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Getting the most from R&D teams

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The size of these teams and the number of sites where they work have a big impact on semiconductor research productivity.

Companies struggle with decisions about the composition of teams of knowledge workers and how to deploy those teams productively. The experience of the semiconductor industry, which has trouble getting most new products to market on time, is instructive: our research on more than 2,000 R&D projects at more than 75 companies finds that leaders underestimate how the dynamics of teams affect the output of R&D.

Using a proprietary database that measures semiconductor-development efforts in a consistent fashion,[1] we examined productivity across a number of company sites. Increasing the size of R&D teams, we found, actually diminishes productivity. So does expanding the number of development sites. In the auto and wireless markets, for instance, R&D output decreased significantly as the size of project teams rose. Output also falls when companies try to manage design teams across multiple work sites, a path R&D managers often choose when they can't achieve critical mass at a single location.

Expanding from one site to three can lead to up to a 20 percent drop in productivity (exhibit). R&D efforts—and perhaps, by extension, other knowledge-work clusters—seem to have natural limits. Adding people beyond those limits diminishes returns. Organizations that manage complexity in an effective way at a single site may lose their grasp when far-flung teams take on complex tasks.

[1] Semiconductor output can vary tremendously within R&D organizations, depending on the complexity of individual products. Using proprietary data, we measure a project's technical characteristics, technical difficulty, and total development effort and normalize the variation among projects.

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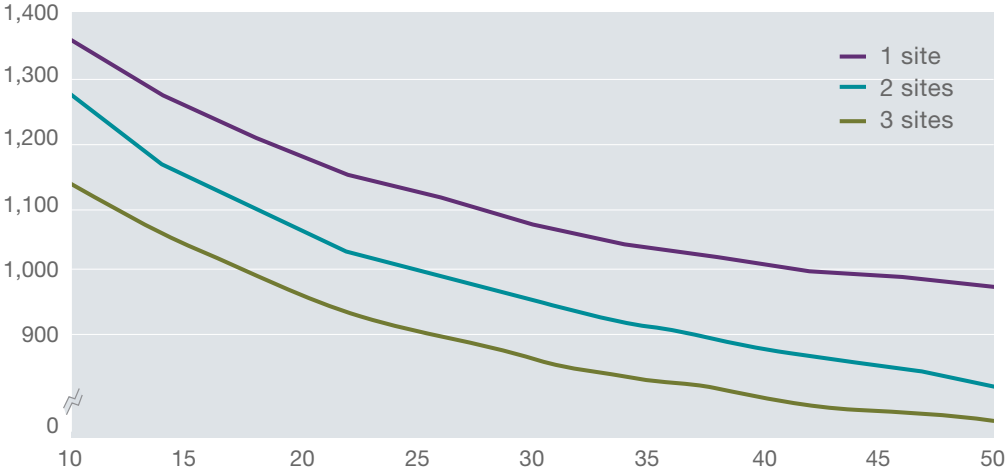
For more, see "By the numbers: R&D productivity in the semiconductor industry," *McKinsey on Semiconductors*, Number 4, Autumn 2014, on mckinsey.com.

Development teams that span multiple sites can be up to 20 percent less productive than teams at a single site.

Productivity, complexity units per person-week



Team size, number of full-time-equivalent employees in peak phase of integrated-circuit development

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