

IBM Institute for Business Value

# Collaborative innovation

*Partnering for success in Life Sciences*



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## **IBM Institute for Business Value**

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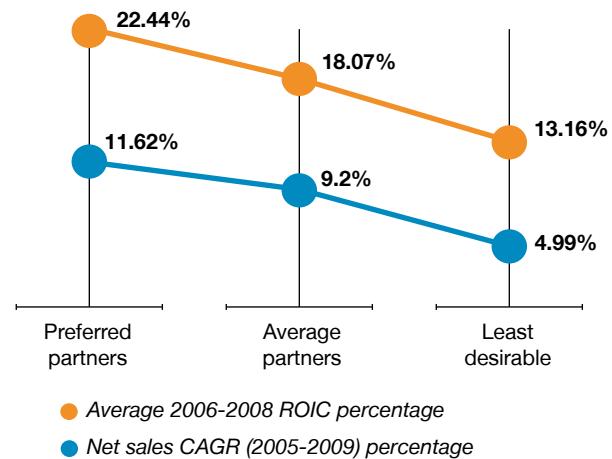
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By Stuart Henderson, Salima Lin, Heather Fraser, Per Lindell and Tiffany Yu

**The ability** to tap new sources of innovation is becoming more important than ever, as declining R&D productivity, the “patent cliff” and intense generic competition all take their toll on Big Pharma. If the industry leaders are to collaborate with biotech companies as effectively as possible, they will need to create explicit strategies and operating models for capitalizing on external R&D. They will also need to build a supporting information infrastructure and master the skills required to conduct networked R&D.

In 2009, nearly half the therapies approved by the U.S. Food and Drug Administration and European Medicines Agency were biopharmaceutical products – clear evidence of the growing contribution biotechnology is making to the development of new medicines and compelling grounds for Big Pharma to collaborate with its smaller brethren.<sup>1</sup> In addition to this, there is yet another reason why the industry leaders should be polishing their collaboration skills: the latest biopartnering study conducted by IBM and Silico Research has uncovered a correlation between popularity as a partner and financial performance.

Our analysis shows that the seven pharmaceutical companies that biotech firms have most wanted to work with over the past four years are also those with the strongest financial records. Between 2006 and 2008, they enjoyed higher sales growth. They also earned returns on invested capital that were, on average, 70 percent higher than those achieved by the companies that were deemed the least desirable partners (see Figure 1).<sup>2</sup>



Sources: IBM Institute for Business Value and Silico Research; IBM analysis of publicly available information. For list of sources, please see page 15, Source 2.  
Note: We have analyzed the results from our 2006, 2008 and 2010 studies to identify preferred, average and undesirable partners. Preferred partners are the seven companies that, on average, enjoyed the highest rankings in all three studies. Average partners are the six companies that were middle-ranked, and undesirable partners are the seven companies that commanded the lowest rankings.

Figure 1: The most popular partners are also the companies that enjoy higher sales growth and deliver better returns.

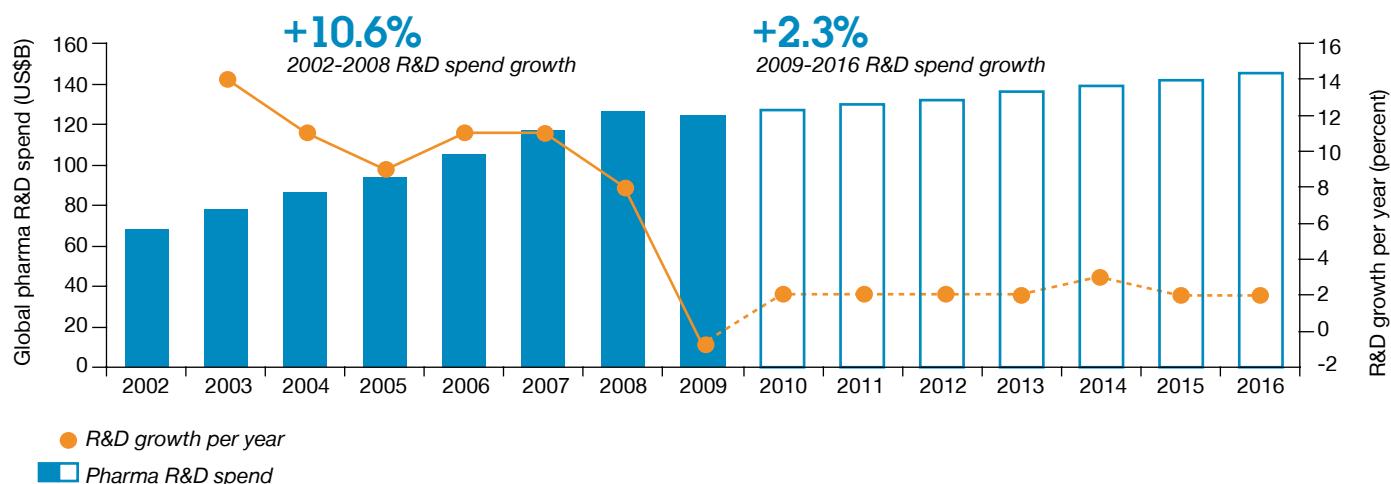
In short, success breeds success. Biotech executives looking for potential partners are attracted to financial outperformers with strong portfolios. The most popular partners are also those that can get access to the best external sources of innovation and thus the means with which to excel.

