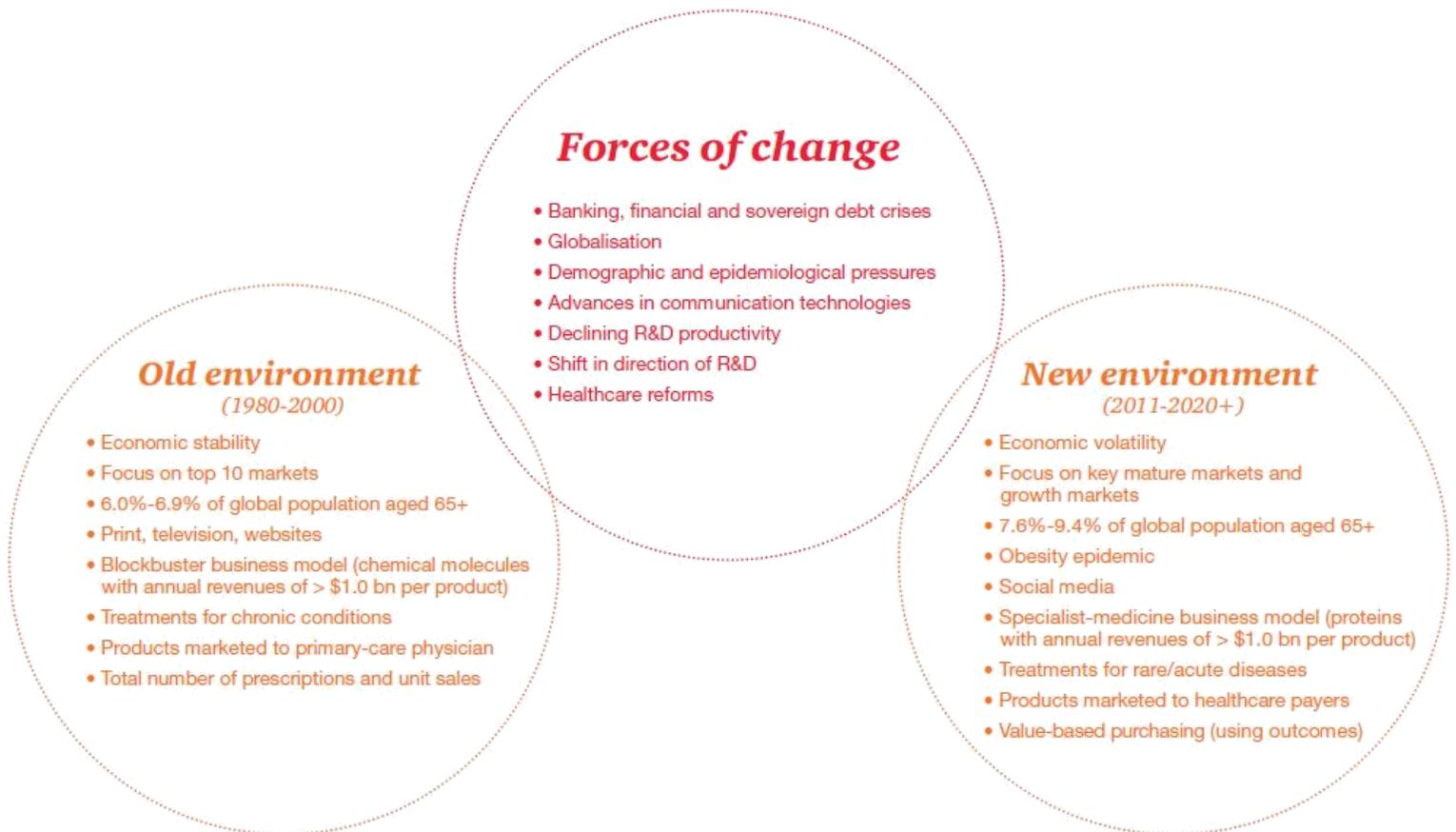


PHARMA 2020 FROM VISION TO DECISION

INTRODUCTION

Pharma companies face a number of key decisions that will determine their success and even survival in a dramatically changing global environment. Customers—consumers as well as both public and private payers—are demanding value defined by both outcome and cost effectiveness. Scientific discovery and medicine are undergoing a data-driven and genetically informed revolution that shifts focus from mass-market to individualized treatment. Pharma companies are struggling to adjust their R&D strategies, business models, and corporate culture, but those that successfully adapt will be able to tap into a rapidly growing global market focused on preventing and managing illness, bottom-of-the-pyramid solutions, and integrated health management approaches that combine pharmaceuticals with mobile communications, diagnosis, and monitoring.

