EXECUTIVE INSIGHTS

Redefining Biopharma R&D Productivity: New Insights and Strategies

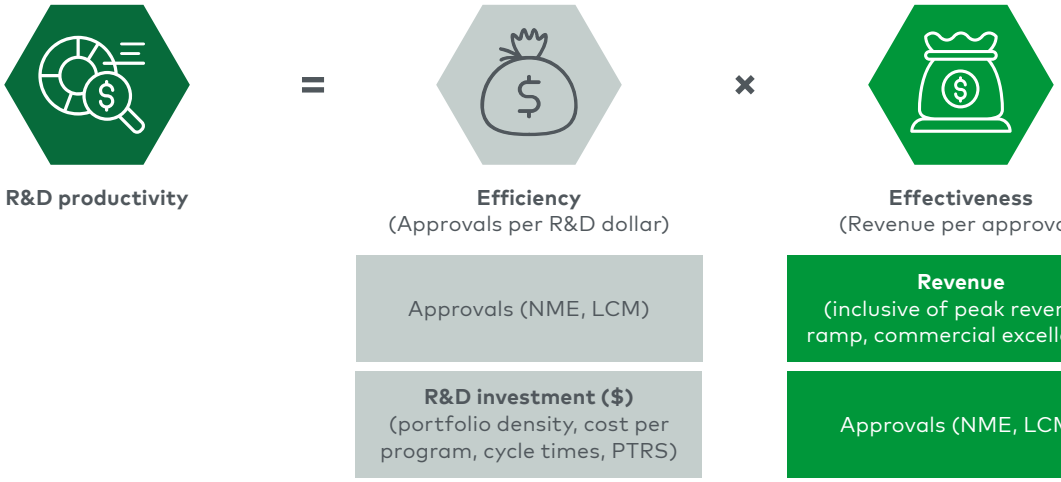
Introduction

R&D productivity stands as one of the most critical issues for biopharma executives, as it directly addresses the ability to transform pipeline investments into tangible revenue streams. Despite its importance, assessing R&D productivity is notoriously challenging due to the long innovation cycles and inherent uncertainties of drug development.

At its core, R&D productivity can be defined as the revenue generated per dollar of investment (see Figure 1). This broad concept can be further broken down into two essential components:

1. **Efficiency of the R&D engine:** This measures the number of drug approvals achieved per dollar invested in R&D. It reflects how well a company can generate successful outcomes from its research efforts within a given budget.
2. **Effectiveness of launches:** This assesses the revenue generated per approved drug. It indicates the ability of a company to maximize the commercial potential of its products through successful market entry, commercialization strategies and life cycle management.

Figure 1
R&D productivity framework



Note: NME=new molecular entity; LCM=life cycle management; PTRS=probability of technical and regulatory success
Source: L.E.K. research and analysis

Previous attempts to assess R&D productivity often suffered from outdated data, opaque methodologies or limited scope, focusing on a small subset of companies. However, with the biopharma industry undergoing significant shifts, it is more critical than ever to adopt a current and transparent approach to understanding how R&D productivity is evolving.

In this edition of L.E.K. Consulting's *Executive Insights*, we explore the two key components of R&D productivity and compares R&D efficiency and R&D effectiveness between Top 15 Biopharmas by revenue and the remainder of the industry (smaller companies).[1]

Such insights are essential to inform and optimize R&D strategies in this dynamic landscape. By understanding the nuances of R&D productivity across different segments of the industry, leaders can leverage mutual strengths to enhance productivity and navigate the evolving challenges and opportunities in drug development and commercialization.

Smaller companies surpass large pharmas in R&D efficiency

Despite remarkable advances in science, technology and operational practices, the consensus within the biopharma industry is that R&D productivity has been steadily declining. This trend is evident in the widening gap between industry R&D expenditures and revenue growth over the past decade.[2] This situation stems from a steady decline in efficiency, a trend that has persisted over the past 50 years.[3]