### Turbulent times

The ability to tap into new sources of innovation is becoming more important than ever. Big Pharma's problems with declining productivity have been exhaustively documented – and such problems are not limited to the pharmaceutical industry. Developing truly new business models, products or services that create value is difficult, as the changing constituency of the Standard and Poor's 500 demonstrates; only 78 of

the companies that were in the index when it was first compiled in 1957 were still on the list in 2008.<sup>3</sup>

Despite the many challenges it faces, Big Pharma has continued to invest heavily in innovation. Global spending on pharmaceutical research and development (R&D) rose at an average annual rate of 10.6 percent between 2002 and 2008.<sup>4</sup> But the shortage of profitable new medicines, the so-called “patent cliff” and intense generic competition finally caught up with the industry in 2009, when it was forced to reduce its expenditure on R&D for the first time in its history. Although R&D spending is projected to increase again over the next six years, the rate of growth is expected to be very much slower than before (see Figure 2).



Source: "World Preview 2016." EvaluatePharma. May 2010.

Figure 2: The rate of increase in spending on pharmaceutical R&D is slowing down.

The competition for promising drug candidates is also likely to escalate, as venture capital becomes more widely available again. In 2008, when the financial crisis was at its worst, venture capitalists invested just US\$6.1 billion in U.S., Canadian and European biotech companies – 17.2 percent less than the previous year.<sup>5</sup> But the situation is gradually improving. U.S. venture capital investment in biotech companies reached US\$1.3 billion in the second quarter of 2010, a 59 percent increase on the US\$812 million that was invested in the previous quarter.<sup>6</sup> The European venture capital sector is likewise showing signs of recovery, with biotech deals worth a total €262 million in second quarter 2010, up from €239 million in the first quarter.<sup>7</sup>

Moreover, many biotech companies are becoming more savvy negotiators. Rather than entering into global agreements, they are forming national or regional partnerships. This enables them to strike a harder bargain. The recent deal between Reata Pharmaceuticals and Abbott Laboratories is one such instance. Despite retaining the U.S. rights to its renal disease candidate bardoxolone methyl, Reata secured the largest upfront payment ever to be made for a Phase II product.<sup>8</sup> Most biotech executives have also realized that adopting a national or regional approach increases the odds of forging a strong partnership. They can get direct access to top management in the subsidiary, rather than going through global channels and having to liaise with a relatively junior business development manager.

Other major changes are taking place, too. In the course of completing the research for its 2010 Global CEO Study, the IBM Institute for Business Value interviewed 76 chief executives and senior managers from the life sciences sector. A full 71 percent – 14.5 percent more than the average – told us they expect the industry to undergo huge alterations over the next five years, with significant consequences for their own organizations. And although they share many of the same concerns as CEOs in other sectors, several issues worry them even more deeply. They are, for example, particularly anxious about the shift of economic power to emerging markets, the growing role of government and the trend toward globalization – all pressures that mean the industry will have to learn how to develop and distribute new medicines more efficiently.<sup>9</sup>

Biotech executives and academic researchers alike are uncertain how these changes will affect Big Pharma's attitude toward biopartnering. But one thing seems clear: the biopharmaceutical companies best at finding new partners, negotiating terms and managing the relationships they form will have a head start over their rivals in building stronger pipelines and supply chains (see sidebar "What is biopartnering?"). So, which companies "play nicely" and what are they doing to win biotech companies over to their side?

