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The Missing Link in Innovative Research

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BY ANNA PETTERSSON AND AUGUST VLAK

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Despite continuous growth in R&D spending, many senior leaders remain deeply concerned about their organization's ability to innovate. For example, the pharmaceutical industry has more than doubled its spending on research and development during the last 10 years, but its success rate in finding new drugs has been disappointing. Yet new research by Booz & Company points to an unexpected and unheralded source of potential productivity: midlevel managers in the R&D function. Companies can significantly raise their R&D productivity by recognizing and activating the unique impact of leaders in the middle of the organization's hierarchy.

Our research with pharmaceutical companies reveals that leaders in the middle of the hierarchy have a singular ability to identify the company's most creative bench scientists — and to help them cultivate new scientific insights and connect with the most promising external sources of innovation. These midlevel managers are an underused asset. They can nurture and navigate promising ideas through complex organizational decision making, reinforce an environment of top-quality science, and keep the brightest minds engaged day in and day out. Better use of the midlevel cohort can be a critical factor leading to breakthroughs in innovation effectiveness — not just in the pharma

industry, but in sectors such as chemicals, energy, and aerospace and defense.

Bigger Companies, Less Success

By nearly all measures, new drug discovery and development has been declining for more than a decade — even as R&D spending by the largest companies has more than doubled. Why?

A wave of consolidation in the pharmaceutical industry over the past two decades has created larger companies with bigger product portfolios. But almost across the board, that wave has saddled R&D units with diseconomies of scale and too much bureaucracy to be effective. As a result, the capacity to generate new insights and make shrewd investment decisions has not grown proportionally, and has even declined. The rate of new drug discovery over the past 10 years has been so poor that the head of one big pharmaceutical company has dubbed it the “lost decade.”

In an attempt to reverse this trend and increase productivity, innovative R&D organizations have deployed a range of different management, technology, process, and structural solutions:

- Earlier commercial involvement in project decision making, in an effort to enhance focus on commercially relevant compounds

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- More rigorous procedures for portfolio management and more stringent criteria for the adoption of new projects
- Clearer guidelines for the handover from discovery to development, and for the integration of basic laboratory research with clinical trials and other applied research
- More sophisticated and comprehensive incentive and reward structures
- New structures that enable more external partnerships for discovery and the outsourcing of “non-core” activities

Some large R&D organizations have begun to create smaller, more accountable units, but that alone has proven insufficient. In 2008, GlaxoSmithKline PLC, as reported by the *Wall Street Journal* on July 1, 2010, divided its research and development function into small groups of up to 80 scientists in an attempt to create the innovative atmosphere and close working relationships of a biotech startup.

Although these approaches have contributed to more efficient research and thus deserve attention, they have not been able to promote and nurture the new insights that can lead to more effective drug discovery. In most R&D efforts, breakthrough insights come from

the work of individual scientists who connect their own deep expertise in one domain with ideas from another discipline. Most notably, in a speech delivered in 1922, “How I Created the Theory of Relativity,” Albert Einstein credited his insight to his discussions with Swiss/Italian engineer Michele Besso, with whom he did “battle against that problem.” The most creative scientists will propose new ideas based on their expertise and input from other disciplines, recombining facts and ideas into new insights. (See “How Aha! Really Happens,” by William Duggan, *s+b*, Winter 2010.)

The role of scientific leaders, therefore, is not only to encourage scientists to strengthen their core areas of expertise, but also to identify the scientists who have the greatest potential for breakthrough insights and help them interact with one another and explore adjacent fields. In pharmaceuticals, this can help create opportunities for major advances in the treatment of human disease.

But the leadership challenge is stark. Industry-wide consolidation has led to larger research organizations, where senior leaders are now managing many more projects. This limits the leaders' ability to generate deep insight, explore multiple avenues, or make informed decisions. Senior leaders cannot know all the scientists, encourage them, or easily identify exceptional scientific

- Do your midlevel managers have clearly delineated roles enabling them to make critical decisions and move promising programs forward?
- Do they possess the necessary skills to harness the creativity of your most productive scientists?

