David-and-Goliath Collaborations

by Robert Thong, November 2014

About this Paper

The bioscience sector has witnessed tremendous growth in R&D externalisation and collaborative R&D programmes over the last decade. In particular, there has been a huge proliferation of “David-and-Goliath” collaborations between smaller companies or academic research groups (“David”) with much larger multinational corporations (“Goliath”). This paper looks at the specific factors that shape the successful execution of such collaborations. It outlines some of the key conclusions emerging so far from my ongoing research (see “About the Research” below).

About the Research

The views expressed in this paper derive from my observations at over 40 different organisations. I developed some preliminary hypotheses in early 2013, reflecting on a decade of working with around 20 smaller to medium sized companies in pharmaceuticals (“pharma”), biological and medical technology (“biotech”) and contract research (“CRO”).

In the late spring of 2013, I initiated a series of face-to-face interviews with (to date) over 40 individuals, the vast majority of these at 23 organisations that I had hitherto never worked with, including several academic research laboratories and large global pharmas. In approximately half of these organisations, I focused on the perspective of “Goliath”, and in the remaining half, on “David”.

I do not claim to have conducted a rigorous academic study. Instead, my views derive from an empirical synthesis of what I have seen and heard, subjectively interpreted through the filter of my two decades’ experience working with the bioscience and medical technology sector.

David-and-Goliath Collaborations are now the Norm

Aggregate R&D productivity across the bioscience industry has been falling for the past two decades[1]. In response, the large multinational pharmaceutical and medical technology

corporations have dramatically transformed their R&D models to embrace externalisation as a major contributor to their new product pipelines. By one recent estimate, external innovation now accounts for an average 64% of the late-stage pipeline value of the biggest companies, comprising 28% from co-development/joint venture, 13% from in-licensing and 22% from acquisitions[2]. While licensing and co-development/joint venture are obviously different collaboration structures, it should also be noted that many acquisitions of small biotechs by pharmas are the consequence of successful initial collaborations between the two parties.

Although the big multinational players have always partnered with their peers to some extent, the pressures they now face combined with the opportunities that are now available have led them to collaborate intensively with smaller firms and academia[3]. They are betting that by working externally with a large number of smaller R&D-based companies and academic research groups, their odds of generating successful innovations will be improved significantly by both having better ideas and "more shots on goal". However collaborations, especially ones where the two parties are quite different from each other, introduce additional layers of complexity and risk. Unless the industry gets better at managing these extra elements, the gains from increased R&D externalisation could be rapidly eroded.

Roadmap for this Paper

In section 1 of this paper, we describe some hidden reasons (in addition to the usual scientific and commercial risks) underlying R&D project failures in the bioscience sector, especially in the case of projects involving collaborating organisations. Next in section 2, we discuss how a number of critical ingredients need to be in place at the outset of David-and-Goliath collaborations to greatly improve the chances of success in such partnerships. We then look in section 3 at the key success factors driving successful execution of David-and-Goliath collaborations. Last but not least, we will highlight in section 4 some issues that apply specifically to collaborations between commercial bioscience R&D organisations and academic research groups.

---

1. See for example: Scannell, J.W., Blanckley, A., Boldon, H. and Warrington, B. (2012). *Nature Reviews Drug Discovery* Volume 11 March 2012.

2. Data is from figure 9 on page 11 of: "Measuring the return from pharmaceutical innovation 2013: Weathering the storm?", Deloitte UK Centre for Health Solutions (2013).

3. This development is articulated in: "Does Pharma's Emphasis On External Sourcing Of Drugs Represent A Strategic Shift Away From Internal Research?", John LaMattina, *Forbes* blog March 2014, http://www.forbes.com/sites/johnlamattina/2014/03/11/does-pharmas-emphasis-on-external-sourcing-of-drugs-represent-a-strategic-shift-away-from-internal-research/ retrieved August 2014.

1. Hidden Reasons for Collaboration Failure

More than Meets the Eye

The historical success rates in bioscience new product discovery and development are notoriously low, in the single digit percentages if one starts measuring from the discovery stages. A lot of promising science at the in vitro level does not translate into the clinic. And increasing regulatory hurdles, evolving medical practice and intensifying reimbursement/pricing pressures make marketplace requirements a moving target. So before any David-and-Goliath collaboration deal is signed, Goliath always conducts a thorough due diligence to assess the traditional scientific, regulatory and commercial (including payer) risk factors. And when the project is set up to be executed, both sides try to put into the collaboration the relevant resources to address these traditional risk factors.

But does the high observed failure rate result solely from these traditional risk factors? The "official" reasons for project failure are typically either *"the science doesn't work"* or *"the regulatory and market requirements couldn't be met"*. But do scientific and commercial risks fully explain the high project failure rates? If you informally ask pretty much anyone who has been involved in R&D projects for some years, they will often reflect on some projects where the manner in which the team operated or was governed was far from optimal. And the sheer number of repurposing successes is evidence that certain projects are myopic and fail to see the wider opportunities.

In theory, the scientific and commercial risks can be managed by assembling resources with the appropriate know-how. In practice, this may not be enough owing to:

- **Unpredictability** i.e. not all aspects of the project can be anticipated in advance
- **Linear thinking and myopia** whereby the team is unable to look at the situation in different ways if their original path leads to a dead end
- **People and communication issues** which prevent the team from working effectively

The above factors create a third class of risk factor, which we will call "execution risk". In other words, irrespective of the classic scientific and commercial risk reasons, there is always a certain proportion of projects, albeit not easily quantifiable, that fail owing to how these projects are managed and conducted:

> ***Execution risk*** *= the risk of the assembled scientific, regulatory and commercial skill sets not being deployed effectively nor efficiently enough, leading to poor or negative outcomes.*

Furthermore, in addition to the execution risk that could potentially afflict any project, David-and-Goliath collaborations are also very prone to a high degree of what we will call "collaboration risk", owing to the significant asymmetries between the two parties:

> ***Collaboration risk*** *= the risk arising from the additional complications in a collaboration situation, over and above the other types of risk already discussed.*

While greater R&D externalisation increases the odds of a better showing against the traditional risk factors (scientific, commercial), the impact of hidden execution and collaboration risks could serve to erode these gains or make matters even worse, unless steps are consciously taken to systematically ameliorate them. We shall concentrate in the remainder of this section on characterising these execution and collaboration risks.