## What is biopartnering?

Biopartnering is the sourcing, formation and management of collaborations. The most efficient life sciences companies proactively source the best deals and enable prospective partners to reach them easily, thereby building a reputation for being a "partner of choice." They use the due diligence, valuation and negotiating process to build a relationship of mutual trust. They realize the value of the partnerships they form by creating and executing robust business plans and organizational and governance arrangements, as well as by utilizing powerful collaborative technologies.

## Top of the charts

Our 2010 biopartnering study, the sixth to be conducted by IBM since 1999, assesses how well the 24 biggest biopharmaceutical companies, measured by global revenues, interact with small biotech firms and academia. It draws on the views of 242 respondents from commercial and academic organizations around the world, 16 percent more than the number who participated in 2008. (For further details of the study population and methodology, please see Appendix 1, page 12.) As in previous years, it reveals some pronounced differences in performance.

Let's begin with the fact that several companies consistently rank "top of the pops." Three of the five companies with which biotech executives most want to partner this year – Roche, Genentech and Lilly – have featured high on the list since 2006, while a fourth – GlaxoSmithKline – has done so since 2008.<sup>10</sup>

2006 ranking	2008 ranking	2010 ranking
1. Roche	1. Genentech	1. Roche
2. Novo Nordisk	2. GlaxoSmithKline	2. Genentech
3. Genentech	3. Merck	3. AstraZeneca
4. Lilly	4. Roche	4. Lilly
5. Johnson & Johnson	5. Lilly	5. GlaxoSmithKline

Source: 2010 Biopartnering Survey. IBM Institute for Business Value and Silico Research.

Figure 3: Three companies consistently stand out from the crowd.

Moreover, these companies are not simply good at handling one aspect of biopartnering, be it deal sourcing, formation or management; on the contrary, they stand out in most other ways (see Figure 4). Roche has ranked among the top five companies in all but one category in one year. Lilly, GlaxoSmithKline and Genentech have also regularly appeared in the top five rankings, although Genentech has lately slipped down the ladder. It figures among this year's most highly rated partners primarily because of its high ranking across other individual partnership drivers that were measured. These include its reputation for innovativeness, the caliber of its people and its strong commitment to partnering at senior management level.

The key question is what are these companies doing to lead the pack? They clearly excel at the basics; all have superb scientific skills and good reputations. But they have also developed explicit strategies for externalizing their R&D. Roche, for example, has built an "innovation network" (See sidebar "Roche: Reaching out to the wider R&D world" on page 11) that includes more than 150 partners worldwide.<sup>11</sup> Similarly, Eli Lilly has established long-term partnerships with various service providers, including Covance and Fisher Clinical, as it transforms itself from a fully integrated pharmaceutical company (FIPCO) into a fully integrated pharmaceutical network (FIPNET).<sup>12</sup>

## Up, down and all around

Several companies have also improved their scores dramatically in this year's survey, AstraZeneca being one of the most notable instances. It has soared from eleventh place in 2008 to third place in 2010, while Novartis and Boehringer Ingelheim have leapt seven places to rank eighth and ninth, respectively.

### Deal sourcing top 5 rank

2006 ranking	2008 ranking	2010 ranking
1. Roche	1. Genentech	1. Eisai
2. Genentech	2. Merck	2. Eli Lilly
3. Amgen	3. GlaxoSmithKline	3. AstraZeneca
4. Abbott	4. Roche	4. GlaxoSmithKline
5. Novartis	5. Boehringer Ingelheim	5. Roche

### Deal making top 5 rank

2006 ranking	2008 ranking	2010 ranking
1. Roche	1. Genentech	1. Roche
2. Amgen	2. Merck	2. Eli Lilly
3. Eli Lilly	3. Roche	3. GlaxoSmithKline
4. Genentech	4. Eli Lilly	4. AstraZeneca
5. Johnson & Johnson	5. BMS	5. Teva

### Partnership management top 5 rank

2006 ranking	2008 ranking	2010 ranking
1. Roche	1. Genentech	1. AstraZeneca
2. Amgen	2. Eli Lilly	2. Roche
3. Genentech	3. Novo Nordisk	3. Eli Lilly
4. Johnson & Johnson	4. Takeda	4. Takeda
5. AstraZeneca	5. Merck	5. GlaxoSmithKline

Source: 2010 Biopartnering Survey, IBM Institute for Business Value and Silico Research.

