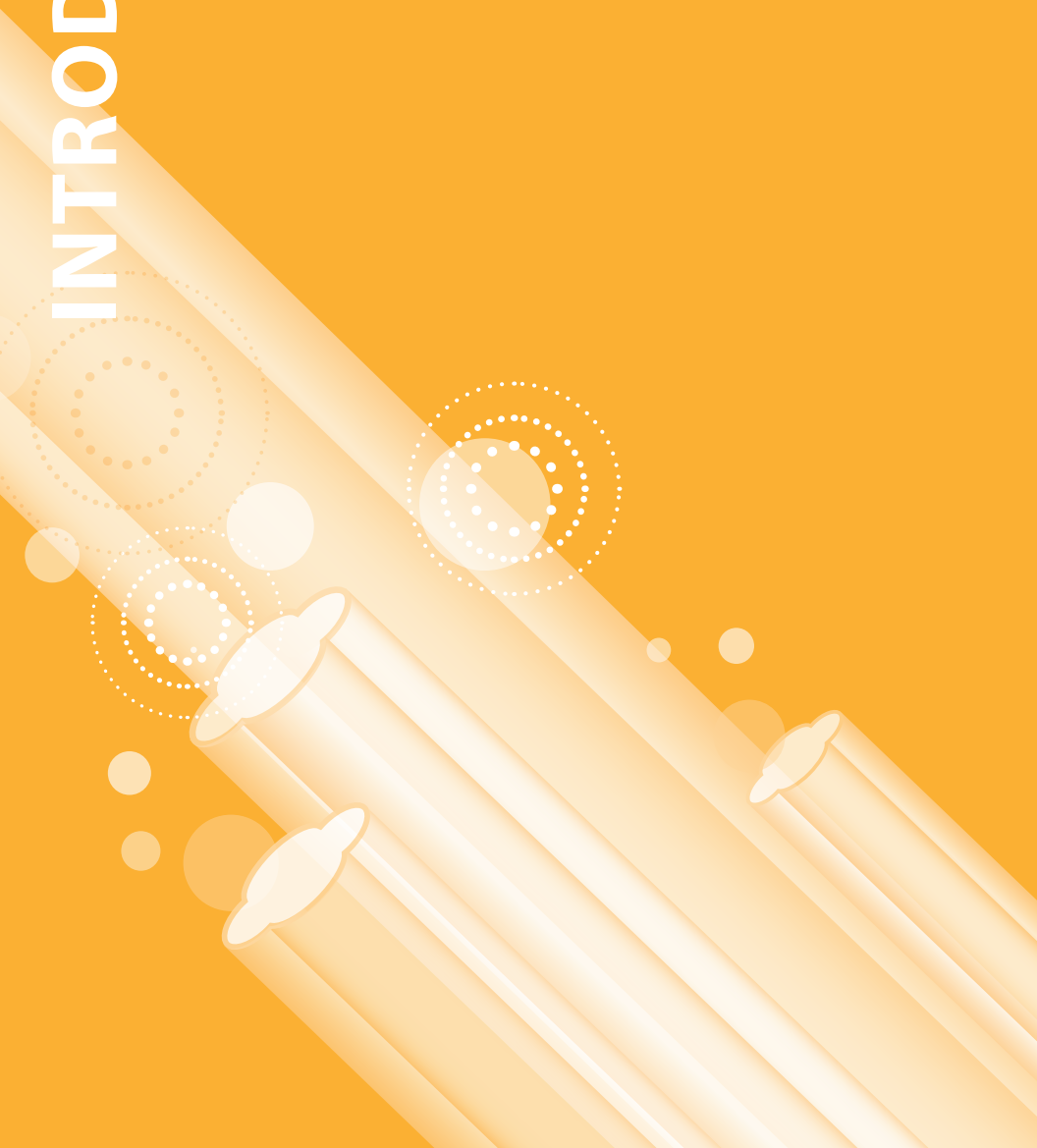
INTRODUCTION

The View Inside: Technologies Collide and Industries Transform



Author

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Every company we know is in a new era of information technology that has erased industry boundaries, altered competitive dynamics, and ushered in formidable new players. The technology I'm referring to is the convergence of several technologies that have rippled and ripened over the last decade, most notably cloud computing, artificial intelligence (AI), internet of things (IoT) devices, and the internet itself.

Together they are stirring the pot of industry change faster and faster. The first global sectors to be transformed are those whose entire product could be digitized and delivered digitally (media and entertainment, banking, business information, and more). But even products that must remain physical products, and services that customers must experience at a company's place of business (hotels, airplanes, etc.), are being digitally altered to become much more useful products and services.

