Whitepaper

Rethinking R&D Collaboration

Five Strategies That Accelerate Time-To-Market

By Ron Niesen

Improving the Way Work Gets Done™

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Rethinking R&D Collaboration

Five Strategies That Accelerate Time-To-Market

By Ron Niesen
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Within the pharmaceutical industry, the R&D function has the greatest potential to improve productivity through internal collaboration, directly reducing time-to-market for drugs. R&D's complex scientific and technical disciplines, the volume and nature of its informatics, and the many sophisticated roles and processes it employs, form daunting barriers to researchers who want to collaborate. Their goals are to exchange ideas and information easily with colleagues, search through R&D repositories for past experimental procedures and outcomes, and work across departmental boundaries. In spite of considerable technological investment toward these ends, productivity gains from this vision have largely eluded pharmaceutical R&D. Why? For collaboration to flourish in the laboratories of R&D, the right ingredients must be titrated as carefully as in any lab experiment.

Fundamentally changing how work is done to promote collaboration requires people to rethink their role and their value which will often lead to resistance.

The Two Ingredients for Successful R&D Collaboration

To understand researcher collaboration, let us first paint a realistic picture of the environment and motivations of typical researchers. They are exceptionally time-constrained, required to master ultra-sophisticated scientific systems, and manipulate complex instruments and software efficiently. They are highly focused, goal-oriented, and frequently competitive. Their work is fact-based, analytical and rational. The best researchers see a higher purpose in their profession and consequently greatly value their ability to contribute. They are measured on results and expect others to be as well.

Given this picture of researchers, what ingredients are needed in a collaboration initiative for it to be embraced by them?

Ingredient #1: 1 mole of Change Management

Opposition by scientists to outside forces of change is predictable. Any change imposed on them will be judged severely: if it does not fully accommodate the intricacies of their work. Furthermore, the demands of their job must be respected. To impose tasks, especially any that are administrative, is considered callous. They are expected to be innovative in their work, selflessly assist other scientists when asked, and keep current in the latest science. Non-scientific activities, they believe, should take less of their time not more. How then, can researchers be prepared to embrace changes to their daily work habits?

There are many frameworks, strategies, and tactics to help change people's behavior. Your change approach should match the degree of change, the scope of the organization involved and its interdependence, as well as how receptive researchers are to the change. Designing a full-fledged change program is outside the scope of this article, but here are a few principles that specifically apply to R&D organizations.

Make it the researchers' idea...they likely thought of it anyway – While your collaboration initiative may be the latest, greatest idea for improving productivity, in reality your employees have had similar ideas but simply could not or would not act on them. If you let them surface their most vexing issues, and subsequently propose your collaboration initiative as a response to their need, it will be **their idea and you will have overcome a major barrier to change**. Example issues they may raise that can be addressed through collaboration include:

figure 1

Emails, papers, presentations, and online correspondence create a complex web of communication between researchers that is difficult and time consuming to maintain.

reducing administrative and wasted time, helping teams innovate, simplifying the informatics environment, and making it easier to access better information. Of particular importance is getting departmental leaders to own this initiative. They are in a key position to rally the troops and provide the resources that are vital to conducting the design activities.

Create a business case for the average researcher – While this may appear an obvious statement, many business cases ignore the average researcher as an audience and focus solely on building an argument for senior management audience in order to secure funding. For researchers to embrace new collaborative practices, they must be convinced the change will improve the quality of their work, and not be burdensome; preferably this message is delivered by a colleague. Above all, be practical in estimating the benefits. Do not dilute your case by overreaching with rosy estimates.

Researchers need to own the design process – While there is a cost to investing researchers' time in designing new processes, this investment should be weighed against how much poorer and harder to adopt the new processes will be without their participation. It is common to use a few select individuals from each group involved to participate on the design team. This team needs to meet only three or four times in facilitated workshops to get the information needed. The members then have enough involvement to feel ownership of the new processes and become evangelists for the initiative.

Senior management attends working activities – Having senior executives attend design workshops is a reliable means of creating a public relations buzz that is far superior to a generic endorsement. If there is a concern that executives' presence in workshops will hinder the free flow of ideas, then teams can present findings to them instead.

On-the-Job Coaching – Because of the numerous pressures on researchers, they expect hands-on help and coaching, if they are expected to change how they work. Given that collaborative practices require changing mindsets, learning new techniques, tools, and behaviors, and giving up age-old habits to align with group practices, a hands-on approach to training is a worthwhile investment. An example of the kind of change researchers must be coached through is illustrated in *figures 1 & 2*. These figures show that when you remove the individual from the middle of the picture, and place

figure 2

In a collaborative environment information becomes the center of work allowing for all to interact with it simultaneously and at anytime. Productivity improvement comes from locating the right information at the right time quickly, teams working more effectively and efficiently, and innovation occurring more regularly. These all serve to expedite decision making.

figure 3

Examples of collaboration scenarios below show how diverse the sharing of information is in R&D. The goal is to integrate these activities as seamlessly as possible.