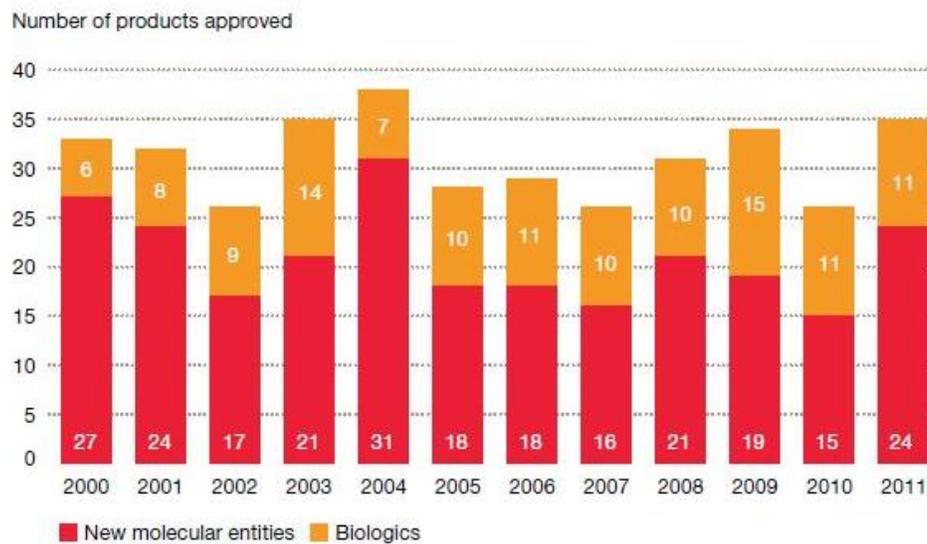


CHALLENGES

In spite of, or perhaps because of, decades of blockbuster success, pharma companies have been slow to adapt to a market that is changing at an accelerating rate. The reality is that innovation has flat-lined for a decade, governments under financial pressure have moved to control healthcare costs, and generics have eroded exclusivity while patients/consumers and healthcare providers are both more knowledgeable and more demanding.

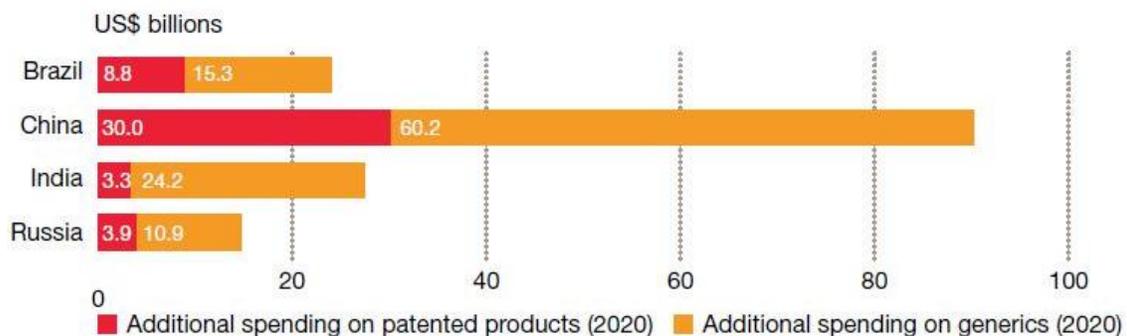
Flatline Innovation and the Patent Cliff

While the past ten years have yielded some great successes, on the whole the rate of innovation has remained stagnant while the average costs per molecule have grown to anywhere from \$75 million to \$4 billion (22, 23).



Source: EvaluatePharma, 'World Preview 2013' (June 2012)

In the fastest growing markets—the BRICS in particular—sales growth by 2020 will be primarily driven by generics rather than new patented products.