Figure 4: The most highly rated companies excel at every aspect of biopartnering.

All three companies have invested a great deal of effort in improving their biopartnering skills, as evidenced by the comments they elicited. Novartis earns high praise for its “excellent R&D leadership,” “focus on science” and responsible attitude in dealing with the media, for example, while Boehringer Ingelheim is lauded as an organization “that commits to deadlines, responds to issues and provides feedback in a timely manner.”

Conversely, a number of companies have fallen back, either because they have made a conscious decision to devote less attention to partnering or because they have been preoccupied with other issues, such as integrating new acquisitions.

Some companies routinely tag along at the rear. These “trudging apatosauri,” as one respondent called them, are widely criticized for being too slow, too bureaucratic and too aggressive; they are “easily outflanked by smaller and nimbler firms,” which they then “kill, buy or hobble through lawyers and money.”

### The qualities that count for most

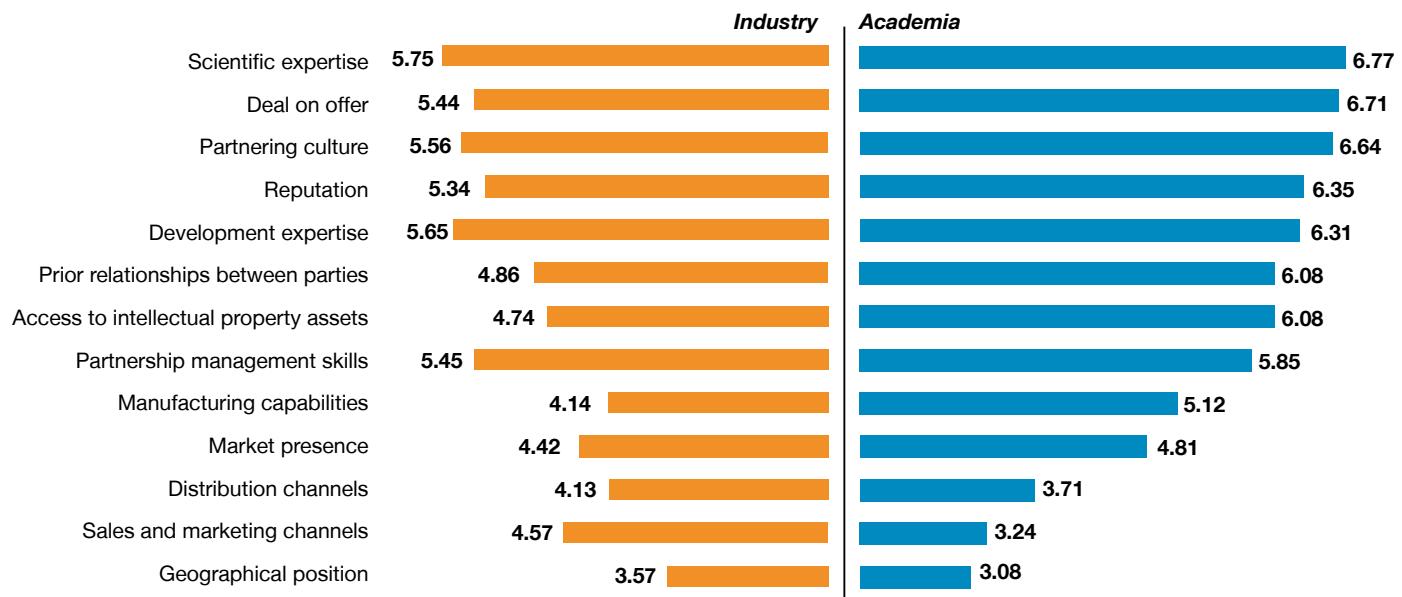
Our study shows how the big biopharmaceutical companies perform in the biopartnering stakes. It also provides an insight into the qualities that matter most to biotech executives and academics when they are looking to partner. Development expertise and partnership management skills still count for a lot, but biotech executives now put more emphasis on scientific expertise and partnering culture than they did in 2008. For example, the deal on offer comes just fifth on the agenda, down from first place two years ago. This suggests that most biotech executives are more concerned with finding compatible and supportive partners than with squeezing out every cent.

Academic researchers have similar priorities, with two specific exceptions. They value corporate reputation and financial remuneration much more highly than biotech executives do – possibly because research output and the ability to raise funds are the two main criteria for promotion in universities (see Figure 5).