Characterising Execution Risk

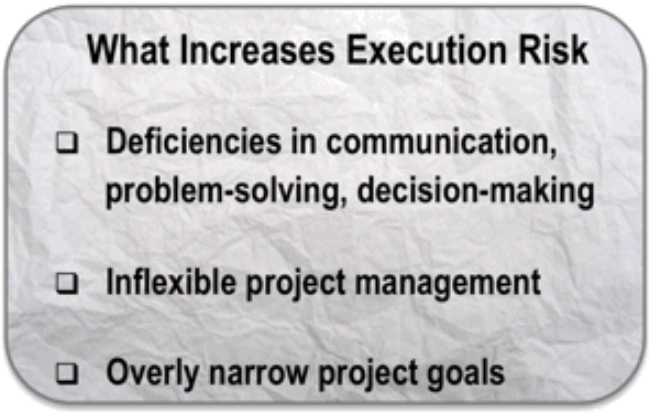
Good execution in bioscience R&D projects is not simply a case of carrying out the project plan on time and to budget. Unlike R&D in say aerospace or informatics, the underlying science is much less precisely understood while the operating environment (i.e. the human body) is hugely more complex. Furthermore, owing to the long new product cycle times mandated by regulatory testing, the precise economic and performance characteristics of the final product are hard to pin down at the outset. For example, the relative priorities placed by healthcare payers in 5 to 15 years' time on different diseases, and the level of intervention for each disease expected by physicians, cannot be accurately gauged today.

Project activities and timelines thus continually need to evolve as new information emerges – the project needs to operate in a nimble and adaptive way. And so any **deficiencies in communication, problem-solving and decision-making** of the project team and/or its governance committee are an obvious driver of execution risk.

In many companies, execution risk is increased by **an inflexible project management approach**. The conventional project management paradigm of adhering strictly to pre-set deliverables, timelines and activity budgets can cause more harm than good. Often, projects get stalled or even cancelled, because the team were unable or not allowed to adopt a more nimble, adaptive project path. What matters is getting to the end-goal, rather than how to get there.

In a similar vein, setting **overly narrow project goals** reduces the chances of significant new value emerging from the project. Because the biological systems in the human body are both complex and intertwined, many projects generate scientific findings which have much broader applicability than the original scope. But these insights are not noticed by the

project team nor the governance process if everyone is fixated on the original narrowly-defined goals. There are many stories of cancelled drug projects that were subsequently rescued through reformulation or repurposing by other companies. And what about the many rejected early-stage compounds that were never tested for other applications? Or the possibility of discovering innovative biomarkers as an additional benefit from a research programme into a new disease mechanism?



Execution risk is a feature of the inherently windy road of the project journey in bioscience and health technology R&D, where unexpected challenges as well as opportunities await around every blind corner - not just from the science, but also from the changing commercial, regulatory and organisational climates. This phenomenon affects all R&D projects in this sector, not just collaborative projects, but as we will discuss in the next section, execution risk is greatly exacerbated in a collaboration environment.

Characterising Collaboration Risk

There are fundamental **differences in organisational missions, processes and culture** between David and Goliath. For example, most academic research teams have a fundamental need to publish their research to further their academic careers. And in a similar vein, most small biotech companies need a stream of frequent “news flow” to grow their enterprise valuation and support investor fund-raising. Whereas a large global multinational might prefer its proprietary research and early development results to be kept under wraps until the resulting new products are closer to the marketplace. Furthermore, there is a stark difference in decision-making process and speed between David and Goliath.

There is also a huge **gap in power and risk perception**. Goliath provides most if not all of the funding, and maintains a large portfolio of both internal and external projects where over time it will prioritise some while closing the others. Whereas in David’s case, as say a small biotech, it needs the collaboration to provide cash flow and maintain investor credibility. The very real risk to David of its collaboration being terminated, put on hold or delayed by Goliath’s portfolio management process could be a threat to its very existence. Whereas for Goliath, this is just “normal business".

Unlike a project within a single company, a collaboration has the dilemma of **simultaneous role separation and duplication**. Within the project team, governance process and other project structures, there needs of course to be a division of labour between David and Goliath. But there also needs to be some "doubling up", so that each side can understand what the other is doing and learning in different functional areas e.g. clinical development people from both sides.

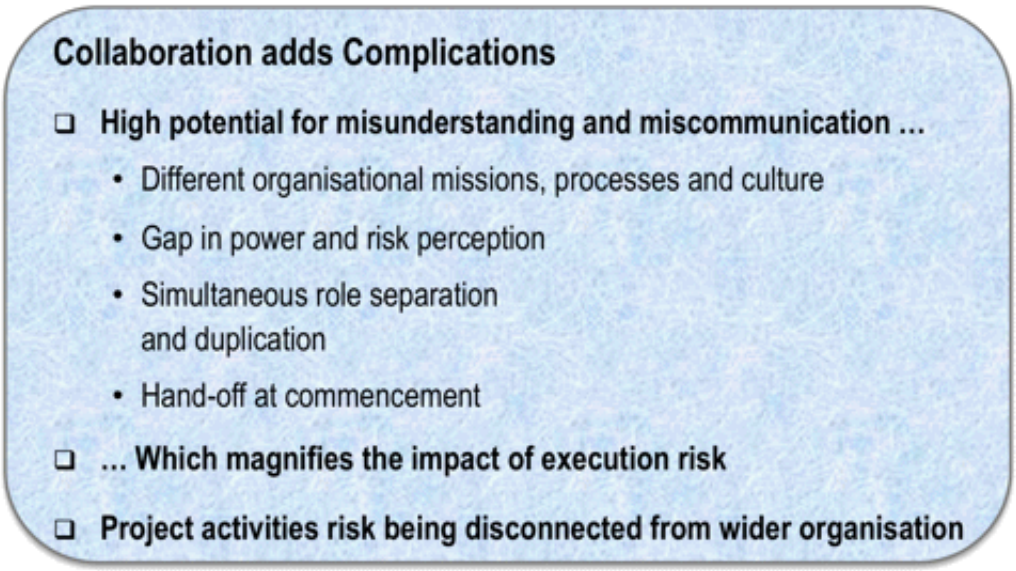
Many collaborations are the consummation of a mating process that may have taken many months and sapped the energy of key individuals from both sides. Once the deal is done, many of those involved move on to find and eventually close other deals. The day-to-day project team that then comes in for the execution is often bereft of anyone heavily involved in crafting the deal; more often than not, the only continuity being some individuals in the project governance process. This **hand-off at commencement of the collaboration** makes it difficult for the project team to get up to speed. The project team will lack some tacit insights that the deal team were unable to transfer. They often struggle to internalise the "spirit" of the collaboration i.e. the broader underlying aims and rationale, relying instead on the formal project plan and deliverables. There is also a psychological hand-off as well. In both David and Goliath, the immediate recognition and organisational bragging rights come from finding and doing the deal. From a cultural standpoint, the challenge of execution is often under-valued and not given sufficient top management attention until something goes badly wrong, by which time it is too late anyway.