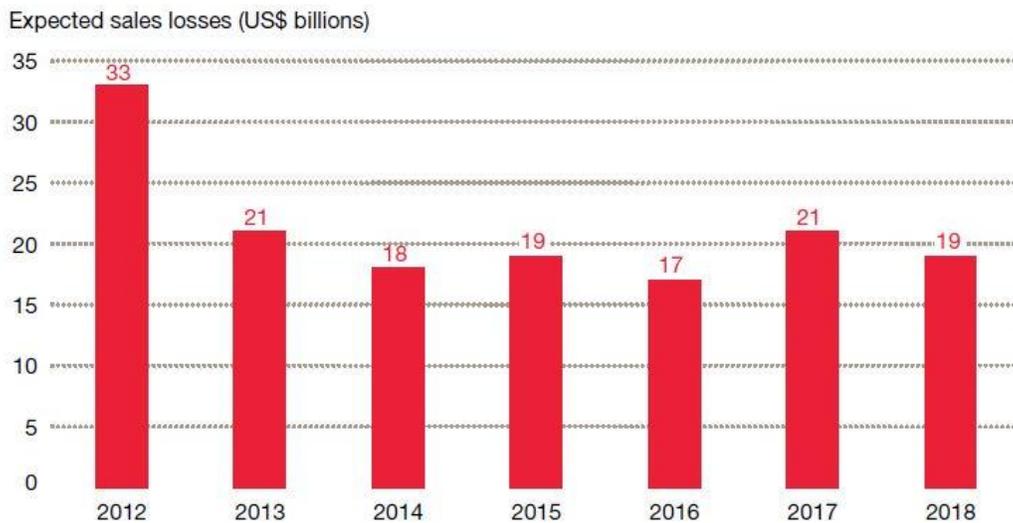
Source: Business Monitor International

Note: All sales are expressed in US dollars at constant exchange rates.

This is not to say that innovation cannot drive profitability, but simply that old models of blockbuster R&D and high sales prices are unsustainable, particularly in the fastest growing markets. Even developed markets such as the EU and Japan are reinforcing and expanding generics (50, 51).

Regulation and Market

Expected sales losses from generic competition are anticipated to cut pharma revenues by \$148 billion between 2012 and 2018 while direct and indirect price controls further erode standard revenue streams (27).



Sources: EvaluatePharma, 'World Preview 2018' (June 2012)

Note: Estimate of losses based on top 500 pharmaceutical and biotech companies.

Healthcare expenditures as a percentage of GDP are rising and as they do political pressure to control costs and reign in dubious marketing practices and politically unpopular corporate profits also rise. The Affordable Care Act (ACA) in the United States is just one of many moves by governments expanding towards universal care and the general principle of healthcare as a human right. The ACA is projected to reduce pharma industry revenue from branded medicines by \$112 billion over the next decade (41), but the overall shift towards value-based purchasing and pay-for-performance replacing fee-for-service models will reverberate throughout the healthcare sector.

Pharma Corporate Stagnation

Blaming corporate culture is a popular and perhaps over-emphasized explanation for industry problems. However, pharma does seem to face a genuine challenge in terms of portfolio management, risk assessment, and R&D innovation. In the words of equities analyst Andrew Baum, pharma has replaced the "fail early, fail cheap" entrepreneurial code with "failing late, failing more, and failing expensively" (175). Companies have not paid enough attention to focusing and specializing their portfolios and they have failed to put incentives in place for R&D teams to discriminate between molecules with