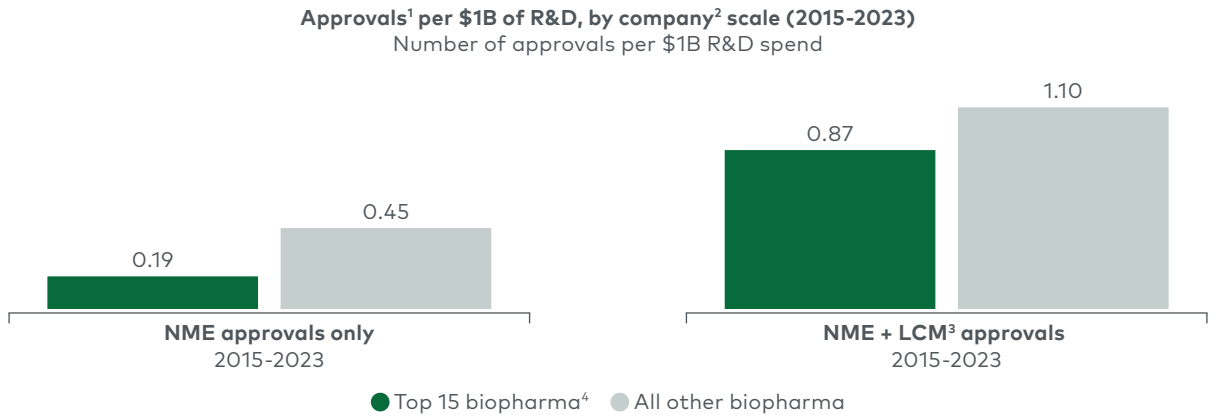
A major factor behind the decline in R&D efficiency is the escalating complexity of clinical trials. The scale and scope of these programs have expanded significantly, driven by evolving regulatory demands and a rapidly changing global clinical trial landscape. This has led to longer trial durations, greater enrollment challenges and higher investment costs. Consequently, the number of new approvals per R&D dollar has decreased over the past few decades.

Interestingly, large pharmas have been less efficient at converting R&D investments into new drug approvals compared to the rest of the industry (see Figure 2). Even when factoring in life cycle indications, the efficiency disparity remains evident, although less pronounced.

This is partly driven by their reliance on outliers — mega-blockbuster drugs such as Keytruda, Humira and Dupixent, among others — to drive top-line growth. To meet stringent internal revenue and return-on-investment thresholds, large pharmas concentrate their efforts on programs with the highest market potential, which typically have more life cycle management opportunities. While such drugs deliver transformative value, they also significantly raise the bar for R&D investments, demanding substantial financial resources and time to achieve market success. This heavy focus on blockbuster outcomes often leads large pharmas to prioritize effectiveness — producing high-impact, high-revenue therapies — at the expense of efficiency, limiting the number and diversity of opportunities pursued within their R&D investments and reducing the potential efficiency of their R&D portfolios in addressing broader medical needs.

Figure 2

R&D efficiency: R&D investment per approval by company type, including number of NME and NME + LCM approvals per $1B in R&D

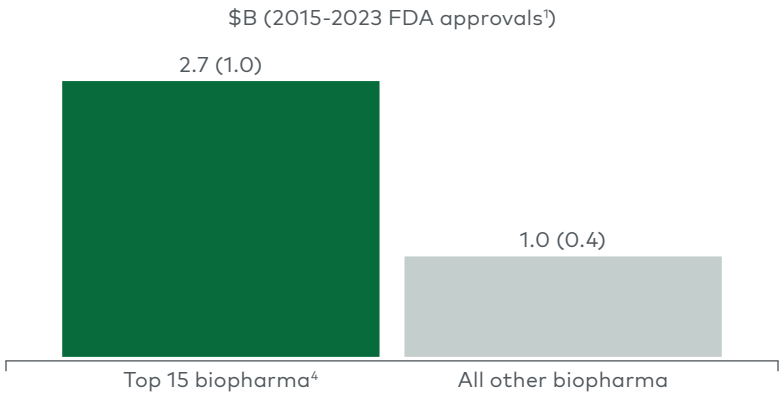


[1]Includes CDER and CBER approvals (vaccines and biologicals); [2]Approvals of acquired companies are included in NewCo company approval counts and revenues if approved after the acquisition date. [3]LCM includes new indication, new patient population, pediatric, and new route of administration; [4]Top 15 Biopharma companies were categorized based on biopharma revenues >$25B in 2024; 2024 trends show a continuing decrease in NME approvals per $1B of R&D spend with Top 15 Biopharma falling to 0.1 and All Other Biopharma pharma falling to 0.3
Source: FDA, company investor presentations and SEC filings

Large pharmas lead in effectiveness, generating more revenue per approval

Large pharmas consistently demonstrate greater R&D effectiveness than smaller companies, a difference largely attributable to their substantial commercial scale and capabilities. From 2015 to 2023, the average peak revenue for new molecular entities (NMEs) approved by large pharmas was approximately $2.7 billion, significantly exceeding the roughly $1 billion average for NMEs from smaller companies. This analysis, which includes historical and forecasted periods through 2030, highlights the revenue-generating advantage of larger organizations (see Figure 3).