<table>
<tr><th></th><th>Information Searching & Feeds</th><th>Team Effectiveness</th><th>Collaborative Innovation</th></tr>
<tr><td>Researcher</td><td rowspan="3">Finding previous experimental information and results
Receiving up-to-date discoveries and research within discipline
Locating fellow researchers within the company</td><td>Through shared workspaces:
Coordinate team work activities and track progress
Develop shared documents
Communicate news</td><td>Tools linking work to other related work going on internally and externally
Brainstorming</td></tr>
<tr><td>Intradepartmental & Intradisciplinary</td><td>Build a collective departmental information repository</td><td rowspan="2">Sharing real-time results in context
Discussing theories and options
Building collectively on ideas
Tagging and rating information quality</td></tr>
<tr><td>Interdepartmental & Interdisciplinary</td><td>Collaborate on interdisciplinary experiments</td></tr>
<tr><td>Decision-Making Processes</td><td>Best practices
Benchmarks</td><td>Real-time 360^0 view of pipeline targets, candidates, trials, and submissions
Automated workflow
Integration of data and information across disciplines and boundaries
Automated data gathering, presentation, and distribution</td><td>Joint operational problem solving
Joint development of target profiles, R&D strategies, resourcing plans, etc.</td></tr>
</table>

there instead an information sharing environment, communications are much simpler, clearer, and faster — i.e., fewer emails, meetings, and phone calls; better coordination, transparency, and consequently, decision making. Without coaching to encourage new work habits, adopting the practices needed to realize these benefits may take a long time to develop, if they develop at all.

There are a myriad of other change management tactics to help drive adoption of collaboration initiatives. The most important consideration is that a strong plan is needed, given the degree of change being asked of the organization and the importance of adopting new practices to reduce the time-to-market of new drugs.

Ingredient #2: 1 milliliter of toolset simplification

Researchers must use many pieces of equipment and software to do their jobs. Elegantly integrating these tools to simplify their work is not only a good way to get their acceptance, but will contribute appreciably to reducing the pipeline's time-to-market. The following is an area for simplification that researchers find difficult and time consuming today.

Case Example: Electronic Lab Notebooks

A good vision for integrating tools seamlessly is to have electronic lab notebooks (ELNs) incorporated into the collaboration processes and platform in a way that document creation, chemical and biological data recording, searching, patent recordkeeping, and compliance with SOPs are elegantly integrated. This is a vision that may or may not be possible with your current systems. Moving toward this goal, however, will yield a high return in researcher productivity.

If these are the key ingredients to R&D collaboration, what is the recipe?

Five Strategies That Create Real Value

As scientists know, a well-conceived lab experiment requires the right combination of elements to succeed. If the target compounds are appropriate, but the wrong assay is used, the experiment will fail. Likewise, if the correct receptors are targeted, but the screening environment is poor, the experiment will also fail. In a similar way, each of the following strategies is a necessary 'element' of a successful collaboration initiative.

STRATEGY #1: Target areas of high return to realize value faster and build momentum.

Finding high-value targets is second nature to scientists in R&D. This same value-driven strategy is important to take when deciding how to stage a collaboration initiative, but often this is not done. Many people operate under the assumption that "if we build it, they will come." They may come, but will they stay and will they create value?

There are two principal reasons for assessing where collaboration will create the highest value. First, your initiative will have limited resources, and in order to realize the greatest returns quickly, these need to be applied where they will do the most good. Second, by realizing high returns early, your collaboration initiative will develop a strong brand. With this recognition, researchers will seek out ways to become involved; without it, they are likely to resist involvement. If resistance develops, it will cause a costly investment in change management tactics and a longer adoption cycle.

Assessing Targets

Determining where value lies in your organization requires understanding better how people share information, work together, and handle the information they produce. Organizational network analysis is one effective means of identifying where value can be realized for different types of collaboration — see *figure 4*. This technique maps relationships between individuals and groups, assesses how productive these relationships are today, and estimates what benefits could accrue if the quality of collaboration were improved.