Use this brief assessment tool to profile your science leadership capabilities and understand potential steps to help you succeed.

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insights. As a result, middle managers have become a linchpin in research productivity.

Meeting the Productivity Challenge

Our team at Booz & Company recently interviewed 20 senior executives at 15 leading research-based pharmaceutical companies and academic institutions. We asked them, “How can better management of R&D solve the productivity challenge?” and then we convened a roundtable with four recent leaders of global R&D organizations. We concluded that because of a gap in scientific leadership, few structural or process solutions have delivered their promised results. We drew on these conversations to identify specific ways to expand scientific leadership capacity.

Our research reaffirms the widely perceived decline in pharmaceutical R&D productivity, but it reveals that although no one company has a sustained record of success, distinct pockets of excellence do exist. This research also confirms the value of improving leadership across the middle of the organization. Middle managers in the research division of pharmaceutical companies are frequently responsible for multiple programs; they report to a therapeutic area head or lead functions. Most importantly, they make thousands of day-to-day decisions about what to support and what not to support, and this collectively gives them a great deal of leverage. Not just pharmaceutical companies, but technology-oriented companies in all industries, could raise their productivity significantly by selecting, developing, and enabling strong scientific leaders at that level.

Regardless of other management approaches — such as an open innovation sourcing strategy, a particular organizational structure and alignment, or other sys-

tems and tools — internal discovery output per dollar can be vastly improved and downstream attrition reduced by addressing the scientific leadership across the middle of the organization. Indeed, one reason that all the investments in organization, tools, technology, and techniques have not delivered additional insight is that the investment in the leaders using them has lagged. Furthermore, the recent wave of outsourcing, restructuring, and merging has caused companies to take capacity away from the middle of the organization. And even where middle managers do exist at some concentrated level in an organization, their roles are often not well defined.

We suggest that companies seeking more successful breakthrough innovation focus on the following three elements.

1. Clearly differentiated roles for senior, middle, and project managers. In many companies, the roles of scientific leaders at different levels overlap, blurring responsibilities and activities. Some leaders in middle management begin to mimic senior leaders, managing resource allocation through formal reviews and relying primarily on checklists and common criteria. Other midlevel leaders duplicate the role of the project managers, continuing to manage too many projects directly — either because their strategic responsibilities are squeezed by their own senior leaders or because they rely on their familiarity with prior roles and responsibilities. By formally defining the responsibilities of each level, companies can take full advantage of the different contributions that people at each of these three levels (senior, middle, and project managers) can offer.

2. A focus on the pivotal roles across the middle. Take advantage of the fact that managers in midlevel

roles typically oversee 100 to 200 employees. This allows them to develop and foster good working relationships with most of the people in their organization, if consistently encouraged to do so. Groups of this size have sufficient scale to develop expertise, create connections and opportunities for serendipity, and marshal resources to support good ideas. Individual researchers or teams may generate new insights, and senior leaders may devise effective strategy, but groups of 100 to 200 researchers have the depth, critical mass, and diversity (via internal and external connections) to deliver results. Midlevel managers are well equipped to select and increase opportunities for these scientists. They can also guide promising ideas through the organization to make sure that they aren't knocked out too easily in a process based on abstract criteria.

3. The development of critical skills within the middle-management group. To lead scientists, managers must have personal scientific credibility. However, this is not enough. Those who rise to the challenge of being strong scientific leaders differentiate themselves in several key ways. For example, they define a compelling destination. When Thomas Hughes, now president and CEO of Zafgen Inc., launched early work on an ultimately successful Type 2 diabetes drug at Novartis AG, he knew it was a challenging project that would require resilience, creativity, and support from scientists throughout the organization. To maintain commitment and tap into the scientists' commitment, he and his team created a manifesto for the proposed drug that set forth its target research profile and described its potential clinical benefits for patients. The vision captured in this manifesto enabled bench scientists to link their daily work directly to the desired outcome and helped

them keep the goal in mind as they considered how to work around the obstacles that inevitably appeared. Launched in 2007, Galvus has been approved in 68 countries.