## Recommendations

How then can the industry leaders make themselves more attractive to potential partners, as the importance of external R&D rises? We believe that, if they are to remain competitive, they will need to adopt a highly networked R&D model.

A few biopharmaceutical companies still rely largely on in-house R&D, but most companies have already adopted a more collaborative approach, some of them with considerable success. All the companies that rose in this year's biopartnering rankings have either recently created collaborative operating models (See sidebar "Boehringer Ingelheim: Building a strong contacts book" on page 8) or refined their existing collaborative models, for example. However, those that consistently garner the highest ratings not only have well established collaborative operating models, but are also experimenting with networked R&D – by which we mean the creation of complex, interconnected relationships that extend beyond the enterprise itself (see Figure 6).



Source: 2010 Biopartnering Survey. IBM Institute for Business Value and Silico Research.

Note: The importance of each driver was rated on a scale of one to seven, seven being the most important.

**Figure 5: Biotech executives and academics have similar priorities when they are evaluating potential partners.**

	<b>Enterprise R&amp;D</b>	<b>Collaborative R&amp;D</b>	<b>Networked R&amp;D</b>
<b>Innovation sourcing</b>	Internally focused	Internal focus plus some external collaborations	An innovation network that extends beyond the enterprise
<b>Processes</b>	Managed by functions	Managed by therapeutic areas	Managed by projects
<b>Organization</b>	Fixed functional <i>(Chemistry, toxicity, etc.)</i>	Fixed therapeutic areas <i>Plus supporting functions</i>	Flexible project teams <i>Plus select large-scale support functions</i>
<b>Culture</b>	“We are the world.”	“We are part of the world.”	“The world is our laboratory.”
<b>Investment criteria</b>	Internal hurdles	Science driven internal hurdles	Science driven external comparative hurdles
<b>Licensing</b>	Traditional in- and out-licensing <i>Small function</i>	Empowered in-licensing <i>Large function</i>	Embedded in the organization <i>Small orchestrating function</i>
<b>Mergers and acquisitions</b>	Ingest and transform	Ingest and co-exist	Integrate into the network

Source: 2010 Biopartnering Survey, IBM Institute for Business Value and Silico Research.

Figure 6: Biopharmaceutical R&D will become increasingly networked.

Our analysis suggests that three elements are required to become a “partner of choice” and top-performing R&D organization:

- A strategy and target operating model with collaboration at its core
- A collaborative information structure to support the “to-be” operating model
- Active experimentation with the components of the networked R&D model.

#### **Creating a strategy and target operating model with collaboration at its core**

The first step in becoming a partner of choice is to establish a strategy and target operating model that will enable a company to take advantage of external R&D. Both parts of the equation must be in place, since a strategy that isn’t backed by an operating model is one that will never be properly implemented.

### **Boehringer Ingelheim: Building a strong contacts book**

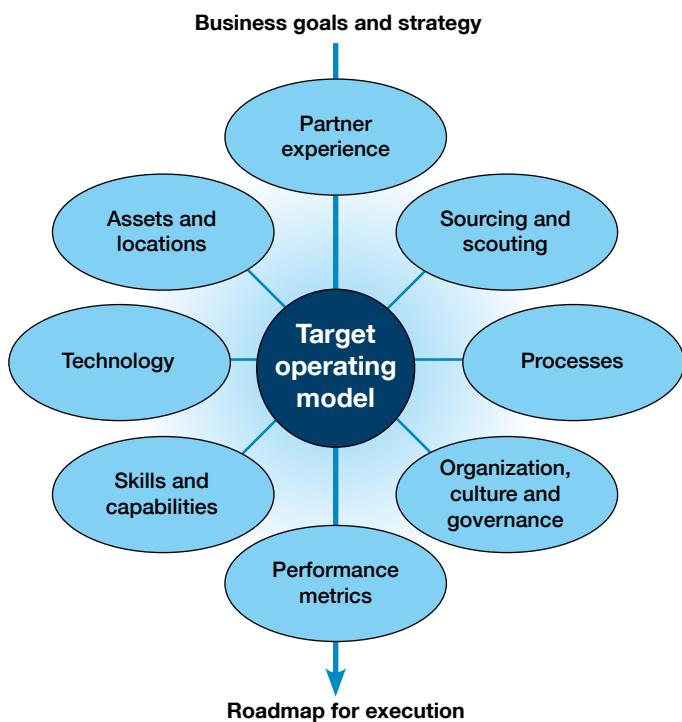
Some years ago, Boehringer Ingelheim modified its innovation sourcing strategy into a more outward-looking approach, accessing external innovation more effectively. Although the company was awarded high marks from its existing partners, many biotechnology firms knew very little about the privately held global pharmaceutical corporation. “We hadn’t signed many deals, but we paid a lot of attention to setting up the deals we did establish as true collaborations, with mutual recognition of each other’s expertise and input brought along. This was clearly reflected in the feedback we received,” Dr. BJ Bormann, Senior Vice President of Business Development and Licensing, explains.

