

# The future of R&D is here. Are you ready?

Six trends are shaping the face of R&D, some of which will likely require companies to adapt to new ways of working

by Elia Berteletti, Karim Doulaki, Thomas Morel and Marc Teulières

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*McKinsey is currently conducting global research on the forces changing R&D and how prepared organizations believe they are to meet the resulting challenges. We encourage you to take our 10 to 15-minute survey (<https://esurveydesigns.com/wix/p45429898.aspx>) on the topic (individual results are kept confidential), and register to receive an advance copy of the survey results.*

In 1987, the economist and Nobel laureate Robert Solow famously observed that “you can see the computer age everywhere but in the productivity statistics.”<sup>1</sup> Although more recently he agreed that the statement is no longer true<sup>2</sup>, he also described as “inevitable” the lag that organizations experienced in learning how to use technology effectively in their day-to-day businesses.

Variations of that lag have been observed in all six of the megatrends that are now transforming R&D—which is hardly a coincidence, since all six also rest on technological innovation. Some, such as globalization, have been at work for decades, while others are comparatively new. But our work with clients suggests that all six are accelerating, reinforcing one another to produce an inflection point:

- **The next frontier for Big Data, the Internet of Things, and advanced analytics:** The intertwined development of three technology-based breakthroughs—almost infinite data storage and retrieval systems, laptop computers capable of billions of instructions per second, and sensors, cameras, and social-media platforms transmitting billions of interactions each day—gives companies unprecedented ability to anticipate their customers’ needs. Even the early results are dramatic. One automaker used its stream of data to reduce the number of possible option combinations for its latest model to fewer than 20, thereby reducing waste and complexity while making consumer choices easier. A leading competitor still offered more than 2,000 on its rival offering. How many would they produce

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<sup>1</sup> “We’d better watch out” (<http://www.standupeconomist.com/pdf/misc/solow-computer-productivity.pdf>), *The New York Times Book Review*, July 12, 1987, p. 36.

<sup>2</sup> “Prospects for growth: An interview with Robert Solow,” ([http://www.mckinsey.com/insights/economic\\_studies/prospects\\_for\\_growth\\_an\\_interview\\_with\\_robert\\_solow](http://www.mckinsey.com/insights/economic_studies/prospects_for_growth_an_interview_with_robert_solow)), *McKinsey Quarterly*, September 2014.

even once, let alone in quantities high enough to outweigh the added costs?

- **All digital, all the way from idea to launch:** Advanced computational power is also supporting major advances in managing every stage of the product lifecycle, from “virtual manufacturing” to assess design feasibility, to rapid prototyping of more mature designs. In sectors as diverse as optical equipment, automotive manufacturing, and aerospace, these techniques have halved time-to-market while further increasing manufacturing efficiency.
- **Advanced materials and manufacturing techniques:** When combined with innovations such as graphene, nanocomposites, and self-healing polymers, advanced processes such as additive manufacturing and metal injection molding are bringing unparalleled flexibility to product development. Even the long-anticipated (but little-seen) “mass customization” is now possible, with early results in fields ranging from sports apparel to medical devices.
- **Software as a strength:** Software is becoming increasingly important for most industrials and applications, leading to a rapid shift from “hardware performance” to “software experience” in fields such as automotive and telecoms. Indeed, the history of upheaval in mobile handsets is instructive: software capabilities have been at least as important as hardware in the emergence of today’s dominant platforms.
- **A world-wide R&D web:** Globalizing R&D may not be new, but getting the most out of a global R&D network requires a level of sophistication that is very new indeed. Whereas companies once focused mainly on cost opportunities, the calculus has become far more difficult: “emerging” markets are maturing, suppliers are improving their own capabilities, and improved communication means that the strength of an entire network starts to matter more than that of any single location.
- **A “P&L” for R&D:** Product portfolios are becoming more complex, thanks to unrelenting cost and quality pressures, growing demand for customization, and shrinking product lifecycles. As a result, knowing how well the R&D function is performing has never been more critical.

Combined, the six trends are forcing R&D to become quicker, more flexible, and more responsive than it has ever been. In our experience, even top-performing organizations face gaps. Is your R&D organization ready?

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*In the third quarter of 2015, we plan to conclude research on the six trends to identify those that companies are most and least prepared for. You can contribute by following the link below to complete a 10 to 15-minute survey; an advance copy of the results will be made available to participants who register.*

Link to survey: <https://esurveydesigns.com/wix/p45429898.aspx>

*About the authors: Elia Berteletti is a consultant in the Taipei office. Karim Doulaki is an expert in the Paris office, where Marc Teulières is a principal. Thomas Morel is an associate principal in the Lyon office.*

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