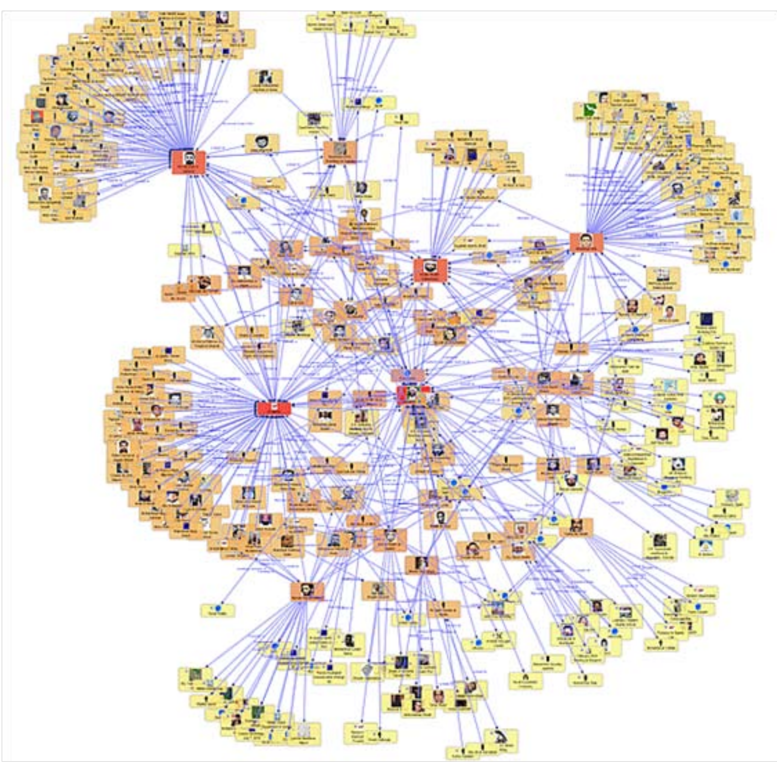


figure 4

Organization network analysis uses maps like these to identify how communications flow and to calculate where and how much value is created by specific organizational activities and players.

Collaboration initiatives are fundamentally about aligning people's work habits as a group to improve team effectiveness.

STRATEGY #2: "Start slow to go fast" and scale your initiative according to paths of least resistance and highest return.

Phase one, the 'start slow' aspect of this strategy, refers to starting small and building up over time. First, find two R&D groups willing to be 'lab mice' for your initiative that must collaborate together and are prime targets for creating value from collaboration (look for the department leaders that are the most frustrated with current operations). Why two groups? Rather than conduct a long study-period involving the entire R&D organization, focus your resources on two committed groups that dedicate themselves to making the project a success. Think of the resources you send to coach these groups as your Special Operations Force – a small team of highly skilled professionals backed up with any support they need to get the job done.

A pilot of this kind can get running quickly and demonstrate what will work and will not work in terms of improving the pipeline process. Choose the pilot groups carefully so that the value they generate will be seen by the R&D organization as legitimate. As noted in Strategy #1, demonstrating results quickly builds the initiative's brand image and pulls others in like a magnet to become involved.

Phase two is to scale the pilot based on the willingness of groups to commit themselves and where improved collaboration can create the most benefits.

You will need to do broad analysis across the organization to define program elements such as knowledge management taxonomies and community charter plans. These can be explored in parallel to the central initiative of getting groups and departments up and running. Cross-functional teams are an important tool in this process. Again, these will be much more productive and develop more innovative designs once momentum has been built around the initiative from early, tangible results.

There will be a tipping point where the majority of the organization needs to get enrolled. The core team running the initiative must predict this need and prepare resources for it so that it does not become a lost opportunity and a frustration for R&D.

STRATEGY #3: "Build a better mouse trap."

Paragon recently surveyed 544 researchers from a global pharmaceutical R&D operation regarding their information systems. The primary complaint was the time wasted finding, moving, sharing and manipulating information among different software programs that were poorly integrated. Respondents also indicated that electronic lab notebooks did not handle the manipulation and sharing of chemical or biological information well. The collaboration platform they used primarily served as a place to store files, because it did not integrate well with laboratory software. Due to these difficulties, the researchers tended to work independently and use email and meetings when they needed to communicate or collaborate.

It will not be easy, but 'building a better mouse trap' means taking on the challenging and intricate task of creating a virtual work environment for scientists that is simple to use and comprehensive. Designing an 'elegant' environment that equally serves chemists, biologists, pharmacologists, immunologists, etc., is a difficult task. The return in productivity, however, can be substantial. In a 2007 Pfizer study of their integrated electronic laboratory notebook and collaborative platform approach it was estimated that efficiency was improved by 15%. It needs to be emphasized, however, that the solution was not just technological, but included significant changes in how researchers agreed to conform to standards, so that the group could work more effectively together.