Figure 3
R&D effectiveness: Average (Median) NME Peak Revenue[2] by Company[3] Type

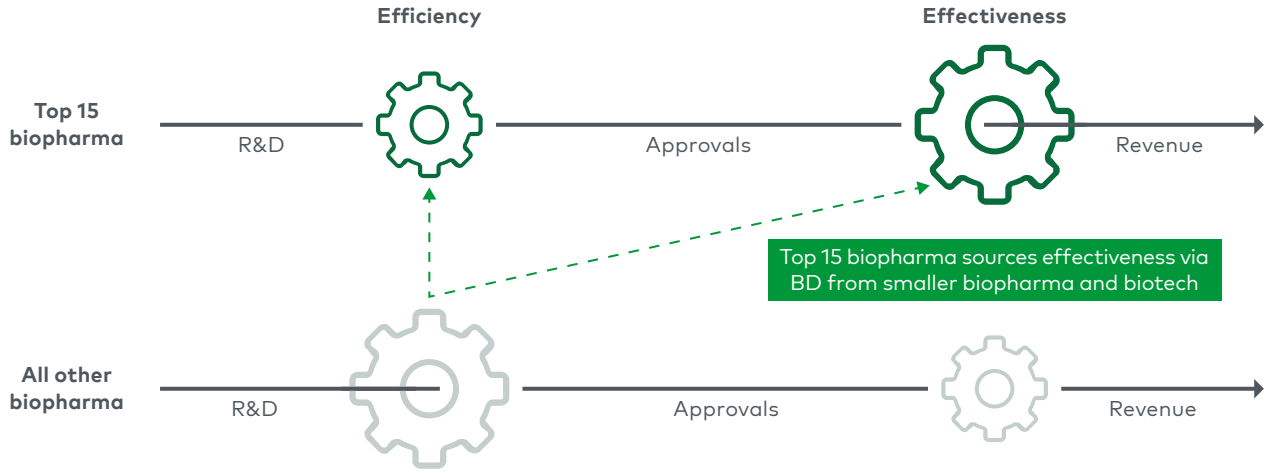


[1]Includes CDER and CBER approvals (vaccines and biologicals). [2]Revenue includes all LCM associated revenue. [3]Approvals of acquired companies are included in NewCo company approval counts and revenues if approved after the acquisition date; [4]Top 15 Biopharma companies were categorized based on biopharma revenues >$25B in 2024, All Other Biopharma is defined as all other innovative biopharma and biotech companies (excluding generics, devices, services, and platform/technology companies); When accounting for 2024 peak revenues for Top 15 Biopharma and All Other Biopharma NME approvals, Top 15 Biopharma remains constant while All Other Biopharma increases to $1.1B average peak revenue
Source: FDA, company investor presentations and SEC filings

Interestingly, large pharma drug candidates that are organically discovered or acquired at a preclinical stage, on average, generate higher revenue than those that were acquired or in-licensed during clinical development. This could be attributed to more stringent portfolio prioritization and the ability to invest earlier in lifecycle management opportunities for these assets.

Smaller companies often operate under significant financial constraints, driven by limited access to capital and a lack of scale in capabilities. As a result, they focus on advancing only those assets they can independently develop and commercialize, prioritizing R&D investments that are both cost-efficient and timely. For therapies targeting larger markets with higher barriers to entry, these companies typically lack the resources needed for full development and commercialization. This limitation often necessitates partnering with large pharmaceutical companies that can leverage their established clinical expertise and commercial infrastructure to bring these therapies to market (see Figure 4).

Figure 4
Conceptual model of R&D efficiency and effectiveness



Note: BD=business development
Source: L.E.K. research and analysis

Strategic actions for biopharma leaders

Large pharmas and smaller companies play distinct yet synergistic roles in driving innovation. Smaller companies act as incubators for novel ideas, while larger pharmas provide the scale and resources to transform these ideas into market-leading therapies. This interplay between small and large players needs to evolve to unlock new opportunities and drive greater value across the biopharma ecosystem.

