

Request for Information

Federal Technology Transfer Authorities and Processes

Thank you for the opportunity to comment on this very important topic.

The following responses have defined technology transfer as the transfer of technology and people from activities (education and research):

- Executed at universities and/or federal laboratories
- Supported completely by private funding, completely by federal funding, or some combination of private and federal funds.

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Questions

1. What are the core Federal technology transfer principles and practices that should be protected, and those which should be adapted or changed?

Unique research environment and resources

Federal research provides a number of unique benefits to the country as a whole through both workforce and technology development. Primary among these benefits is the unique research environment universities and federal labs provide.

- Federal labs have a number of facilities and capabilities that are unique to the world. In many cases the costs of the facility investments are justifiable only on the national scale; industry alone could not support. Also, the federal system funds research that is in the national interest but lacks an apparent commercial value proposition and therefore would not be sponsored by industry.
- Universities are intellectual powerhouses with professors and students who think outside the box, are not encumbered by traditional approaches, and are filled with energy and enthusiasm to drive creative solutions.
- Since neither universities nor federal labs focus on product commercialization, the environments are ideal for bringing together competitors, co-suppliers, and customers in novel and non-threatening ways. Convening these groups and facilitating discussion which otherwise would not occur is a great way to uncover new concepts.

Emphasis on longer term research and workforce development

The low TRL level typical of federal research ensures many of the resulting inventions are broadly applicable and highly leveraged throughout a range of industries. Furthermore, university and federal laboratories have performance expectations grounded in fundamental research and are free from the increasingly intense quarterly profit expectations experienced by industry. This encourages and enables longer term and higher risk research to still flourish in the United States. Industry increasingly relies on these institutions for basic research and long term competitiveness.

Strong foundations that encourages technology transfer

Universities train the next generation workforce for industry and this well-established relationship provides a robust technology transfer mechanism in itself. In addition, the Bayh Dole Act and corresponding legislation for federal laboratories has been very effective, in general, for encouraging federally funded research to be actively transferred for public benefit.

There are always improvement opportunities

- The balance of funding dedicated to basic or applied research should be regularly evaluated, as should the balance of funding to established industries and to industries-yet-to-be created.

- The quest to be objective in funding decisions should be balanced with expeditious decision making, both at the general topic level and the specific project level. The goal of neutrality can become a detriment when it forces excessive reviews and equitability assessments that slow the process down enough such that opportunities are missed. Many resources are consumed non-productively in the very competitive and long proposal process.
- There should be better communication among universities, federal labs, and industry. The value propositions of each organizational type should overlap, but not too much. Industry should focus on commercialization; universities on workforce development and basic research; federal labs as stewards of national facilities and on R&D of national, not commercial, interest.
- There are some small clarifications that could be made to the IRS Rev Proc 2007-047 for corporate-sponsored research at facilities financing with tax-free bonds; a sponsor who fully pays for the research (and often presents the idea) should have preferred access to the intellectual property.

2. What are the issues that pose systemic challenges to the effective transfer of technology, knowledge, and capabilities resulting from Federal R&D? Please consider those identified in the RFI as well as others that may have inhibited collaborations with Federal laboratories, access to other federally funded R&D, or commercialization of technologies resulting from Federal R&D?

It's about the Technology not the Transfer

The primary challenge with the effective transfer of technology, knowledge, and capabilities resulting from federal R&D is not the details of the transfer, but technology itself being transferred. If the technology has a line of sight to commercial opportunities, industry will do what is needed to obtain it. Too often there is a fatal flaw or there is yet a lot of research to be done. Contrary to common perception, there is not a lot of technology just sitting on the shelf ready to be commercialized.

Voice of industry should be louder

There is a disconnect between the research being funded and what industry needs. Of course, basic research without a link to industry should always be supported – after all industry does not always know what it needs -- and there is always research to be done in the national interest with low likelihood of mid-term commercial opportunities. However, industry should have more of an opportunity to provide input on topics, projects, and future workforce -- but not on funding decisions. When industry is not interested in what is being funded, they won't have an interest in the results. Because of the requirement for transparency and open forums, the voice of industry in events such as workshops is too often overshadowed by academic and federal participation – the very individuals and organizations who have an immediate and direct interest in the outcome of federal funding priorities. The voice of small businesses is even fainter.

