

Executive Briefing
Enhancing the Performance of Pharmaceutical Research
Catenion

The Setting

Pharmaceutical research is increasingly in the firing line.

Over the past ten years or so, multiple attempts have been made by companies large and small to fix the machine: Tight productivity goals have been set, budget cuts have been implemented and spending on outsourcing and partnering has been increased. Proof-of-concept organisations have been set up to bridge the gap with clinical development; translational medicine, disease biology and biomarker units have been established to fully leverage the potential of new technologies and the progress made in molecular medicine. Once-centralised structures have been broken up into smaller units and there has been much talk of introducing a “more biotech-like culture” into pharmaceutical discovery organisations.

Although the size of Early Development pipelines has increased substantially, ultimate success measured by the number of approved product has not been achieved. The optimists tell us that there are many potential breakthroughs looming in early development, we just have to persevere, whereas pessimists claim that too much has been promised and the model of large scale “industrialised” Discovery is fundamentally flawed. In the latter context, “deconstruction” of the value chain has become the flavour of the day. Big and large pharma should focus on what they do best and leave major innovation to biotech and academe. Hasn't most breakthrough innovation originated outside of large industrialised structures anyway? – so the argument goes.

In our view, the risk of deconstructing pharmaceutical Discovery is one of throwing the baby out with the bathwater.

In a nutshell, we agree that much is wrong with the way Discovery Research operates in many pharmaceutical companies. We also support many of the changes that have been made to the operating model of companies in recent years. But based on our hands-on experience of more than ten years of working as management consultants in the Discovery field, we are also convinced that there is a huge untapped innovation potential in the industry that can be set free and which surpasses by far what small biotechs can ever deliver.

More money in our view is not the issue - the key to better performance is to be found in the Research Business Model, i.e. the way in which strategy, structure, processes, governance and HR systems interact and influence culture and behaviour.

A Pragmatic yet Thorough Approach

The very minimum one would expect senior management to do before further cutting back and moving into deconstruction mode is to take a hard look at the facts.

Pharmaceutical Discovery Research is a complex field, but here are a few common-sense questions that can be addressed in a structured approach:

1. Take the pulse: Which elements of the business model support or hinder productivity and innovativeness in day-to-day operations?
2. Look at the data: How well is your company actually performing in terms of productivity and innovativeness compared to its peers?
3. Learn from others: What insights can be gained from organisational approaches tried by peers and successful innovators in other industries?

Once the answers to these questions are available, strengths and weaknesses of the current model will become clear and options as to how best to enhance performance can be formulated and evaluated.

To support decision-making by senior management, we have developed a pragmatic yet thorough approach that is briefly laid out on the following pages. For reasons of exposition and urgency, we focus on a Discovery Research organisation but the approach is easily adapted to a proof-of-concept or full R&D organisation as well.

Depending on the size and complexity of the client organisation, a small team of experienced Catenion consultants can perform such an assessment in six-to-eight weeks.