The impact on industries can't be overstated. 'The World is Flat' author and *New York Times* columnist Tom Friedman so aptly stated this recently[1]:

> **We're in the middle of a change in the 'climate' of technology. We're moving into a world where machines and software can *analyze* (see patterns that were always hidden before); *optimize* (tell a plane which altitude to fly each mile to get the best fuel efficiency); *prophesize* (tell you when your elevator will break and fix it before it does); *customize* (tailor any product or service for you alone) and *digitize and automate* just about any job. This is transforming every industry.**

While such predictions could be easily dismissed in the past, they can't be today. The reason is that a growing number of companies are getting rich by using these technologies in these ways. They offer dollars-and-cents proof that the transformation is here. Consider three stunning statistics on the money some firms have already made (or their value in the stock market) by tapping into the cloud, AI, IoT, and other mobile digital devices and the internet:

- **$2.4 trillion:** The combined market value of Facebook, Apple, Google parent company Alphabet, Amazon, and Netflix in June.[2] All but Netflix deliver their digital services to your digital devices through the cloud (their own data centers). Netflix delivers its video services through Amazon's cloud, AWS.
- **$39 billion:** How much revenue investment analysts predict Facebook will produce in 2017.[3] (Its 2016 revenue was $27.6 billion.) If it hits that number, Facebook's revenue will surpass the revenue of the entire U.S. newspaper industry in 2016 ($29.6 billion).[4] From where does Facebook get that revenue? Since (unlike newspapers) its members can get its content for free, Facebook gets it from advertising that the company can tailor to its members' needs and tastes. And it is increasingly using AI to target those ads.

[1] The New York Times, Climate Shifts Aren't Limited to the Weather, August 02, 2017, Accessed August 02, 2017, https://www.nytimes.com/2017/08/02/opinion/climate-change-technology-globalization-china.html?ref=opinion&_r=0

[2] Fortune, FAANG Tech Stocks Are No Bargain. Here's Why, June 15, 2017, Accessed August 02, 2017, http://fortune.com/2017/06/15/faang-tech-stocks/

[3] Financial Times, The estimate of Facebook 2017 revenue was the consensus of the 34 stock market analysts who cover the company, Accessed August 02, 2017, https://markets.ft.com/data/equities/tearsheet/forecasts?s=FB:NSQ

[4] PR Newswire, Newspaper industry revenue number from PwC, June 05, 2017, Accessed August 02, 2017, http://www.prnewswire.com/news-releases/pwcs-entertainment--media-outlook-forecasts-us-industry-spending-to-reach-759-billion-by-2021-300469724.html

- **$7 billion:** How much revenue General Electric (GE) expected to generate in 2016 from its digital business, which helped the company, customers, and its industry partners capitalize on IoT devices and software. GE predicts the number will be $15 billion by 2020.[5]

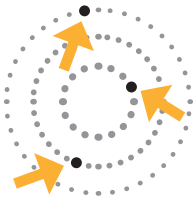
I hope we have begun to convince you (if you weren't convinced already) that this technological revolution is having substantial here-and-now consequences. The articles we've assembled in this issue of *Perspectives* shed light on why things are playing out this way.

We've organized the articles into two sections: the business opportunities of the technological transformation, and how to pursue them. Here is a preview of each article.

The Business Opportunities

Where to Turn AI and Automation Loose in Your Company

See page 13.



Industrial-strength AI is ready for deployment. But one of the biggest challenges for large companies is determining where to use it. Although the possibilities are endless, companies' budgets, of course, are not. In their article, Ashok Pai and Krishna Mohan give executives a way to identify the best places to use AI in their organizations.

Why Your Products Must Be Smart and Connected

See page 26.

In the last few years, strategy experts like Harvard Business School Professor Michael Porter have been urging industrial companies to embed their products with digital sensors and wireless devices that report back on how they're functioning in the field. In their article, Sreenivas Chakravarti and Anurag Jain argue that making such products smart and connected is no longer an option; it's a necessity. They explain why virtually every manufacturer should now be using such technologies to turn their products into services.

[5] Investors.com, GE Sees Digital Revenue More Than Doubling To $15 Billion By 2020, June 23, 2016, Accessed August 02, 2017, http://www.investors.com/news/ge-courts-silicon-valley-investors-for-digital-industrial-push/

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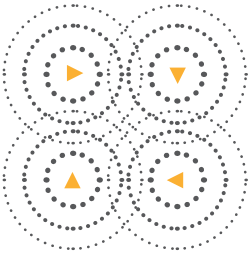

Now You Can Simulate Nearly Anything

Suppliers of public cloud computing services such as Amazon Web Services, Microsoft, and Google represent a powerful capability that many companies don't realize they now have: to simulate strategies, product and service concepts, and new business processes at affordable prices. In their article, PR Krishnan, Satishchandra Doreswamy, and Suranjan Chatterjee explain why this is so important today, and seven applications of simulations that promise big benefits. To illustrate each one, they point to examples at Kellogg, Aon Benfield, GE, and HSBC, among other companies.