Specifically, large-pharma executives should shift their R&D productivity to:

- Structuring their portfolios with sufficient shots on goal to produce outlier mega-blockbuster assets that can feed their revenue growth requirements. This requires maintaining stringent portfolio prioritization processes.
- Investing in internal innovation by optimizing for access to early science, speed in clinical development, breadth of therapeutic application and development success rate. Large pharma drug candidates that are organically discovered or acquired at a preclinical stage on average are likely to be more productive in generating returns than those accessed externally at later stages of development given transaction costs.
- Deploying business development into more selective opportunities. While business development will remain essential for larger pharmas, it can be a costly way to drive R&D productivity. Large pharmas should therefore carefully weigh the contribution of their business development activities to R&D productivity and rely on it as needed, as opposed to the default approach.

On the other end, small-company executives should center their efforts on:

- **Sustaining and enhancing R&D efficiency.** Small companies have historically excelled due to their lean teams, constrained capital and focus on efficiency. However, as they grow and gain access to larger pools

of capital — fueled by recent high-value financings — they risk losing this critical edge. To maintain their R&D efficiency, these companies must continue to prioritize agile and financially disciplined management of early-stage programs, as well as well-designed experiments and trials that maximize impact while minimizing resource expenditure. By staying adaptive and disciplined, they can scale without sacrificing their innovative and nimble culture.

- **Rethinking clinical development of lead assets.** Too often, small companies focus their lead asset development on niche indications to secure early clinical proof of concept. While this approach is often dictated by financial constraints, it may limit long-term potential. Executives within these companies should consider a more ambitious strategy by targeting larger, higher-value indications when possible. Bold prospecting in these areas can deliver greater valuation and drive significant shareholder value, even if it requires creative financing or partnerships to achieve.
- **Exploring value-retaining deals.** Biotech platforms often present unpredictable therapeutic applications, necessitating a strategic balance between targeting smaller, independently manageable indications and addressing larger, more competitive markets that require collaboration with large pharma. When partnerships are necessary to maximize an asset's value, executives should avoid giving away too much value too early and structure deals to retain long-term upside, such as through co-development, co-commercialization agreements or attractive milestone payments.

By prioritizing these strategies, biotech and pharma executives can effectively navigate the evolving and competitive biopharma ecosystem, combining innovation with disciplined execution to drive R&D productivity and achieve sustainable success.

The authors would like to acknowledge Jenny Mackey and Ethan Hellberg from L.E.K.'s Healthcare Insights Center for their contributions to this article.

For more information, please contact us.

Endnotes

[1]The top 15 biopharma companies were categorized based on biopharma revenues >$25 billion in 2024 (Evaluate Pharma estimates). Non-top 15 biopharma is defined as all other innovative biopharma and biotech companies (excluding generics, devices, services and platform/technology companies).

[2]Genengnews.com, "The Great Pharma Wasteland." https://www.genengnews.com/topics/drug-discovery/the-great-pharma-wasteland/

[3]Nature.com, "Breaking Eroom's Law." https://www.nature.com/articles/d41573-020-00059-3

About the Authors

Pierre Jacquet
Pierre Jacquet, M.D., Ph.D., is a Managing Director and Vice Chairman of L.E.K. Consulting's Global Healthcare practice. Based in Boston, Pierre has more than 20 years of experience in corporate and business unit strategy consulting and in M&A advisory services. He has led numerous engagements across the biopharma, medtech and diagnostic sectors, helping companies identify and execute strategies that maximize shareholder value creation.

Ricardo Brau
Ricardo Brau is a Managing Director and Partner in L.E.K. Consulting's Boston office. Ricardo leads the firm's Life Sciences Biopharma practice and has experience across most therapeutic areas and industry segments, in both large and emerging biopharma companies. He joined the firm in 2008 as a Life Sciences Specialist and advises clients on a range of critical issues, including corporate and business unit strategy, innovation, R&D portfolio management and commercial planning.

Bradley Hagan
Bradley Hagan was formerly a Senior Engagement Manager in L.E.K. Consulting's New York office and a member of the firm's Life Sciences Biopharma practice. Bradley has extensive experience advising large pharma and biopharma clients on commercial M&A diligence and R&D strategy and prioritization.

About L.E.K. Consulting
We're L.E.K. Consulting, a global strategy consultancy working with business leaders to seize competitive advantage and amplify growth. Our insights are catalysts that reshape the trajectory of our clients' businesses, uncovering opportunities and empowering them to master their moments of truth. Since 1983, our worldwide practice — spanning the Americas, Asia-Pacific and Europe — has guided leaders across all industries, from global corporations to emerging entrepreneurial businesses and private equity investors. Looking for more? Visit **www.lek.com**.