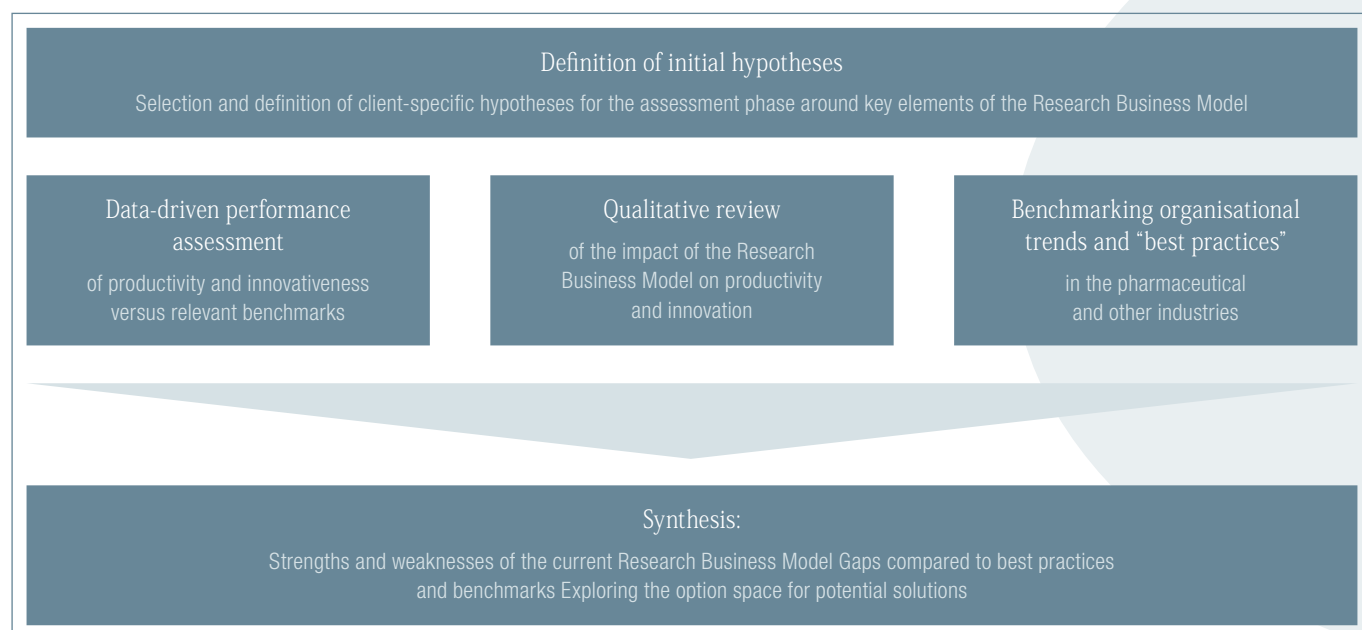


Figure 1: Catenion Approach to Assessing and Enhancing Research Performance

Taking the Pulse – How the Organisation Really Works

Many discussions of Research management tend to focus on a few points of structure and governance. Whilst these are undoubtedly important, in our experience one finds many unexpected – and unintended – barriers to productivity and innovation buried in the domains of research values and beliefs, goals, and strategy, as well as HR systems, processes and culture.

We have developed a focused approach to taking the pulse of an organisation by speaking to a selection of individuals

across functions, hierarchical levels, TAs and sites about their daily work. These one-to-two hour interviews – between 60 and 80 depending on the complexity of the organisation - move freely along the dimensions of the business model and can quickly point to key issues for productivity and innovativeness.

Usually we start the process off with management providing their hypotheses on barriers to performance, which will then be validated or rejected through the interviews.

