

Promoting Technology Enabled Collaboration in Complex R&D Environments

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An important element in a successful R&D effort is effective collaboration. As the complexity of the research, development, and eventual adoption environments increases -- as it does with large Federally funded R&D efforts -- the importance of working together and sharing information, ideas, and goals increases as well.



This is one of the reasons that, in classic examples of government funded R&D going back to the [Manhattan Project](#), secure co-location of theorists, developers, and engineers has often been an effective way to maximize the likelihood of the group's innovation, collaboration, and information sharing.

In today's complex R&D and national security environments, though, such massive examples of centralized development have also given way to more specialized and dispersed efforts. Staff and program related resources are often spread across multiple organizations and geographic locations. This dispersion places an even greater emphasis on the need for appropriate communication and information technologies to not only promote but also to accelerate the collaboration and communication processes involved in idea creation, innovation,

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development, and adoption.

Of particular importance to the R&D environment is technology enabled collaboration. Technology enabled collaboration potentially incorporates a range of communication and information management technologies -- both traditional and "new media" -- that can increase the likelihood that people:

1. Understand the program's goals and objectives.
2. Discover common interests.
3. Exchange information about those common interests, and
4. Build and maintain personal and professional relationships over time that reflect those interests in practical and innovative ways.

Technology enabled collaboration can be supported by both traditional technologies (e.g., phone, email, teleconferencing) as well as newer collaboration and social media such (e.g., blogs, wikis, group messaging, social networking, and social bookmarking). Even though informal communication and interpersonal professional and social networks have always played an important role in the R&D environment, the "social networking" potential of collaboration technologies differs from more traditional forms of communication. For example, modern networking and communication technologies enable scientists, researchers, students, and engineers to develop relationships, collaborate, and share information securely with much wider networks of individuals than ever before.

In cost benefit terms, technology-enabled collaboration acts as a "force multiplier." It reduces the time it takes for an individual to find the solution to a problem. The basic idea is that workers spend less time searching, and more time developing. In basic terms, "knowing the right people" in advance can reduce the time it takes to get questions answered, compared to getting that same question answered by having to start at "square one" without having access to such a network.

But there are also challenges to relying too much on undirected personal and professional networking to promote knowledge discovery, sharing, and collaboration:

1. The different people and organizations involved in a program may not be accustomed to communicating or collaborating to accomplish common objectives.
2. Competing objectives may exist among the different groups in a complex program, e.g., for-profit vs. nonprofit, academic vs. commercial sector, basic research vs. engineering, privacy advocates vs. law enforcement, etc.
3. Voluntary participation by the private sector can be an important factor in driving success of a federally supported R&D program. For this to occur, the private sector needs to understand and adopt a variety of public sector goals, objectives and —

bureaucracy intrudes here — processes.

4. There still exists a need for both traditional communication media and newer media, especially in situations where broadcast and one-way communication are more effective than more interactive approaches.

Fortunately, technologies that allow people to communicate and collaborate are rapidly evolving. Many are available "off the shelf" and are being used, especially by [younger analysts and researchers](#), to communicate securely with their peers around the world. Now there's even a [Facebook page](#) for "...for information about how Governments can best use Facebook." Such applications are growing and inevitably are impacting the expectations of professionals involved in large R&D programs.

Social media and social networking technologies that allow people to rapidly establish and maintain communications that bypass traditional organizational and professional boundaries represent a significant source for collaboration and innovation opportunities. Still, even when a Federal agency's leadership provides a clear statement of policy goals and objectives that the R&D program must support, the view from "the trenches" may be different. For example:

1. In an academic institution that receives public funding to support certain types of research, a balance must be achieved among the institution's educational objectives, the objectives of individual faculty and students, and the R&D program's objectives. How can we use technology to accelerate the process by which ideas generated in academia can be evaluated as the basis for possible beneficial products and services?
2. In a private sector organization whose commercial product development strategy parallels the development goals of the Government program, how much to invest of private funds in a potentially competitive government procurement must be decided. Can we use technology to improve the way we communicate Government requirements to private sector organizations so they can accelerate their decisionmaking about their own investments?
3. In a government organization formed from the merging of multiple agencies, it may take years to integrate existing formal and informal communication channels that may be based on years of past loyalties, management structures, and multiple technologies. Can we use technology to break down the barriers that prevent valuable collaboration and innovation from occurring?
4. When there are security or national defense implications of the R&D program, how does one balance the need for secrecy with the need to foster communication and collaboration? Can we use technology to simultaneously protect what needs to be protected, and disseminate what can be safely disseminated?

Despite such challenges, scientists, engineers, students, researchers, procurement, and information management professionals of all kinds are already accustomed in varying degrees

to communicating and sharing information. People understand that ideas that are hidden or isolated can lead to dead ends.

An important question is how best to promote collaboration through the use of technology, given the organizational and cultural realities of large or complex programs. Many approaches are possible, for example:

- Do you provide a standardized communication and networking infrastructure to all participants?
- Do you create small demonstration programs that will hopefully "go viral"?
- Do you change professional or financial incentives to encourage collaboration?
- Do you work "behind the scenes" to solve basic technical infrastructure compatibility issues before introducing a comprehensive program?
- Do you explicitly maintain parallel collaboration programs, one for more traditional workers and one for "young turks" for whom traditional security and privacy concerns are of secondary interest to "just getting the job done"?

I'm not a believer in "one size fits all" solutions. It will always be necessary to look closely at the goals and objectives of the individual program and how it operates before [developing an appropriate strategy](#) that includes an appropriate mix of traditional and new media to aid in communication and collaboration.

It is equally important not to overemphasize the role technology plays. While there is no question in my mind that new and easy to use tools have wide benefits, they're just tools. The real issue is getting people to use them in ways that are beneficial and supportive of program goals. Seeing that this happens is a job for management and leadership, not just technology.