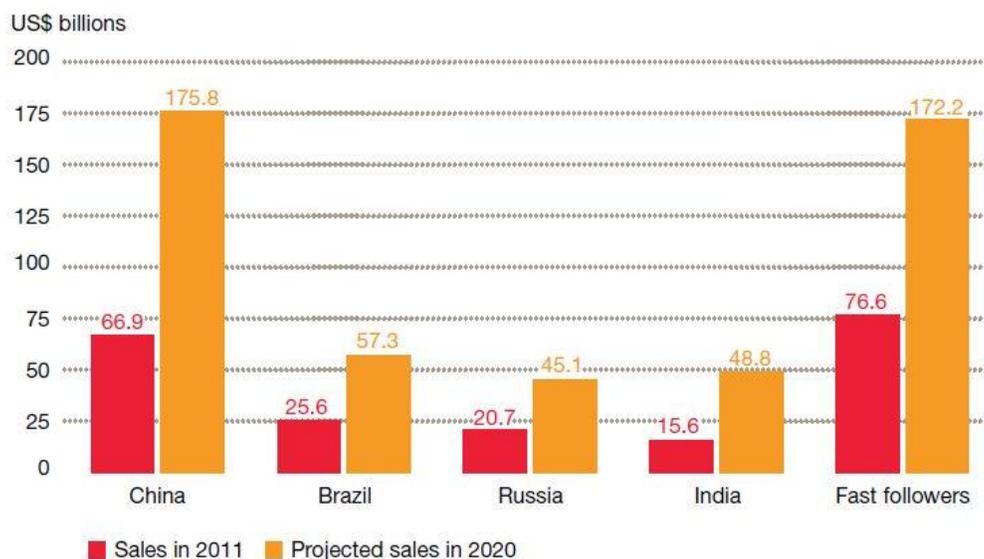
potential and those headed for failure. An overly bureaucratic corporate structure has further exacerbated these problems.

OPPORTUNITIES

The same forces that are challenging pharma today also represent the greatest opportunities in the coming decade: namely personalized and preventive care, emerging markets, collaborative R&D, and new paradigms of medical care.

Growth Markets

Expenditures on medicines in growth markets is anticipated to nearly double from \$205 billion in 2011 to \$499 billion by 2020. The BRIC economies will make up a third of world GDP (86).



Source: Business Monitor International

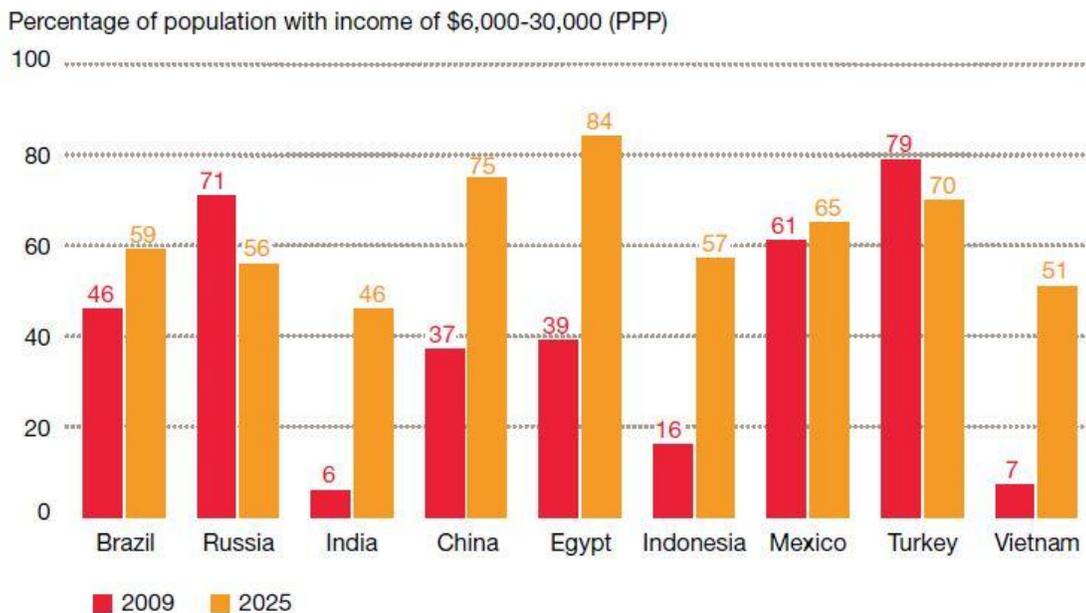
Notes: (1) All sales are expressed in US dollars at constant exchange rates; (2) The fast followers include Argentina, Egypt, Indonesia, Mexico, Pakistan, Poland, Romania, South Africa, Thailand, Turkey, Ukraine, Venezuela and Vietnam.

However, business models for these emerging markets are not self-evident. Pharma companies have taken a variety of approaches, ranging from Roche's innovation-driven high value strategy (92) to GSK's market-driven focus on generics, primary-care products, and differential pricing (93).