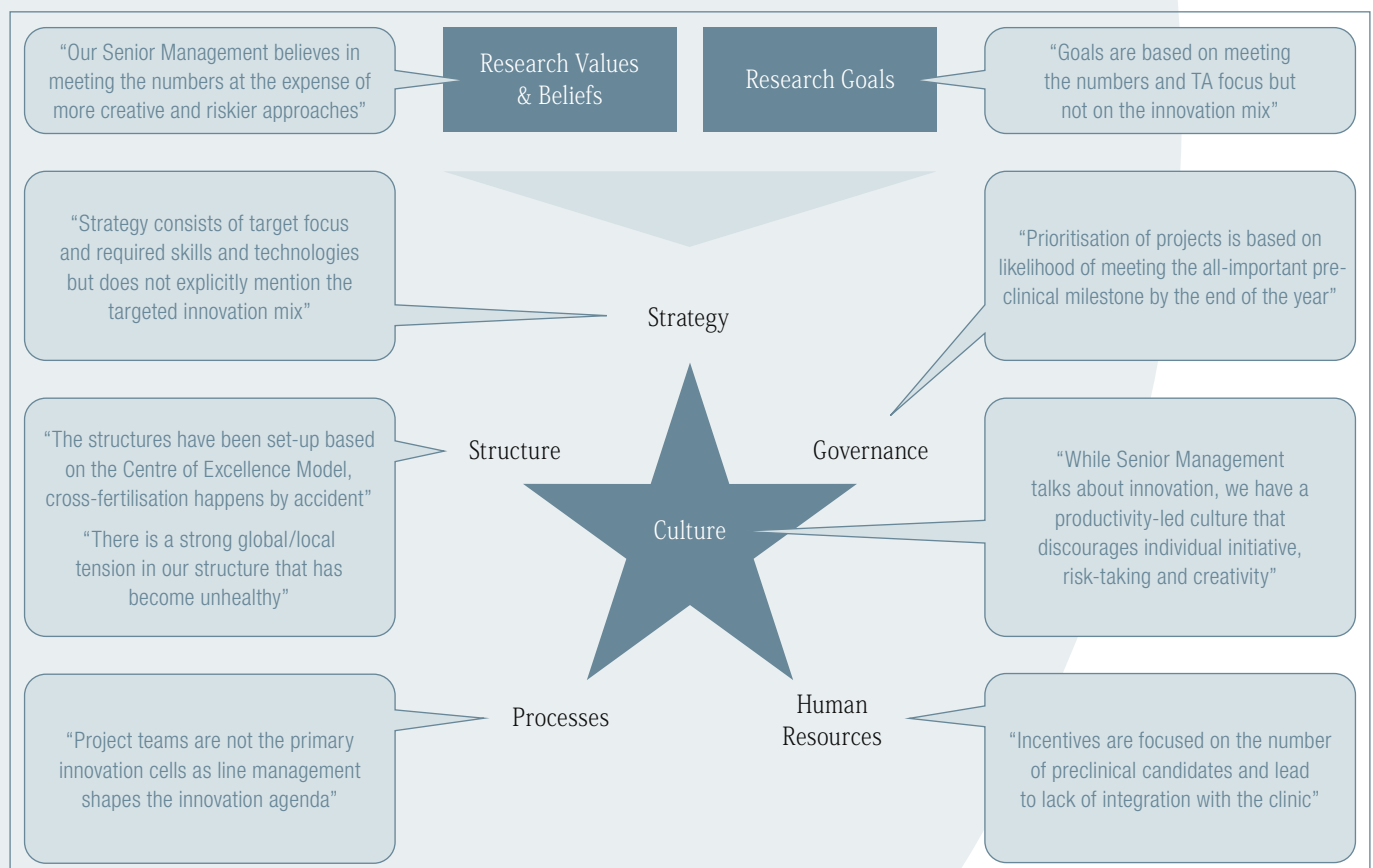


Figure 2: Catenion Research Business Model with Initial Hypotheses for Dysfunctionalities (Client Example)

Taking the Pulse – Selected Questions for Interviews

Here are some of the questions we will typically discuss with different people across functions and hierarchical levels in order to develop an understanding of real life in the company as opposed to what is stated in the organisation handbook:

Strategy

- What is the linkage between planning at the business, clinical development and Research levels?
- Which impact do values and beliefs have on planning indication/TA/site strategies?
- How does prioritisation across indications/TAs/sites work?
- How are changes to strategy and structure dealt with? (eg. uptake of new indications or approaches, de-emphasising others)?
- How are partnering requirements and partnered assets integrated into indications/TA/site planning?

Governance

- What is the level of autonomy of project teams?
- What is the authority of the team leader and how are team members selected?
- Who owns the budgets?
- What is the planning horizon at the functional and team level (budget stability)?
- How are projects which cut across indications initiated and funded? Is there a dedicated budget for “recombinant” exploratory potential breakthrough projects or technologies?
- How many committees are involved in decision-making?

Human Resources

- How do key HR processes stimulate/inhibit incremental versus breakthrough innovation in each indication/TA/site? (Hiring, performance management, staffing, training, career planning)
- Are there specific practices in place that aim at stimulating creativity, individual initiative and risk-taking and how do they differ across indications/TAs/sites?
- How is accountability for results (innovation and productivity) distributed and ensured?

Processes

- How are cross-fertilisation and knowledge-sharing facilitated?
- Are there specific practices in place that aim at stimulating creativity, individual initiative and risk-taking and how do they differ across indications/TAs/sites?
- How are functional synergies at the level of screening, medicinal chemistry and enabling technologies leveraged across indications/TAs/sites?
- How is networking with external partners and academe organised?

Culture

- How are creativity and innovation defined, recognised and encouraged across indications/TAs/sites along a number of key dimensions?
 - Words, language, physical and spatial arrangements, meetings, success stories, role models?
 - Role of creativity, individual initiative, risk taking?
- How strong is the not-invented-here-syndrome between indications/TAs/sites?

Looking at the Data – Productivity

As every researcher knows, productivity measures in pharmaceutical research are tricky. Productivity measurements are short-term indicators of resource use and performance and as such do tell us little about the contribution of research to long-term company success. Normalisation of resource use, timelines and attrition rates for different levels of innovativeness and risk is difficult.

On the other hand, major deviations from internal and/or external standards can point to real issues in performance or structural issues; tracking of productivity can also keep some healthy pressure on the organisation.

Catenion can rapidly build a high-level productivity model for a client's research organisation and its main sub-units (sites and Therapeutic Areas) by drawing on internal benchmarks as well as data from external benchmark providers. Results have to be seen in context but the model can play a useful role in comparing performance to industry standard and simulating different productivity, resourcing and growth scenarios.