STRATEGY #4: Enforce structure that delivers a return while still promoting entrepreneurship

Recognize from the outset that collaboration initiatives are fundamentally about aligning people's work habits as a group to improve team effectiveness. This applies to any type of collaboration, whether it is information sharing, team effectiveness or collaborative innovation, because in all cases participants must adopt new behaviors for the process to work. Table 1 lists example behaviors for each.

Table 1 – Work Practice Examples
Information Sharing examples
1) Use of a standard file naming convention
2) Use of a global taxonomy for meta tagging and document filing
3) Use of a standard content typing
4) Standard search terms
Team Effectiveness examples
1) *The items listed under Information Sharing above*
2) Protocols for using shared documents, e.g., check-in, check-out
3) Standard project team workspace designs and terminology
4) Standard R&D processes for reporting and decision-making processes
Collaborative Innovation examples
1) Use of standards conceptualization tools
2) Protocols for sharing information across different group boundaries
3) Record keeping for patent and compliance purposes

Though researchers understand the potential benefits of collaboration, they instinctively want to hold on to old work habits. The failure of many collaboration projects is underestimating the level of planning required to entice people to change their long-engrained habits.

OK, but what structure is needed? Let's look at an example of a fast growing biotechnology company.

Case Example: R&D Pipeline

The head of a program management office responsible for overseeing the R&D pipeline decision-making process was swamped with out-of-date summary reports and no centralized means for accessing the latest status of targets and candidates. With 19 departments contributing to 25 different pipeline management documents, it took the program office 350-400 hours of staff time monthly to manually finalize these documents and another 180 hours to prepare a monthly portfolio overview. In addition to this onerous effort, this process allowed and promoted costly errors. It was clear some structure was needed.

To redesign a new R&D decision-making process, a cross-functional team of department champions and program management office managers was formed. They were challenged to reduce individual department preparation time and have a daily pipeline status overview prepared automatically. The overview had to allow for drill down into 3rd and 4th level data behind the report.

The team knew that a system could solve the version control issues and create dynamic reports, but only if people accepted standard ways of preparing and submitting their information. The standards they selected included: rigid deadlines, workflow management steps, document templates, information formats, filenames structures, approval responsibilities, and naming conventions.

Ironically, more structure is often better received in R&D than too little. Intuitively, researchers know that when a system is not properly regulated, it will cease functioning over time. Respectfully policing behaviors in the early days will promote commitment and uncover improper training or change-management gaps. But given the need for structure, how do we get researchers to adopt new ways of working?

STRATEGY #5: Provide fuel for the engine

If your collaboration initiative is an engine for improving productivity, then the fuel for that engine is data, information, and knowledge. Without these, any collaboration initiative will stall. Sorting out what data, information, and knowledge are valuable in your existing repositories will undoubtedly be an enormous task. Rather than relegating this sprawling but crucial job to an afterthought, it is important to make it a high priority.

If your collaboration initiative is an engine for improving productivity, then the fuel for that engine is data, information, and knowledge.

A basic outline of a plan to mine your content (data, information, or knowledge) from existing repositories would include these steps:

1. Inventory existing repositories and their owners.
2. Develop criteria for grading the quality of the content.
3. Create procedures that allow people who own the content to perform the grading.
4. Decide how best to migrate content from each repository.
5. Establish a schedule and resource plan for migrating the content by a deadline consistent with the timeline of your collaboration initiative.
6. Assign the necessary resources and project oversight in order to ensure it executes according to plan.

While appearing straightforward, accomplishing this job will take effort, resources and persistence. Those who own the content will need to devote significant time to these tasks.