All the above factors combined create a **high potential for misunderstanding and miscommunication** on both the technical and procedural aspects. How can any David-and-Goliath collaboration even have a chance of succeeding if it is constantly mired in arguments over a string of different issues? So as mentioned earlier, the **collaboration environment magnifies the execution risk**. It is hard enough to instil a more nimble, adaptive project management approach with a team drawn from many different functions in the same company. The bar is raised an order of magnitude higher when the project team and its governance process includes cross-functional participants from two different companies with asymmetrical missions and culture, operating in an environment conducive to misunderstanding and miscommunication.

In addition, there is a risk the **project activities become disconnected from each side's wider organisation**, in which case the most appropriate skills of each side are not brought into play, nor are the outputs of the collaboration exploited by Goliath. In a recent study[1] of over 100 corporate-sponsored academic research projects, 50% generated major outcomes (i.e. produced new ideas or solutions to problems, developed new methods of analysis or generated new intellectual property of potential benefit for the sponsor) but only 40% of these projects with major outcomes achieved major impact (i.e. an observable and generally agreed-upon positive effect on the sponsor's competitiveness or productivity). Thus only 20% of all the collaborations were successful from a business perspective.

The above finding seems to indicate that good science done by the project team is not enough - the work also needs to be connected into the sponsoring organisation in order for it to be exploited. As one of my interviewees commented:

"Having worked with this large pharma on several projects, we definitely prefer some of their project leaders rather than others - the best ones are those that network into their own organisation to get help and to sell what the project is doing, while the worst ones are those whom their own organisation ignore".



To recap, collaboration risk arises in large part from the very high potential for misunderstanding and miscommunication inherent in a collaboration, and also to some extent from the collaboration's activities not being sufficiently connected into the collaborators' wider organisations.

Managing the Hidden Risks

To fully reap the benefits of David-and-Goliath collaborations, both sides need to proactively manage execution and collaboration risks over the entire course of the collaboration. It is not sufficient to just manage the traditional scientific, regulatory and commercial risk factors. Otherwise the gains from externalisation are likely to be eroded by the additional challenges inherent in David-and-Goliath collaborations.

---

1. See "Best Practices for Industry-University Collaboration", Pertuzé, J.A., Calder, E.S., Greitzer, E.M., and Lucas, W.A. (2010), *MIT Sloan Management Review* Summer 2010.

2. Critical Ingredients at the Outset of Collaboration

In this section, we look at the critical ingredients that need to be in place at the outset to greatly improve the David-and-Goliath collaboration's chances of success. We start by discussing some common pitfalls in the technical and commercial due diligence prior to the deal being signed - these can greatly affect how the collaboration is set up and executed. The remainder of this section then concentrates on what can be done at the outset to alleviate or reduce the hidden execution and collaboration risks described in the previous section.

Pitfalls in the Technical and Commercial Due Diligence

A compelling scientific and commercial rationale is needed to initiate any collaboration. Normally this is validated by a thorough due diligence before the deal is consummated. Nevertheless, there are four not infrequent pitfalls that need to be borne in mind, the first two of which are mindset traps and the latter two being flaws in analytical logic.

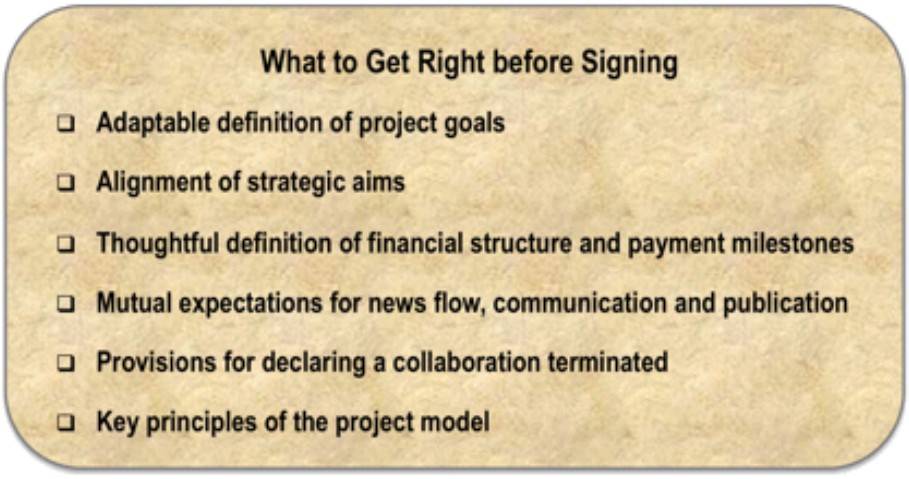
1. Beware of **scientific fashion**. There are always certain scientific approaches that are in vogue at the time, with many papers being published and many big players investing. While getting a deal signed in a "hot" area can have a positive impact on the financial valuation of both David and Goliath, this can be very short-sighted. Many of the today's hot areas are also tomorrow's dead ends. You should go back to basics and ask, "Does the science make sense for the intended application?".
2. Beware of **blockbuster bias** when assessing the commercial aspects. For Goliath, there will often be organisational pressure to find a successor to one of its top-sellers, or to regain a market that had been taken by a rival's blockbuster. Of course you should exploit areas where you have strong commercial expertise. But nevertheless be careful of favouring a deal with comparatively weaker scientific rationale just because of the commercial fit. This is also a pitfall for David, especially those biotech/medtech companies whose investors seek focus on currently large markets. Today's high margin growth market could well be tomorrow's commoditised generic market. Again you should go back to basics and ask: (a) "Does the science make sense for the intended application?" and (b) "Will the market dynamics and health economics at the prospective time of launch be favourable?".
3. Beware of **under-valuing a future application owing to lack of market data or vice versa**. It is comfortable to forecast high growth rates on existing revenues by