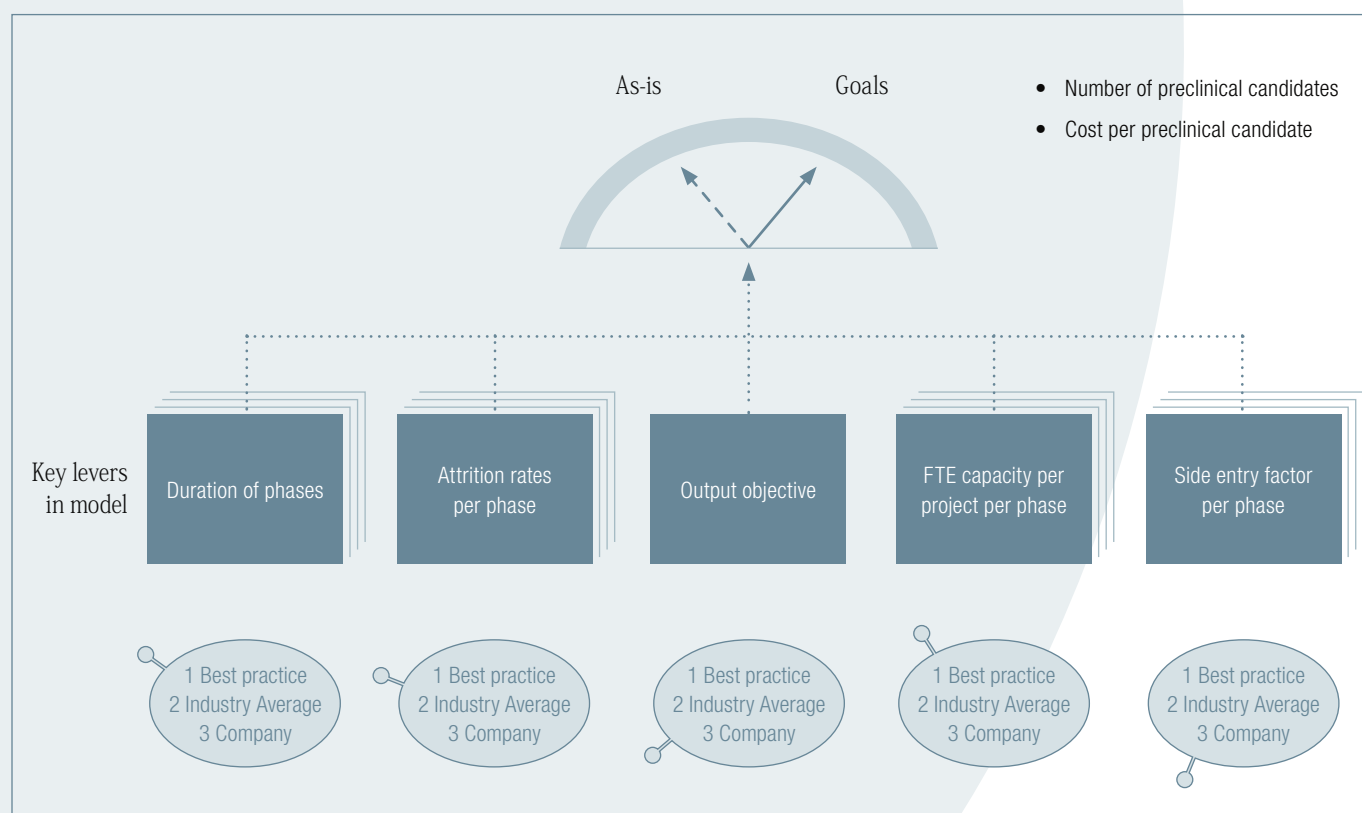


Figure 3: Catenion Productivity Model for Pharmaceutical Research

Looking at the Data – Innovativeness

The third crucial element after reviewing the business model and productivity is to take a hard look at the innovation potential (we call this innovativeness) of the actual output in terms of the portfolio of projects (Discovery and Early Development).

But what exactly defines innovation or innovativeness? There are different perspectives on this question depending whether you ask a scientist, a clinician or a marketing professional.

When asking pharmaceutical executives what their company's main R&D goal is, one often hears something on the lines of "bringing clinically-differentiated drugs to market" or "being best-in-class or first-in-class". Statements such as these are basically tautologies and don't go much further than saying that one is in business to turn a profit. In any event, they are not very helpful in determining R&D strategy.

To become operationally useful, the discussion of innovativeness needs to be dealt with at a more concrete level. At Catenion, we have developed a simple scoring approach to assessing the potential innovativeness of Research compounds based on four criteria: novelty, usefulness, market potential and commercial exploitability.