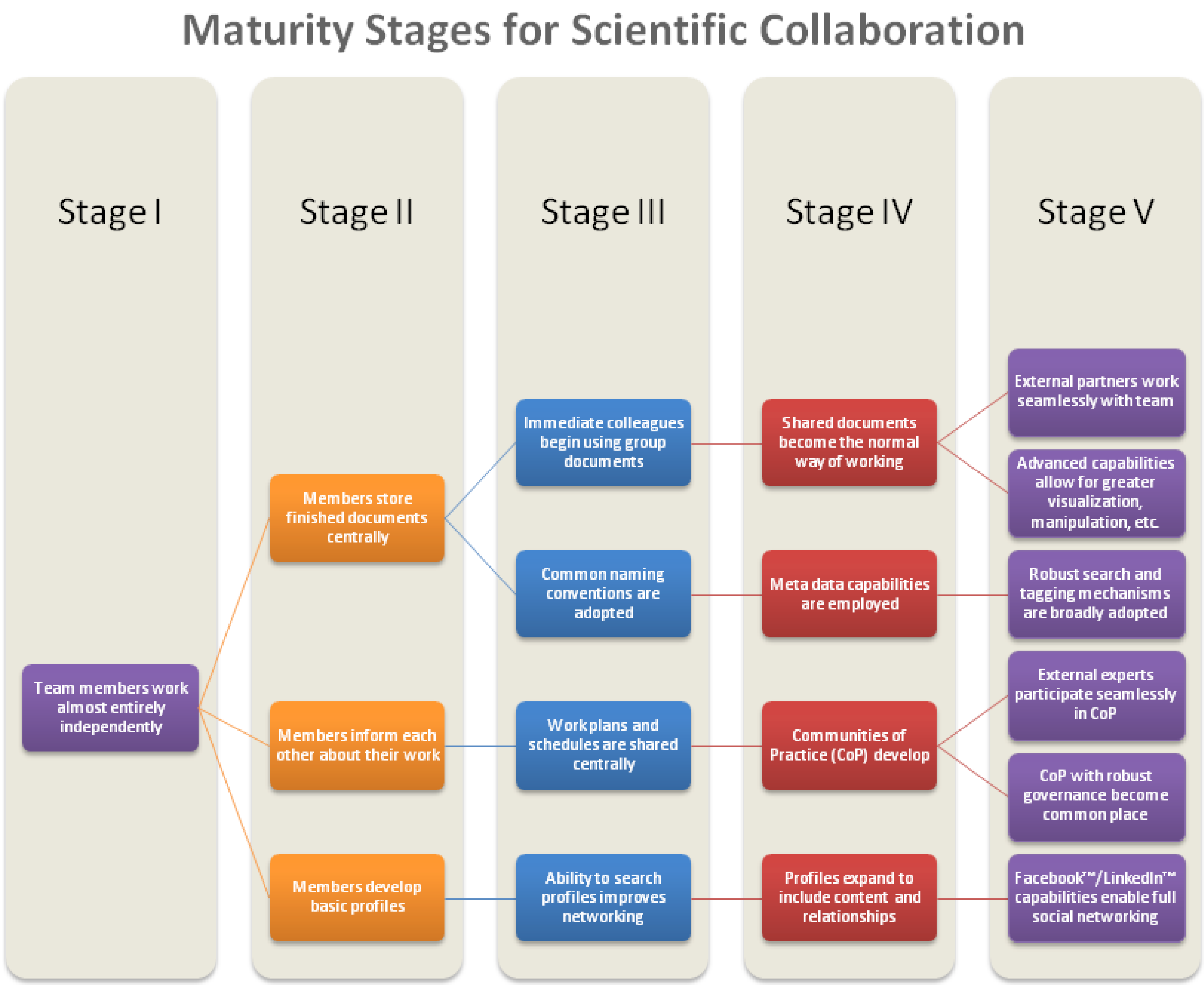
CONCLUSION

The strategies laid out in this article are highly prescriptive in order to provide you some of the more important elements of a successful collaboration strategy. Any initiative you sponsor will need to take into consideration where the process is starting, what the organization's goals are, and how top-down or bottom-up the procedure will be.

In *figure 5* example stages of collaboration maturity are shown. Progressing through these stages is a non-linear process. In fact, one of the goals of this article is to provide you strategies for creating a powerful collaboration initiative that will take your organization from an early stage to a late stage without wasting time in between.

However sophisticated your R&D organization is today at collaborating internally, there are opportunities for reducing the time and cost incurred to bring a drug to market by employing more advanced collaboration strategies. The tools, techniques, and processes that enable collaboration are rapidly evolving and most R&D organizations only use a small percentage of these broadly and regularly. If you craft a collaboration initiative that both pays particular attention to involving researchers in the design process and delivers good quality processes, you can quickly realize pipeline improvements from collaboration.

figure 5


Maturity Stages for Scientific Collaboration
Stage I
Stage II
Stage III
Stage IV
Stage V
Team members work almost entirely independently
Members store finished documents centrally
Members inform each other about their work
Members develop basic profiles
Immediate colleagues begin using group documents
Common naming conventions are adopted
Work plans and schedules are shared centrally
Ability to search profiles improves networking
Shared documents become the normal way of working
Meta data capabilities are employed
Communities of Practice (CoP) develop
Profiles expand to include content and relationships
External partners work seamlessly with team
Advanced capabilities allow for greater visualization, manipulation, etc.
Robust search and tagging mechanisms are broadly adopted
External experts participate seamlessly in CoP
CoP with robust governance become common place
Facebook™/LinkedIn™ capabilities enable full social networking

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