital age.

Europe has risen to challenges in the past and there is no reason why it cannot do so again in this era of technological ferment. But it will not happen on its own: policy makers and business leaders have critical roles to play in creating the right conditions, ensuring scale, and leading the charge. ●