For the purpose of the performance assessment discussed in this briefing, we would recommend focusing on innovativeness as a surrogate marker for commercial attractiveness (and technical risk). Such an analysis can be quickly performed for a company's pipeline by drawing on readily available data. It will be complemented by an analysis of the split between different drug classes and lifecycle projects vs. new molecular entities.

1. Novelty	2. Usefulness ²	3. Theoretical Market Potential ²	4. Company Exploitability ²	
Criteria	Innovativeness Score			Weight of Criteria
	Low (1)	Medium (2)	High (3)	
1. Novelty of target / disease hypothesis	Not among Top 5	Among Top 5	Among Top 3 (potential to be first in class)	xx %
2. Novelty of entity ¹	Structure-driven modification of existing compound	Close to existing compounds	New class	yy %
3. Clinical path to PoC	No patient selection – broad approach	Selection design potentially with existing companion Dx	Novel endpoints, or targeting subpopulation with novel companion Dx	zz %

1) The scoring model will differ slightly for early stage projects, eg. before LO phase "Novelty of entity" may not be applicable
 2) For brevity additional elements of the Catenion Innovativeness Assessment Model will not be used during this process

Figure 4: Catenion Innovativeness Scoring for Research Compounds

Learning from Others

When interpreting the data emerging from the internal performance assessment and looking at potential ways of mending weaknesses and enhancing performance, in our experience, it can be very helpful to look outside the company and learn from the experiences others have made with their respective business models.

Companies were selected based on innovation track record and/or the peculiarity of their business model. Our case studies are a mix of snapshots – sometimes going a few years back – and transition from one model to the next.

- GSK – the CEDD structure old and new – “being both big and small where it matters”
- Roche – from the “open innovation” model to DBAs
- Sanofi-Aventis – diversity in approaches
- Genentech – a “creativity-led” culture
- Novartis – the “NIBR experiment”
- Wyeth – a successful “productivity-led” culture
- Bayer – a failed “productivity-led” culture
- Boehringer Ingelheim – a “conservative, no frills, yet successful approach” to R&D

- 3M – technology fusion as a systematic process
- BMW – only car manufacturer with broad innovation strategy across all functions
- Intel – limited internal Research, but highly innovative through external networking
- Xerox PARC – often regarded as a commercial failure, but highly innovative and successful Research
- IDEO – widely regarded as innovation leader based on cross-industry recombination of ideas
- Toyota – very comprehensive and consistent long-term philosophy of constant improvement and at the same time a leader in breakthrough innovation

When designing the Janelia organisation, HHMI looked at the MRC Laboratory of Molecular Biology in Cambridge, AT&T’s Bell Laboratories in Murray Hill, New Jersey and a few other leading research institutes. For details cf.: <http://www.hhmi.org/janelia/forebears.html>

Six principles were distilled:

- Individual research groups were small to promote collaboration and communication between groups, as well as good mentoring.
- Group leaders were active bench scientists – this was true even for Nobel Prize winners and department chairs.
- Research was internally funded – all research funding was provided from internal sources at a dependable and generous level. Outside grant applications were not permitted.
- Excellent support facilities and infrastructure were provided – this enabled individuals and small groups to function effectively and to focus on creative activities.
- Staff turnover was high and tenure limited – many scientists were at an „early career stage,” and moved on to university positions after 5 –10 years.
- Originality, creativity and collegiality were valued and supported.

Similar principles led to the foundation of the Kaiser-Wilhelm Society in Germany in 1911, later renamed the Max Planck Society.

Figure 5: Case Studies from Pharma, Other Industries and Academe

Synthesis

Once the data have been collected and collated, we will point to the key barriers to performance and develop realistic options for addressing them. Options are presented with their respective pro's and con's with the final package of the internal improvement potential being weighted against more radical outsourcing and deconstruction approaches.

In summary, at Catenion we believe there is a significant potential for the enhancement of productivity and innovativeness in pharmaceutical research organisations if management is willing to address the performance barriers inherent in the operating model head-on. This requires a willingness to look beyond quick fixes of organisational structure or accountability.

What is required is a comprehensive approach to the company's research business model, entailing a wholesale alignment of its different elements, from Research values, beliefs and goals to human resource management and culture.

Such an approach can liberate the formidable potential of pharmaceutical companies to innovate based on their outstanding people, technical infrastructure, process know-how and the diversity of experiences and approaches they comprise and which sets them apart from academe and biotech companies.

Catenion: Your Partners for Pharmaceutical Strategy and Innovation

Catenion is a management consulting firm devoted to helping pharmaceutical and medical products companies significantly increase the returns on their R&D and Marketing investments by creating more innovative and effective strategies and organizations.





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