Figure 4 Big pharma's using four strategies in the growth markets



Both of these strategies have their pros and cons—volume vs. pricing in particular. However, pharma companies also need to assess the potential of the “bottom of the pyramid” and mass-market approaches to complex services such as high-volume affordable heart surgery (104) or assembly-line style eye surgery (105). Likewise, stimulating demand and developing novel logistical and marketing strategies can reach previously untapped markets. Colalife, for example, distributes anti-diarrheal drugs by packing into the space between coke bottles being distributed to rural areas in the developing world (106). This kind of thinking can have huge potential when taken to scale in growth markets while recognizing the highly varied regulatory, cultural, and market conditions.



Source: Goldman Sachs

Note: In Russia and Turkey, the percentage of the population falling within these parameters is declining as more people move into higher-income groups.

New Payers, New Evidence

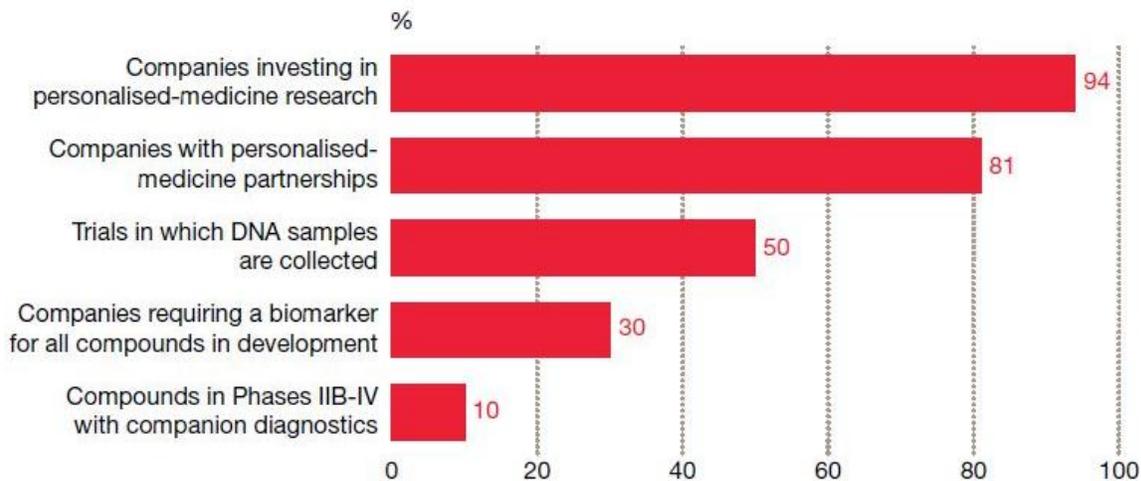
As governments, regulators, and insurers shift towards value-based payment structures, opportunities have expanded in defining value and evidence. While randomized controlled clinical trials will remain the gold standard, measuring and understanding real-world impact and capturing patient experience is gaining acceptance.

The importance of patient experience is difficult to understate here. Patient satisfaction accounts for nearly a third of the quality measures used to evaluate value-based purchasing in the US (62). The myelofibrosis drug Jakafi was approved by the FDA based largely on patient reported outcomes and led to the unusual inclusion of symptom relief information on the packaging (63). Real world reporting and evaluation is essential to these approaches.

Pharma companies have also neglected their relationship with payers, an area ripe for development by communications firms in particular. A mere 5% of US health insurers are confident in the quality of pharma-provided economic data and only 7% are “very confident” in information on a drug’s comparative effectiveness (61). These numbers are shockingly low considering the importance of these measures in decisions on reimbursement and coverage, and increasingly on clinical guidelines for physicians and prescribers. The need to better communicate the relative benefits of new products is growing—but it is shifting from marketing to consumers towards “marketing” in a broader sense that is targeted at convincing decision makers through compelling data and evidence and demonstrating the real-world and personal impact of a given product.

Genetics and Genomic Medicine

Genetics and genomics are transforming medicine. Breast cancer screening, for example, was revolutionized by the identification of the BRCA1 gene and Herceptin. DNA testing in 2012 has further revealed 10 different tumor subtypes, opening up opportunities for even more targeted, individualized treatments. And yet, pharma companies spent only 7% of total R&D budgets on genomics in 2011 (133). PWC estimates this share could easily rise to over 20% by 2020 as the potential of these targeted, personalized treatments grows and is embraced by consumers, physicians, and ultimately the pharma companies that stand to profit from their development.