There is also a disconnect between higher education and the workforce industry needs. It does the nation a disservice if graduates cannot find jobs and companies cannot find employees.

What is Basic? What is Applied?

There appears to be a bias towards funding basic research. This sets a self-limiting boundary for the 'valley of death' of technology transfer. A 'bad basic' research project should not be funded over a 'good applied' research project just because of unclear or artificial definitions.

- Science is not unidirectional from basic to applied. Universities and federal labs would benefit from researching more applied topics, both for workforce development and for uncovering fundamental questions that stem from applications.
- There is a lot of low TRL science yet to be discovered in established industries. This 'basic' research in 'mature' areas is too often mis-conceived as applied science and is therefore not considered meritorious for funding.
- There also appears to be suspicion of large company research topics due to their pursuit of profit. This ignores the fact that for many of these industries very small improvements stemming from understanding the fundamentals can have huge impact due to the increased scale of the activities.

Who wants to work on applied anyway?

Applied research does not come naturally to or from most federally funded research at national labs and academia. This is in spite of the fact that many of these very researchers would welcome opportunities for research in areas where they can see the application and time frame for realization. However, the federal lab and academic career progression relies heavily on output of peer-reviewed journal articles, not inventions. So

even when industry seeks to fully fund research at universities, there can be an adverse effect on the career advancement of the academic partner.

And then there are the contracts.....

Lastly, there is lots of room for streamlining in the contracting mechanisms. The current mechanisms make it difficult to do proprietary work, require significant upfront payments, involve unfavorable IP terms, have limited project directional flexibility, are inconsistently applied, and often take too much time to execute. Industry to industry contracts are often much easier to execute and are just as well suited to the activities typically practiced. The contract process and terms discourages industry from federally funded work, further reducing the industry voice from the federally funded research programs.

3. What is the proposed solution for each issue that poses a systemic challenge to the effective transfer of technology, knowledge, and capabilities resulting from Federal R&D? Please consider the approaches identified in the RFI.

It's about the Technology, not the Transfer

With a focus on the technology developed as opposed to the technology transfer process, a number of solutions are obvious.

A louder industry voice

First, increasing national lab and academic interactions with industry would help federally funded research focus on topics of value to industry. Industry participation, not control, throughout the process would ensure the most commercially impactful ideas are considered and, when funded, do not drift into uncommercializable spaces. The most successful companies have decades of experience prioritizing the most commercially viable technologies from their own pipelines and training new employees in sometimes basic skills. Encouraging and hosting more industry focused events and review panels would help expose industry needs and facilitate the necessary discussions.

Balance Basic and Applied

Secondly, given that applied work does not come naturally from the existing systems, federal lab and academic metrics should be adjusted to encourage and reward work in this space. Increasing federal funding for proof of concept or proof of value activities would be a big step. Including goals for meaningful industrial interaction would also be helpful.

Balance New and Established Industries

Thirdly, increased funding for advancing established industries, although not as glamorous as emerging markets, would have huge economic payoffs due to the scale at which changes could be implemented. Also, workforce development would be done for the topics immediately critical to industry. It is difficult for industry to hire college graduates with research experience in the traditional fields since these do not often receive federal funding.

And then there are the contracts...

Finally, there are a multitude of small changes which could improve the contracting process and thereby encourage more industry participation. They are listed above in question 2. Basically, anything that brings the federal processes closer to the pace and terms of industry-industry contracts is helpful.

4. What are other ways to significantly improve the transfer of technology, knowledge, and capabilities resulting from Federal R&D to benefit U.S. innovation and the economy? What changes would these proposed improvements require to Federal technology transfer practices, policies, regulations, and legislation?

All our comments are covered in the above sections.