Boehringer Ingelheim established a central licensing group managed by top experts in senior positions. The group operates globally in a matrix fashion and consists of separate therapeutic area-focused licensing teams, with representatives from research, medical, development and marketing. If an opportunity falls outside the respective therapeutic areas, it will be evaluated by a cross-functional team that includes people from every therapeutic area to collectively assess the opportunity.

Boehringer Ingelheim’s management has simultaneously promoted a partnering mentality of mutual support that allows concerted efforts to present at conferences while also building its contacts with biotech companies and venture capitalists. “We consider this to be a ‘what-we-can-do-for-you’ mentality,” says Dr. Bormann.

Boehringer Ingelheim’s hard work has paid off handsomely, as the results of this year’s biopartnering survey show. The company has also cemented a number of important and creative deals and is eliciting positive comments from prospective partners.<sup>13</sup>

The strategy must explicitly support collaboration, both internal and external, and must be sponsored by top management. Collaborating successfully is difficult; it requires serious and continuous organizational commitment. The target operating model must likewise extend to the entire organization and spell out how best to deploy the relevant resources (see Figure 7).



Source: IBM Institute for Business Value.

*Figure 7: A collaborative target operating model harnesses the disparate resources within the organization so that it can form stronger, deeper partnerships.*

Many companies make the mistake of creating localized operating models in their business development functions and focusing only on the organizational structure and processes. But in companies with mature operating models, collaboration is not isolated in a specific function; it is embedded in every area of the business – from R&D to Finance and IT. The skills, technologies, metrics and rewards required to sustain teamwork across organizational boundaries are also in place. In fact, collaboration is so integral to the culture of these companies that it's almost a state of mind.

#### **Building a collaborative “infostructure”**

The second step in effective partnering is to establish an information infrastructure – or “infostructure,” as we call it – to support external collaboration (see Figure 8). This includes existing collaboration tools and networks such as shared infrastructure, platform and software models; health and patient information exchanges; and scientific social networking tools. In addition, modern technologies, such as cloud computing, are making it increasingly easy to work together regardless of location or time zone. A fully integrated global cloud and shared workspace with common systems, processes and data enables people from multiple organizations to collaborate rapidly, economically and securely. (For a more comprehensive discussion of cloud computing and its applications in the life sciences industry, see our report “The wisdom of the cloud: Cloud computing in the life sciences industry.”)<sup>14</sup>