How to Pursue the Opportunities

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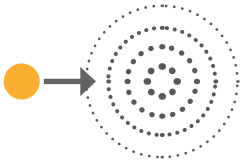

What Happens When You Turn Your Products Into Services

So you've decided to make your products 'smart and connected'. How do you then play in the 'servitization' game, the one in which you'll generate revenue by offering your product as a service? In his article, Regu Ayyaswamy explains why the service opportunities are abundant: They turn what he calls 'open-loop' systems into 'closed-loop' ones—where a manufacturer no longer loses information to third parties on how its products are performing for customers. He examines four servitization opportunities for companies with closed-loop systems, and explains how to overcome significant obstacles that will stand in the way.

Why Agile Software Development Requires Radical Changes in Budgeting and Scoping

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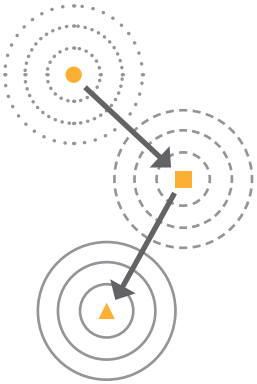

To stay competitive in this world of intelligent cloud-based products and services, big companies need to move as quickly as new companies. That means getting new digital products and processes up in weeks or months, not years. But that can't be done if such systems are staged, funded, and scoped in the same manner of the enterprise systems of old. Companies must now rely on agile cross-functional teams that use agile software development methods. But that is harder than it sounds, and one of the biggest barriers is how agile programs are scoped and funded. In short, traditional systems budgeting and scoping methods can throw wrenches into the wheels of agile development. In their article, Nidhi Srivastava, Apala Mukherjee, and Somnath Ghosh provide an antidote to the all-too-frequent starts and stops of agile teams: a different way of scoping and budgeting these programs.

Raising Your IoT Cyber Security Game

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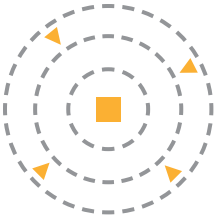

By making their products smart and connected, manufacturers can transform themselves into service companies and generate new revenue. But they can also generate the attention of attackers to their new IoT-enabled products, as TCS IoT cyber security expert Satish Thiagarajan writes in his article. As he says, hacking incidents into IoT-enabled products in the U.S. alone soared seven times between 2010 and 2015. And most computer networks should expect IoT security breaches next year, warns IDC. Thiagarajan outlines eight steps companies should take today to reduce the chances of becoming the next victim.

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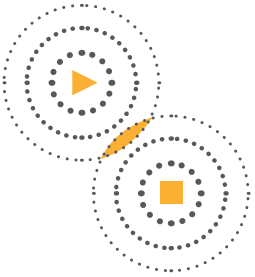

The Big Opportunities at the Junction of AI and Analytics: Interview with Tom Davenport

We are delighted to feature an Interview with Tom Davenport, a leading chronicler over the past 30 years on how information technology has radically transformed the work and very essence of large businesses around the world. Since the late 1980s, Davenport has been a pioneer of business process redesign/reengineering, business analytics, and other leading concepts. He has published several classic *Harvard Business Review* articles and bestselling books on the business value of enterprise systems, knowledge management, big data and analytics, and most recently AI. I think you'll find Tom's interview eye-opening, particularly his call for companies to stop focusing on using technology to get rid of people.

Executive Traits for Recognizing the Bountiful Opportunities Ahead

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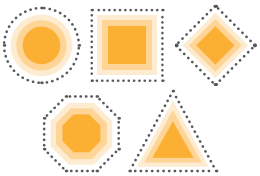

The opportunities we point to in this edition of *Perspectives* are substantial. But they are also difficult to recognize. In our last article, I look at five personality traits of three of the most successful CEOs of the last 10 years—Steve Jobs, Jeff Bezos, and Reed Hastings—all of whom were early to recognize the implications of cloud, mobile devices, and AI, and moved their businesses forward early to capitalize on them. I explain how the traits—abundant imagination, a voracious appetite for often-clashing ideas, relentless focus on increasing value to customers, calmness in the face of the rising competitive storm, and being sentimental about top talent but not about their jobs—are so crucial today.

I hope these articles provide you and your colleagues with inspiration and ideas that help your organization thrive in these exciting times.