projecting forward historical performance. While it takes courage and out-of-the-box thinking to argue for significant revenues in unformed markets without track records. Furthermore, when conducting net present value ('NPV') assessments, it is easy to assign overly low probabilities for revenue streams from new markets and conversely for well-established markets. The combination of both creates a "double whammy" effect that over-values established markets and under-values new markets.

4. Beware of valuing only a narrowly-focused application and **ignoring the option value**. As mentioned in the previous article, there are usually wider application areas for the underlying science, supporting data for which could well emerge in the collaboration. Something with multiple possible places in therapy/diagnosis for one disease, or with application in multiple diseases, is always worth much more. Whatever is the intended primary focus of the collaboration, you need to bake into your assessment some estimate of the extent to which the initial focus could be broadened, or the range of alternatives that could be pursued, if the primary focus turns out to be less viable than initially expected.

Anticipating Execution and Collaboration Risks before Closing the Deal

Before most collaboration deals are signed, the focus is initially to conduct diligence on the scientific, intellectual property and commercial aspects, and subsequently to negotiate the financial terms and legal contract. There are also a number of other crucial elements which are often not done well or ignored entirely at the deal stage - these elements can make or break the collaboration during execution. Not all of the elements that we will discuss below need to be handled in the formal contract. Some of them could appear in a separate informal expectations addendum which can be written without complex legal language. And/or alternatively written into the governance process mandate or project team charter. The important thing is to get these elements into the open and discussed before closing the deal.



Let us first look at the need for an **adaptable definition of project goals**. In a project within a single company, it is not too hard to adjust project goals sensibly when new information

arises. But in a David-and-Goliath collaboration with an inherent culture and power gap, it can be quite difficult to change project goals once the collaboration is kicked off without getting drawn into a long contractual discussion.

The legal and conventional project management standpoints would argue for very specific, tightly-defined project goals to facilitate waterproof contracts and unambiguous project monitoring. As was discussed in the previous section however, this approach raises the execution risk and can hasten the chances of the project not producing anything of value since the project team has little leeway to then:

- Manoeuvre around the inevitable volatile scientific findings and operational timelines, both negative and positive.
- Take advantage of other potential applications that could emerge, whether closely-related or in another area entirely.

Consider this artificial example[1] of a project to find inflammation drug candidates in a collaboration where Goliath has a strong commercial franchise in inhaled respiratory drugs, and its top product has superior efficacy but an inferior side effect profile compared to its competitors. Here are three alternative ways to define the project goals:

Option	Alternative Definitions of Project Goals
A	Candidate drug for asthma or COPD, with specified sets of threshold metrics (not listed here for brevity) with respect to efficacy, DMPK, formulation and safety. Must be non-inferior as regards the first three sets of metrics and superior as regards the final set when compared to the three main competitors.
B	Candidate drug(s) with efficacy, DMPK, formulation and safety parameters indicating a competitive and differentiable anti-inflammatory drug for "topical" application in the lungs, on the skin or in the gut.
C	Competitive and differentiable candidate drugs for autoimmune disease applications by any route of administration. Plus a secondary goal of identifying biomarkers that might be used to support precision medicine claims in such applications.
	COPD = Chronic Obstructive Pulmonary Disease DMPK = Drug Metabolism and PharmacoKinetics

Option A is clean/simple and easy to monitor of course. However option B is more representative of practical realities since the DMPK and formulation characteristics of inhaled, dermatology and some inflammatory bowel therapies are similar and in any case all these diseases are mediated by related inflammation pathways. While Option C might make sense if the mechanism of action being investigated is unprecedented since the team might well find the mechanism more suited to intervention in some forms of arthritis or perhaps systemic lupus.

The broader the project goal set up at the outset, the greater is the onus on the governance process to dynamically focus the efforts of the team on specific intermediate goals (which could be quite narrowly defined over short time periods) as the project progresses and new information emerges. And of course there will be business situations that mitigate against having too broad a goal, such as the opportunity for David to collaborate with two different partners for different application areas.

Related to defining the project goals, but nevertheless distinct, is the **alignment of strategic aims**. Each side of the collaboration will have some business strategies or higher-level goals that the project could have a significant impact on if successful i.e. the strategic context for the collaboration. While the project goals *must* be common and shared by both sides, the strategic aims need not, and probably cannot, be common. What is important however is:

- The strategic aims of the two parties are not incompatible.
- Each side recognises, understands and respects the other's strategic aims.
- The expectations that each side has of what the other can contribute to the collaboration are not unrealistic as regards its own strategic aims.