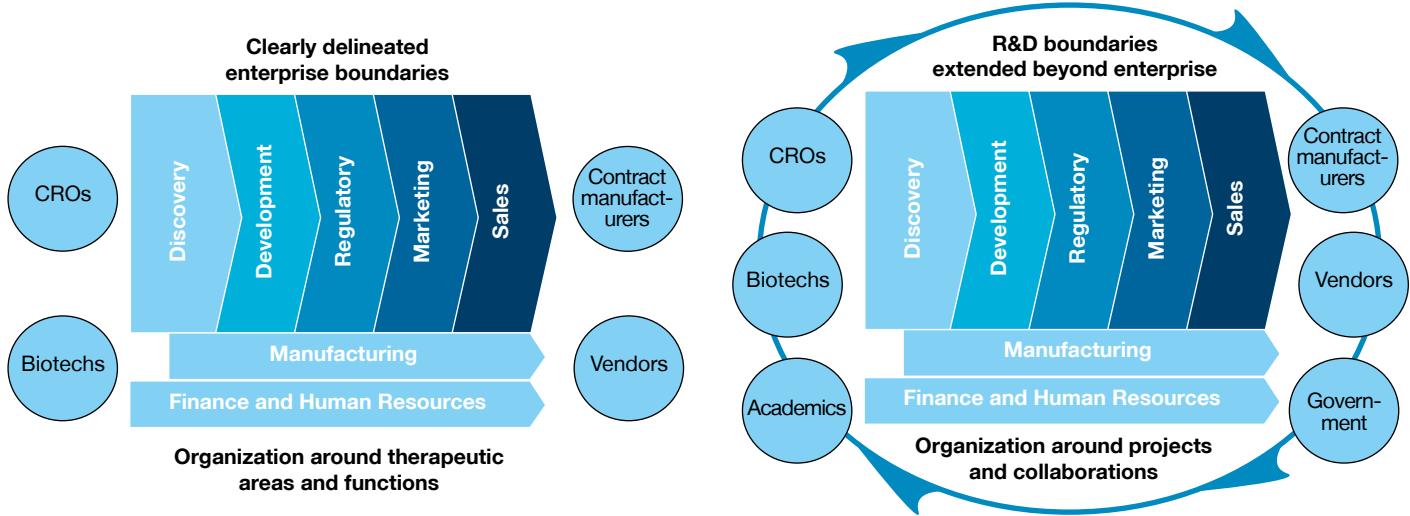


Source: IBM Institute for Business Value.

*Figure 8: Collaborative infostructures provide a workspace in which users from multiple organizations can easily work together.*

#### **Preparing for a future of networked R&D**

The final step is to prepare for a future in which R&D is not collaborative but networked. In a collaborative R&D operating model, there are clearly delineated boundaries between an enterprise and its external partners (see Figure 9). In a networked R&D operating model, by contrast, the boundaries are porous (see Figure 10). The enterprise engages in numerous collaborations, both internal and external, covering everything from early-stage research through to marketing and sales. It creates and dismantles teams as necessary, and its workflows extend across projects, in respect of both space and time.



Source: IBM Institute for Business Value.

*Figure 9: In a collaborative R&D operating model, the boundaries between the enterprise and its partners are still clearly defined.*

Making the transition from collaborative R&D to networked R&D entails mastering many new skills – skills that will take time to develop and learn. In networked R&D, for example, there are too many relationships for any one function to manage, so most of the activities involved in collaborating with others have to be embedded within the organization. The traditional licensing function is thus likely to give way to a function responsible for coordinating a company's collaborative activities and providing specialist skills like deal structuring, but which does not initiate or manage most of the partnerships itself.

Source: IBM Institute for Business Value.

*Figure 10: In a networked R&D operating model, the boundaries between the enterprise and its partners are porous.*

Similarly, different relationship management skills are required to support networked R&D.

In a conventional alliance, the respective parties interact with each other periodically, but they don't work together continuously as a cohesive unit. Rather than relying on the current model of alliance management, pharmaceutical companies will therefore have to adopt a new model in which every contact is treated as a potential part of their collaborative R&D ecosystems.

### **Roche: Reaching out to the wider R&D world**

Roche has long been perceived as a first-rate partner, not least for the way in which it has managed its relationship with Genentech. It is now refining its approach even further. "We have always had a strong alliance management group, and we are now expanding this to be able to run collaborative projects in exactly the same manner as internal projects," Dr. Dan Zabrowski, Roche's Worldwide Head of Partnering, explains.

Roche is beginning to put some of the key components of a networked R&D organization in place. It has established three close academic collaborations and expects to create another three next year. Its existing academic networks have already proved very fruitful. "You just don't know what people are working on out there. Through our academic collaborations we've found researchers who have thought for a long time about issues that we've only just started considering," says Dr. Zabrowski.

Roche is also in close touch with various venture capitalists, although it prefers to cultivate warm relationships with a small handful than to maintain a very wide network of contacts. "We can talk to them much more deeply. We learn a lot from hearing about what they're looking for in making investments and what they're looking for in a partnership," Dr. Zabrowski concludes.<sup>15</sup>

### **Conclusion**

Demand for safer medicines, better outcomes, more accountability and greater value from the life sciences industry is increasing, as people's expectations rise. Any biopharmaceutical company that wants to fulfill these expectations and compete effectively will have to collaborate with other organizations. Many firms are already collaborating quite extensively, and some of them are doing so very successfully. Our research shows that there's a demonstrable connection between those companies good at biopartnering and those that deliver the best financial returns.