Strong scientific leaders connect beyond boundaries. They recognize that functional silos, highly specialized scientific knowledge, and uneven communication skills create barriers to the critical networking interactions that are at the heart of innovation. "Creativity is simply the art of putting two well-understood ideas together in a new way," says Phillip Sharp, cofounder of Biogen Idec Inc. and co-winner of the Nobel Prize in Physiology or Medicine, "and making connections through networks is central to innovation." For that reason, the best scientific leaders facilitate connections for their teams and serve as role models for strong formal and informal networks across functional disciplines, franchises, and organizations.

They also apply multiple lenses to problem solving. Any research organization must use a single framework to organize people and activities and to align resource deployment, decision making, and information sharing. For example, most pharmaceutical R&D organizations divide themselves into therapeutic or disease area teams and functional departments. But any organizational structure creates blind spots and biases, and decision making by therapeutic area groups will frequently miss opportunities to apply insights from other therapeutic areas. The tendency of many companies to set research targets within each therapeutic area may also stifle creativity and insight by constraining the researchers' "field of vision" and establishing incentives to advocate for a specific therapeutic area rather than for breakthrough science.

The best scientific leaders not only systematically apply multiple lenses to problem solving and prioritizing, but also make sure their teams appreciate the different perspectives. “As a leader, you have to understand what is happening in politics, technology, and science, in order to make good decisions,” says Sharp. These leaders see beyond the inherent limitations of their structure to ensure that biologically relevant findings are not discounted due to poor fit with the organizational structure of the department.

As organizational size and complexity grow, leaders can lose visibility into both key research activities and their people. As a result, they not only fail to gather multiple perspectives on projects but also miss the opportunity to get to know their staff. In contrast, successful scientific leaders use informal channels to engage people, understand their different strengths, and learn what motivates them. These leaders identify the “creative geniuses” — scientists who need more time to pursue nonlinear research — and help them interact with other scientists to fertilize work across the organization.

When Michael Varney arrived at Genentech Inc. as its new senior vice president of small molecule drug discovery in June 2005, he recognized the challenge of sustaining the company’s enviable reputation in drug development. To succeed, Varney not only relied on his academic credentials and successful track record but also created personal connections with his teams by organizing informal gatherings, conducted both at work and at his home, to gain deeper insight into their efforts and to foster better collective judgment. “As a leader, you can set the organizational and strategic framework,” he says, “but you need to keep the human connection with your people to get to know them and make sure they remember you are a real human being.”

Putting It All Together

To put these ideas into practice, senior leaders will need to first assess the current state of their scientific leadership, and then create a systematic capability to generate great scientific leaders and enable them to have maximum impact. Specifically, senior leaders need to identify which opportunities, organizational groups, and projects could benefit the most from strong scientific leadership and build an explicit shared commitment to developing a group of scientific leaders. A successful scientific leadership development initiative, which, in the words of David U’Prichard, the former head of R&D at SmithKline Beecham, “is a novel exercise for most phar-

maceutical research organizations,” will include the following:

- A diagnosis of current managers across the middle, including functional and project management leaders, assessing their scientific leadership skills and track record of achievement
- An assessment of the gap between the number of current and potential scientific leaders and the number required — a “talent gap” analysis
- The creation of an organizational environment in which scientific leaders across the middle can develop and thrive
- Structured “challenge sessions” aimed at addressing scientific problems or improving R&D processes, where project teams composed of people from different therapeutic areas (with common biological pathways) can talk openly with scientists in other disciplines
- Defined roles for managers across the middle, distinct from the roles of project teams, sub-function managers, and senior executives, with spans of control that enable midlevel managers to stay close to the science while allowing them to meaningfully influence resource allocation decisions
- Measures of performance that track and reward contributions to the success of other teams as well as the leader’s own team, to reinforce interaction and collaboration
- Other structures that enable effective scientific leadership, including simple matrix management processes such as “contracting” for resources between functions and project teams

These changes will require support from human resources, as well as a different role for senior managers in talent development. As Severin Schwan, CEO of the Roche Group, has said, “Innovation is ultimately a talent business.” And talent at the middle of the organization is key. +

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