Here are some hypothesised strategic contexts that could be relevant for the inflammation project example earlier, with quite different strategic aims for the two different David types:

Illustrative Strategic Contexts for different kinds of collaborators		
Large Pharma (Goliath)	**Academic Laboratory** (David)	**Small Biotech** (David)
Defend established respiratory franchise. Build opportunistically in other autoimmune areas	Publish ground-breaking research on inflammation pathways	Secure cashflow for inflammation laboratory and build credibility for major fund-raising in 3 years' time

A **thoughtful definition of financial structure and payment milestones** is needed, taking behavioural implications carefully into account. Consider for example the effect of an excessive back-end loading i.e. the practice of paying as little as possible in the early stages. This reduces the financial risk for Goliath, who thinks this incentivises David to give its best efforts and deliver as quickly as possible. In practice however, a situation can arise, particularly when David has several collaborations running with different Goliaths, that this has the opposite effect. If the project is having trouble making scientific headway, there can be a tendency for David to concentrate its attention and best resources on other projects with more promising results - the extreme back-end loading means David needs frequent cash injections to stay afloat and it will prioritise efforts on those activities with the higher likelihood of near-term cash flow. This of course has a disastrous effect on the de-prioritised project, which falls even further behind, pretty soon everyone in David has given up on it, and the project is eventually cancelled by Goliath for lack of compelling scientific results.

Or consider another example where the milestones are very tightly-defined at the outset in the contract. This simplifies the legal and project monitoring aspects. But in a similar vein to overly-narrow project goals as discussed earlier, can prevent the project team creating

value when the original premise inevitably does not pan out *exactly* as anticipated at the outset. Even worse, a situation can arise where David, to ensure receipt of its milestone payments, continues working to generate outputs that satisfy the tightly-defined milestones even when it does not make scientific sense anymore, taking the project away from the path of optimal value creation. Such a phenomenon is not dissimilar to the old practice a decade ago of incentivising in-house Discovery groups on volume targets for molecules ready to start GLP toxicology testing - you just ended up with lots of placebos.

As was the case for project goals, it makes sense to lay out broad milestones in the contract and let the governance process dynamically determine more specific definitions for completion of each stage at the commencement of that stage. Or sometimes to be even more practical, if the governance process determines that the project should continue to the next stage, the relevant milestone is deemed to have been contractually achieved.

Mutual expectations for news flow, communication and publication need to be agreed in advance. For most Davids, this is key aspect of their existence. Goliaths need to recognise this and agree specific expectations in advance with their Davids for what can be published, by whom, at which points in the timeline and the procedures for sign-off if required. Not doing so can contribute stress and distrust between the parties - it is not something to be worked out dynamically via “case law”.

A potentially thorny issue concerns the contractual **provisions for declaring a collaboration terminated**. Most contracts have hand-back provisions for returning the asset, relevant data and other intellectual property in the event that the collaboration is terminated. Sometimes however, a “limbo-like” situation can arise where the project, in the words of a David CEO, *“just sits there, neither dead nor alive, with one side not admitting that it is dead”*. To anticipate how to deal with this situation, it might make sense in some cases to incorporate contractual clauses that automatically deem the collaboration to be cancelled (and hence triggering the hand-back provisions) if the project has not made it to certain stages by certain timelines, unless both parties agree it is still active.

And finally, the **key principles of the project model** need to be put on the table in advance i.e. the main elements of the operating and governance processes. The project model will be discussed in much more detail in the next article of this series. At this stage before the deal is signed, the important thing is to agree some mutual high-level ground rules of how it will work, including the expectation that time and resource need to be set aside at the beginning of the collaboration to establish the day-to-day processes, build the working relationships and increase the project team’s capacity for joint problem-solving.

---

1. This illustration merges and disguises two real life cases which the author is familiar with.

3. Key Success Factors during Collaboration Execution

In this section, we discuss the key success factors during the execution of David-and-Goliath collaborations. We start by discussing how to set up the project model, then we consider how to optimally exploit the "honeymoon period" in the early months of every collaboration, and finally we look at how to drive the ongoing execution.

Project Model Setup

The first key step after consummating the collaboration deal is to set up the **project structure**, which on the face of it, looks very similar[1] in most David-and-Goliath collaborations i.e. operating team(s), governance committee(s), participants, decision mandates and associated formal processes. One should be careful though not to confuse the project structure with the **project model** – the latter is a broader concept which (in addition to the formal project structure) also incorporates the working mindsets of the participants, how they interact, and how they contribute beyond just their technical expertise.

Fundamental to managing execution and collaboration risks is an **agile team mindset** in both the operating and governance processes. The participants need to recognise that they are together negotiating an adaptive journey, with unanticipated problems to solve as well as unexpected opportunities to exploit. And they need to recognise that they will have to proactively work on building relationships, trust and communication channels so that they enhance their capacity to deal effectively and efficiently with these issues as they arise. For example, the governance process will (as mentioned in the previous article) need to dynamically adjust intermediate project goals and detail the milestone definitions - this will test both the participants' creative problem solving capabilities and the strength of their relationships.

Consider now the **team composition**. The traditional criteria for selecting participants are that they:

1. Have relevant technical knowledge and experience.
2. Represent key organisational stakeholders needed to approve decisions.
3. Are available i.e. not otherwise committed to other projects and activities.

While these traditional criteria are practical and essential, it is important to also have sufficient **diversity for problem-solving** i.e. a wide enough range of project experiences, scientific perspectives, commercial perspectives, thinking styles and group working styles. Such diversity dramatically increases the capacity for creative problem solving to both resolve unanticipated issues and exploit unexpected opportunities. Whereas the lack of such diversity can lead to myopic decisions and inability to innovate solutions. This need for diversity applies not just to the operating process but also to governance. As one of the interviewees commented:

> *"The scientific advisory board was filled with rheumatology experts as the sponsor wanted the next arthritis blockbuster, so nobody noticed that perhaps some of the de-prioritised candidates could have made wonderful drugs for asthma, Crohn's disease, etc."*

Furthermore, this diverse project team needs to be led and managed by **co-project leaders with a broader skill set** than traditional R&D project leaders. In addition to an obvious need for sufficient technical knowledge and peer credibility in the subject matter of the collaboration, project leaders of collaborations also need to have the following set of skills:

Collaboration project leaders must be able to nimbly plan and manage activities adaptively i.e. be able to dynamically re-plan, while working within available resource constraints, in response to a stream of unexpected problems and unanticipated opportunities. This goes beyond the usual project management skills of managing activities to set time and budget constraints. Furthermore, for the joint team to address these challenges and opportunities, collaboration project leaders must also have a strong aptitude for facilitating synergistic

problem-solving in a diverse team, integrating the team's capabilities to "co-create" solutions that individual team members would not have been able to come up with on their own. They also need to be good at finding ways to resolve in a "win-win" way those differences in opinion that will surely arise, both within the joint team and in the governance process. And finally, they also need to be skilled at influencing people and networking across their own wider organisation, both to access resources and to generate appreciation and interest for the work being conducted in the collaboration. An ex-David project leader illustrates this last point:

> *"Our collaboration with Big Pharma X went extremely well because my counterpart project leader was well-connected in her organisation, could reach out to additional scientific expertise across X as and when our project needed it, and ensured a level playing field for our project in X's portfolio review process."*

Besides the co-project leaders, it is valuable to continuously have an **executive champion** from Goliath who is active in the governance process - someone who not only sees the value of the collaboration but is also an advocate in Goliath's portfolio management process as the project takes its inevitable twists and turns. Many collaborations do start off with such a champion, often the person who had shepherded the deal through to its signing. The challenge is ensuring there is someone in this role throughout the collaboration's lifetime since many executives move around in large Goliath organisations. Whereas the senior executive/professor from David who is overseeing the collaboration tends to remain the same over time.

The Honeymoon Period

Having set up the project model, it is critical to **invest wisely in the honeymoon period**, from both a procedural and a relationship standpoint. In the first 9 to 18 months of most collaborations, many of the activities are straightforward and predictable. You should take advantage of the goodwill at this stage to build a strong foundation for execution.

This is the time to establish a modus operandi by "running in" the day-to-day working process, making small practical adjustments through trial and error until both parties are comfortable:

Formal meetings

- Frequency, length and format - face-to-face, teleconference, videoconference
- Core agenda topics
- Participants and quorum
- Meeting style[2]

Other communication

- Data file formats, protocols and IT sharing platforms.

- Long-form formal written status reports at key junctures.
- Brief e-mail updates at more frequent intervals.
- Routine for informal telephone and e-mail exchanges.

This is also the time to go the extra mile to **build mutual understanding and personal relationships** - appreciation of each others' business models, strategic aims, cultural norms and communication styles e.g. how to raise an issue or ask questions in a non-threatening way.

A David CEO commented:

> *"We make an extra effort to start every new large pharma collaboration by having face-to-face discussions and site visits every 4 to 6 weeks in the first year; we rotate a few different people each time so that pretty soon everyone in our team has worked face-to-face and socialised informally with their people. Yes it takes a chunk out of the travel budget, but the reservoir of trust that you build this way enables fast hassle-free problem-solving when all the unexpected things start emerging later on as they usually do."*

Driving Ongoing Execution

Once good foundations have been built, it is down to the operating and governance processes to **run the project in a "smart" way**. This approach involves agile and thoughtful planning of intermediate goals and activities, in response to new information emerging and within available resource constraints, to keep moving towards the overall project goals without being stuck in a rigid project plan. The **co-project leaders play a critical integrative role** in this "smart" project execution style by exploiting the team's diversity to create synergy for solving problems and exploiting opportunities as they emerge. To discover or develop a new product innovation, the project team needs to innovatively address lots of distinct problems and opportunities along the way – there is often no single eureka moment followed by a predictable workflow. Instead the process more resembles a roller coaster ride with many ups and downs. The co-project leaders also need to keep the governance process in the loop as the project situation is constantly evolving, possibly requiring some brief informal discussions with relevant committee members outside of the formal process. Maintaining dialogue with the governance participants is part of the co-project leaders' wider role to keep the project connected into their respective wider organisations for accessing resources and building interest and appreciation for the project. It can also be helpful in larger collaborations to deploy separate project coordinators in support of the project leaders, the former taking some of the load for task management and activity coordination, so that the latter can concentrate on the more strategic and value-added aspects of their role.

A separate **alliance management function** is increasingly the norm in most Goliaths. From what I have seen and heard, I have the sense that this investment in resources and skills

could be much better exploited by both sides of the collaboration. While all the Goliath alliance management people that were interviewed were positive and enthusiastic about what they were doing, many Davids have a neutral to negative view of their Goliath collaborators' alliance managers, although there are a few positive stories too:

David's View on Goliath's Alliance Managers

Neutral to Negative Sentiments	Positive Sentiments
"Alliance managers can't be the primary driver. You need scientists interacting with each other if you want to get somewhere. You don't want the alliance managers coming in between the two, else you get nowhere."	*"This guy (their alliance manager) is different. He predicts what's going to come, helps avoid problems, he's really impressive, by far the best I've seen."*
"To be honest, I'm not sure what their alliance manager adds that can't be done by a good project leader on their side"	*"Their alliance management team were definitely different from those of the other big pharmas. They went out of their way to get to know our people and understand how to influence us informally. They also saw their role as socialising our project internally in their organisation to make sure that when the asset is transitioned to their company, it would viewed as an internal one."*
"In the past, my interactions with alliance management at previous companies had been much the same - pretty hopeless! They're usually bean counters who jump in with something and don't really understand what's going on."	

A lot more can be done by the Goliaths to demonstrate the value-added of their alliance management function to their David collaborators, and to supplement the required skill sets of collaboration project leaders. At the same time, it could also make sense for some Davids, especially those with a lot of active collaborations, to consider deploying their own alliance management function, distinct from their project leaders. These David alliance managers could focus on orchestrating relationship building and problem resolution, as illustrated by this quote from a former David project leader:

> *"Our alliance manager built contacts across their organisation and spends time finding out what's going on behind the scenes. She is a very warm person whom you could easily talk to, but at the same time is very perceptive of how things are moving, and is not afraid to step in and influence on both sides when the situation calls for it."*

Throughout the project, both sides need to **make proactive efforts to stay aligned and keep the collaboration energised**. In longer collaborations going into their third, fourth or even later years, there is a risk of "staleness" or "fatigue" emerging and an antagonistic climate soon builds up, as mentioned by some of my interviewees:

"If you're not careful, after a few years you end up focussing on each other's bad points, remembering only those arguments you've lost and completely forgetting why you got together in the first place."