Source: Tufts Center for the Study of Drug Development

Genetics and genomics will also transform the way that patients perceive their own care, building on the information-age changes already underway. Informed and empowered patients demand personalized treatment options and have the potential to take a greater role in the management and monitoring of their own health. However, the proliferation of information and misinformation as well as the complexities of privacy concerns will mean that clear communications and information management will be more important than ever.

The HONDAs

One of the results of institutional cost-cutting pressures has been a rigorous evaluation of where those costs are coming from. Healthcare payers have come to realize that so-called HONDAs—Hypertensive, Obese, Non-compliant, Diabetic Asthmatics—account for an estimated 70% of healthcare costs (39). This is both a problem and an opportunity. Cost remains a prime driver behind treating and managing these conditions, however payers and providers are increasingly willing to experiment with new solutions that shift HONDAs out of hospitals and into the home, that help them to manage their own conditions, and that reduce overall long-term costs even at short term expense.

“From Blood and Guts to Bits and Bytes”: Personalized Care, mHealth, and “Pill Plus”

At the same time as care and treatment options are increasingly tailored to individual genomes and co-morbid conditions, patients/consumers are taking a broader role in their own diagnosis, monitoring, and treatment. This trend actually parallels the pay-for-performance shift in government and other payers. Both individuals and institutions are demanding clinical, financial, and more subjective outcomes. Institutions require lower morbidity and mortality, lower re-admissions, and lower costs. Patients increasingly demand greater transparency, more control and convenience, and lower costs as well as more intangible benefits and tradeoffs in lifestyle and overall health and wellness.

mHealth and “pill plus” solutions that provide diagnosis, treatment, and monitoring packages have the potential to address both payer and patient demand. In the US alone, over \$210 billion is wasted every year in overuse or misuse of medicines and procedures. Conditions that can be addressed through lifestyle changes account for another \$303-493 billion per year (55). If pharma companies can create compelling, data-driven, proven solutions to these problems, they will address the demands of multiple stakeholders. Simple solutions such as reducing dosing frequency, providing compelling reminders, or prescribing mobile apps to accompany drug prescriptions have huge potential (56). Importantly, these principles apply equally in both growth and established markets.

mHealth itself remains poorly defined, but the potential to tap into mobile surveillance, data collection, health monitoring, diagnosis, and even treatment are paving the way to a “care anywhere” future. Even payment is going mobile, both in established and growth markets—in Kenya almost 14 million people use the mobile banking system M-Pesa and many are looking at ways to connect mobile banking to mHealth (109, 110). The potential of these technologies will improve compliance, reach remote communities (and thus previously inaccessible markets), and shift the point of care out of hospitals and clinics and into communities and homes.

Collaboration and Specialization

Many pharma executive are coming to recognize the value of “open innovation,” partnering with universities, government agencies/ministries, and other private-sector

companies in drug discovery. Given the high cost of failure in development and the disturbingly high rate of failure due to strategic reasons or ineffectiveness, cooperation becomes increasingly attractive(138).

| | Attrition rates | | Current reasons for failure |
|------------------|-----------------|------|--|
| | 1990 | 2010 | |
| Phase I | 33% | 46% | |
| Phase II | 43% | 66% | Insufficient efficacy (51%) Safety concerns (19%) Strategic issues (29%) |
| Phase III | 20% | 30% | Insufficient efficacy (66%) Safety concerns (21%) |

Sources: Fabio Pammolli et al., 'The productivity crisis in pharmaceutical R&D'; Steven M. Paul et al., 'How to improve R&D productivity'; and John Arrowsmith, 'Trial watch: Phase II failures: 2008-2010'; 'Trial watch: Phase III and submission failures: 2007-2010'; and 'A decade of change'

Given the need for increased cooperation around foundational pre-competitive research, side effects, and genetics, pharm specialization will take on increased importance in coming years. Rather than trying and failing to cover all of their bases, pharma companies need to prune their portfolios, hire or collaborate with the best in a given field, and specialize. This can lead to "ownership" of a given disease or disease class, such as Pfizer with vascular health and GSK with oncology (57, 58, 59).

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