But it also shows that some companies are still reliant upon sporadic liaisons rather than sustained partnerships and that, if the industry is to collaborate in the fullest sense of the word, the leading companies will have to adopt a different operating model. They will have to build R&D networks with permeable intellectual, structural and informational boundaries so that they can tap the knowledge of the scientific community at large. Mass cooperation across time and space is transforming the way in which numerous sectors work, giving birth to new business models and providing new ways of creating real economic value. The life sciences industry can learn from such precedents.

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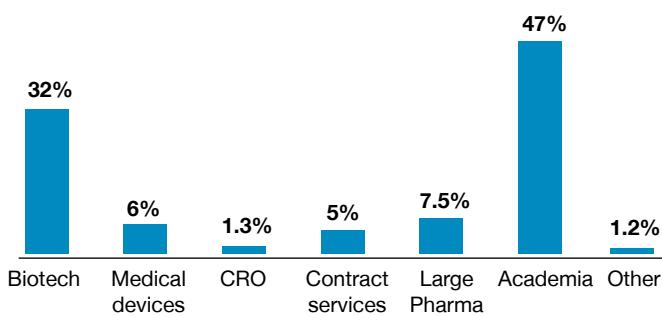
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## Appendix 1

### Study population and methodology

The 2010 Biopartnering Study was jointly conducted by the IBM Institute for Business Value and Silico Research. It draws on the responses of 242 people from commercial and academic organizations around the world (see Figure 11).



Source: 2010 Biopartnering Survey. IBM Institute for Business Value and Silico Research.

Figure 11: Respondents by sector.

Two questionnaires, long and short, were distributed. The long version went to sponsors and their partners, asking for detailed feedback about each partnership with the sponsoring company. The short version was sent to academic researchers and other executives in the sector, who were asked to nominate between three and 10 of the largest 50 life sciences companies with which they were most familiar. They were then asked to rate each company in five respects:

- Its skills in initiating alliances
- Its skills in negotiating alliances
- Its skills in managing alliances
- Its attractiveness as a partner
- How readily they would recommend the company as a partner to colleagues.

The responses of academic researchers were excluded from the calculation of the rankings for sponsoring companies, except where specified, to ensure comparability with previous studies.

## About the authors

Stuart Henderson is the Americas Life Sciences R&D leader of IBM Global Business Services. He has over 14 years experience in the pharmaceutical and life sciences industry, covering business and IT capabilities across the value chain. He has successfully led numerous global multidimensional projects, including many projects focusing on the alignment of business and technology to deliver measurable benefits. He has also worked on business and IT strategy, market analysis, solution development, solution implementation, post-merger integration and post-implementation review. Stuart is a key member of the IBM Life Sciences thought leadership team. He contributed significantly to the “Pharma 2005” and “Pharma 2010” series and was the principal author of “Pharma 2005: Silicon Rally – the race to e-R&D.” He can be reached at [stbender@us.ibm.com](mailto:stbender@us.ibm.com).

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## The right partner for a changing world

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## References

- 1 The U.S. Center for Drug Evaluation (CDER) approved 25 new molecular entities, six of which were biologics. The U.S. Center for Biological Research and Evaluation (CBER) approved another 10 novel biopharmaceutical products. The European Medicines Agency (EMA) issued 50 marketing authorizations, 24 of which were for biopharmaceutical therapies. The two agencies thus issued 85 approvals, 40 of them for biopharmaceutical products.  
  
For information on the number of approvals issued by CDER, see [mhttp://www.fda.gov/downloads/Drugs/DevelopmentApprovalProcess/HowDrugsareDeveloped-andApproved/DrugandBiologicApprovalReports/NMEDrugandNewBiologicApprovals/UCM091096.pdf](http://www.fda.gov/downloads/Drugs/DevelopmentApprovalProcess/HowDrugsareDeveloped-andApproved/DrugandBiologicApprovalReports/NMEDrugandNewBiologicApprovals/UCM091096.pdf); For information on the number of approvals issued by CBER, see Rader, Ronald A. "FDA Biopharmaceutical Product Approvals and Trends: Significantly More Approvals Were Granted in 2009." Biotechnology Information Institute. 2010. [http://www.biopharma.com/approvals\\_2009.html](http://www.biopharma.com/approvals_2009.html); For information on the number of marketing authorizations issued by EMA, see Maggon, Krishan. "New Drug Approvals Europe (EMA 2009)." <http://knol.google.com/k/new-drug-approvals-europe-ema-2009#>
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- 11 Details of Roche's innovation network are available at  
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