The frequent communication of positive aspects and joint celebration of even minor wins needs to be maintained. And the occasional swapping of new faces, carefully thought through, can also keep the relationship healthy and fresh. It is also advisable to conduct a regular "health check" via surveys or perhaps interviews and feedback by an independent third party.

Last but not least, the importance of relevant **training and development** should not be under-estimated. Not just the project leaders and alliance managers, but also many of the team members who are heavily involved. Such training and development would emphasise the adaptive project execution style, synergistic problem-solving, out-of-the-box thinking, communication and influencing.

---

1. Most collaborations will usually have a Joint Project Team ('JPT') comprising functional representatives from both parties, typically led by a pair of co-project leaders/managers. There will usually also be a Joint Steering Committee ('JSC') of senior executives from both sides to provide governance. Sometimes you might also have a Scientific Advisory Committee ('SAC') of independent experts. In larger collaborations, there could be various operational sub-teams reporting to the JPT, each comprising people from one or sometimes even both parties. And in collaborations with multiple projects under one umbrella, there might be a Joint Operating Committee ('JOC') that sits in between the JSC and the multiple JPTs.

2. For example, one company aims in the team meetings with its collaborators to "have everyone review all supplied data beforehand, and limit presenters to no more than five summary powerpoint slides".

4. Ensuring Successful Industry-Academic Collaborations

Collaborations between pharmaceutical or medical technology companies with academic research groups exhibit certain distinctive features not present when these industry players (irrespective of size) partner with each other. In this section, we look at some of the unique challenges and opportunities thrown up in these situations.

We start by discussing how prospective industry sponsors can make themselves more attractive to academic collaborators. Next, we consider what specific needs of academics ought to be taken into account when designing the collaborations. We then discuss why aligning industry and academic collaborators is inherently challenging, before ending by mentioning a number of recent developments that could signal an exciting future.

Important Ingredients for Attracting Academic Collaborators

It is no surprise that the first prerequisite for an industry sponsor is to be willing to spend **money**! However, just as important is the sponsor's **reputation for integrity**. Yes, academics do want and need funding, but it is just as important that the sponsor has built a reputation for treating academia fairly and with respect. When approached by a company they have not worked with before, most academics will reach out to their network to ask about their peers' experiences with said company. Furthermore, the reputation in the public eye of that company is important too, especially with regards to any negative publicity concerning ethical behaviour.

A popular academic group in a scientific domain that has application to major disease areas will have many prospective industry suitors. In addition to the two prerequisites above, there are four other elements which can differentiate sponsors in the eyes of academia.

Academics like challenging and interesting work that has **potential to generate eventual publications**. Sponsors who add value through making available **scientific tools and other items that support the academics' research** are also highly appreciated. Furthermore, well-regarded sponsors need to have a **critical mass of know-how in the scientific domain of the collaboration** – academics appreciate and respect those who can have a sensible and interesting dialogue about the read-outs from their work. As the head of a world-renowned academic laboratory commented:

> *"Many of the large pharmas are hollowing out their scientific expertise, increasingly they can't judge good versus bad, and struggle to have meaningful scientific dialogue in specialist areas"*

Last but not least, **personal chemistry and stable relationships** are highly valued. Many academics have become very wary of companies who are constantly reorganising and changing their key contact points. Furthermore, the longevity of involvement in a particular field elicits respect from academics, as the quotes below illustrate:

> *"We hate the musical chairs every 2–3 years from reoganisations and mergers"*

> *"Our people work for decades in their field, whereas someone working in an area for only 2 to 3 years is not really seen as cutting edge"*

Accommodating Academics' Key Needs when Designing Collaborations

There are a few critical needs of academia which industry sponsors need to address when designing a collaboration. These aspects are reflected in some of the sponsor differentiators mentioned earlier but we nevertheless expand upon them in this section.

Firstly, academics want **interesting and challenging problems**, especially those that trigger new lines of enquiry for their research. Historically, many collaborations resulted in the industry sponsors treating the academic laboratory as a contract research organisation ("CRO") conducting piecemeal studies and experiments to order, using specialist models, tools or biological samples that the laboratory had unique access to. The latter are often the principal reasons why the sponsor finds the collaboration attractive, and furthermore, a CRO-like arrangement is "easy for the corporate bean counters to monitor and approve payments". However, in many pure CRO-like arrangements, barriers are being created to tapping the academics' thinking and creative energy. They find this kind of repetitive work boring:

> *"The head of the lab may like the money, but the lab staff, many of them highly rated postdocs in their field, hate being treated like production workers … unless you can make it intellectually interesting for them"*

The best you can reasonably expect in these situations is that they execute the sponsored studies within the terms of the contract. And there will be a tendency for this kind of work to be actually carried out by comparatively inexperienced masters or doctoral students rather than by career researchers.

Secondly, **publishing** is crucial for academics' careers. The design of the collaboration should incorporate mechanisms that allow publication of some aspects of the work being sponsored, without breaching proprietary secrets of course. Many sponsors are concerned about the potential leakage of intellectual property or premature release to the public eye of new approaches that could give them a competitive advantage.

One approach for ensuring interesting and publishable work while still giving sponsors' access to the academics' unique tools for repetitive experiments is a two-component structure for the sponsored work:

1. Repetitive experiments that the academics have to conduct for the sponsor – the "CRO" part.
2. Research work within a broad scope agreed with the sponsor that is publishable as long as no proprietary secrets are revealed. This creates a resource for speculative work that can lead in any case to valuable insights and new opportunities for the sponsor.

Thirdly, an **operational contribution from the sponsor** is highly valued. Academics appreciate scientific tools, hard-to-source reagents, access to specialist equipment and other items that support the academics' research interests. Particularly well-regarded are sponsors who deploy some of their own people to help by:

- Transferring existing or developing new assays and protocols for the academics to execute.
- Conducting studies on the sponsors' specialist in-house equipment.

This builds the relationship and creates opportunities for valuable new insights to emerge through the interactions for both the current project and for wider applicability.

As mentioned earlier, reputation is an important characteristic that academics look for in sponsors. Particularly when the sponsor has not collaborated before with anyone in the parent institution, it makes sense to **build reputation and the academic collaboration step-by-step**, taking a longer-term investment perspective. For example, starting with high profile but comparatively low-cost funding of a few postdocs and PhD students to build:

- Trust and relationships.
- Mutual understanding of each other's perspectives, needs and capabilities.
- Corporate brand at the institution.

Once the above has been achieved, the sponsor can then start setting up more focussed and more intense projects. It is a well-known fact that multi-project collaborations over a sustained period have much higher return on investment.

In keeping with the global open innovation trend, some industry players run programmes that encourage academic groups to submit new ideas in a competitive process, the winners of which receive small grants to further develop their ideas. This is seen as a way to build the corporate brand amongst academics and as a precursor to subsequent major collaborations. However this approach can be a double-edged sword. For sure, it enables lesser-known academic groups to make themselves known to industry. But depending on how the competition is positioned and scoped, it can have a negative effect with those who do not win (which is the majority of applicants of course), especially if these laboratories are already well-known in their field, as one senior academic explained:

> *"These 'idea fishing' programmes that some companies run are not always appreciated; in particular those that indiscriminately solicit bids across all*

specialisms to 'see what you have' often create internal competition across the university. And it gives the impression that they do not know which fields they want to concentrate on, and have no opinion for what they feel might be the most promising new scientific approaches."

Alignment between Industry and Academia is Inherently More Difficult

Historically, only a small minority of academic leaders and their laboratories have a strong desire to be embedded in industry's commercial vision i.e. to generate market-viable real-world therapeutics and diagnostics. Even if an academic group wanted to do so, they usually do not understand the process and find it hard to appreciate what commercial organisations have to go through as regards industrial-standard rigour for laboratory notes, experimental protocols and eventually 'GxP' process standards in the later stages.

Unlike collaborations with a CRO or a small biotech, it much harder to enforce contractual deliverables and timelines in an inherently more loosely-controlled academic environment, even if the academic group's leader is on board. Sponsors need to find ways to ensure that the whole academic team have the motivation and desire to deliver what they need from them.

Sponsors also need to realistic about what they will get from an academic collaboration. For example, most drug discovery research groups are mandated to produce patentable therapeutic molecules. But they will not get usually get these directly from an academic collaboration (unlike a collaboration with say a small biotech company). What they can get however are:

- Tools and better insights for their projects.
- New treatment concepts and new potential targets.

Emerging Developments and Opportunities

Many sponsors do not yet sufficiently **exploit their academic partners' network of other specialist academia**, whether this be within the same institution or globally. Operating at the leading edge of their fields, most top academic laboratories work with other academic groups worldwide that enable or accelerate their own research. Awareness of and introductions to these other groups can be immensely valuable to sponsors, not just for the current area of collaboration but in many other wider contexts too. This is an opportunity waiting to be captured by forward-thinking sponsors.

Some academic institutions have set goals to increase the practical applications from their research, and in certain countries, these goals are being encouraged and incentivised by government. Consequently, these institutions have greatly **improved the professionalism of how they work with industry**. Their actions include setting up standard contracts and deploying key account managers (many of whom have come from industry) to handle the

management and business interface with industy. Academic laboratories in these institutions are also increasingly open to having dedicated people to work on collaborations without having a strong onus to publish, as one laboratory head commented:

> *"Our collaboration leader works full time to manage our projects with Company X. She is not on the publishing track, and my expectations are that she makes sure the goals of our collaboration are achieved"*

There is an emerging trend for some academic laboratories to **become more like drug or device discovery groups**. Some laboratory heads have already achieved publication fame and now seek "save the world" fame. Others see a moral duty to ensure that their group's intellectual prowess leads to something practical. And others too recognise that the best outcomes will arise if their activities are more closely aligned and integrated with industry. In all of these cases, the academic groups in question are very open to evolving and adapting the way they work with industry.

Funding for very early stage biotech and medtech startups is increasingly challenging as the financing community has been burnt in the past on highly speculative investments. Some venture capitalists have responded by funding virtual project-centric entities with only a handful of dedicated people. While this approach ensures that early-stage ideas get funded at manageable risk, it does not encourage assembly of the critical scientific mass needed for sustainable platforms in new scientific fields. If the virtual project-centric approach becomes the preferred norm, the number of long-term oriented platform biotech companies of sufficient size will begin to dwindle. Perhaps the gap can be bridged by certain academic laboratories essentially becoming platform biotech companies that generate new candidate drugs or new device prototypes in collaboration with industry sponsors. A typical biotech company often has ambitions to be either sold to a large pharma or to become a large pharma itself, both of which are high risk high return paths. Whereas an academic laboratory can adopt a longer-term perspective and invest in the right capabilities and activities. So academic groups that operate like discovery research houses can become over time an alternative vehicle to reliably generate new therapeutic and diagnostic candidates.

Conclusion

Much of the published literature and media hype around David-and-Goliath collaborations concentrate on the front end i.e. finding, evaluating and contracting such collaboration deals. Whereas here in this paper we have focussed on the back end i.e. ensuring that after the deal is signed, the collaboration goes on to execute successfully and deliver significant value to both parties. Increasingly, more and more industry players are beginning to realise that execution is where there is still a huge upside for improvement[1].

To ensure successful David-and-Goliath collaborations, it is not sufficient to find the right complementary partner, negotiate a win-win agreement and conduct a thorough due diligence. You also have to get the execution right. As we have argued in this paper, you do this by addressing the execution and collaboration risks. Otherwise the gains to be accrued by R&D externalisation and open innovation will be lost in a sea of collaborations that have run aground.

---

1. For example, “Making it Work” was mentioned as a key theme in: “Pharma-biotech collaborations: Eight themes from Biocom’s Partnering Conference”, Mandy Jackson, *SCRIP Intelligence* 28 February 2014.