A New Strategic Approach To Technology Transfer

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Abstract

The principal goal of federal research and development (R&D) is to solve problems for public benefit. Technology transfer (TT) within the U.S. Department of Agriculture (USDA) has always been a core part of its mission, but has usually been addressed after a research project is completed. As a result, TT may either not reach desired impact, or arrive at the scene when the technology is commercially non-viable or scientifically obsolete. In order to better help USDA scientists, we have adopted a new paradigm. In this new paradigm, TT is not an afterthought, but an essential and integrated part of the research process beginning when the research objectives are first conceived. By aligning TT with research objectives, the impact of research outcomes will be strengthened.

In his book, *7 Habits of Highly Effective People*, Stephen Covey divides tasks and their relation to time management into four quadrants arranged in a two-by-two grid. The top row represents the most important tasks, while the left column represents the most urgent tasks. The first quadrant, in the upper left, captures tasks that are both urgent and important, such as crises or deadline driven projects and pressing problems. The second quadrant on the upper right covers non-urgent yet important tasks such as planning, relationship building, preparation for meetings and presentations. The last two quadrants, in the bottom row, cover non-important but urgent tasks such as some emails, phone calls and non-important and non-urgent tasks such as busy work, junk mail, time wasters, respectively. Technology Transfer professionals in most organizations are called upon when bumps in the road are encountered, for example, when there is a dispute over inventorship or ownership for an invention, or problems with materials received from a scientific collaborator. Thus, technology transfer (TT) is usually in the first quadrant. Our goal at the U.S. Department of Agriculture (USDA) is to move TT from quadrant I to II, or from crisis management to strategic planning (Table 1).

Shifting Tech Transfer to the Beginning of the Research Continuum

Since the passage of the Federal Technology Transfer Act (FTTA), TT at the USDA's Agricultural Research Service (ARS) has usually been addressed well after a research project is underway. As a result, TT may either not reach desired impact, or arrive at the scene when the technology is commercially non-viable or scientifically obsolete. In order to better help our ARS

Table 1. Time Management For Technology Transfer

The table is based upon Stephen Covey's model in 7 Habits of Highly Effective People, which specifies the activities in the realm of technology transfer.

	Urgent	Not Urgent
Important	**Requires Immediate Attention** • Submitting a provisional patent application on a technology being disclosed tomorrow at a scientific conference. • Litigation matters, *e.g.*, infringement, inventorship. • Filing a patent application with a bar date of tomorrow.	**Important, But Can Wait** • Consolidating rights with a co-owner prior to licensing. • Inventorship analysis on co-owned inventions. • Strategizing about the desired collaboration or commercialization partner. • TT Education and Outreach.
Not Important	**Distractions** • Phone calls and meetings on possible vendors. • Data compilation (dicing and slicing the data for different stakeholders). • "Red Herrings," non-issues that have somehow been flagged and perceived as issues.	**Wasting Time** • Submitting an invention disclosure on a technology disclosed in a paper published a year ago. • Insisting on patenting non-patentable inventions.

scientists reach the full impact of their research, we have proposed a different paradigm.

In this new framework, TT is not an afterthought, but an essential and integrated part of research from the time the research problem statement and objectives are first conceived. Technology Transfer professionals would discuss the desired impact of a given research project with the scientists. Based upon the desired impact and through an iterative process with the research team, administrative program team, line management team, public information team, and technology transfer professionals a comprehensive TT strategy and tactical implementation plan is crafted that, if the research project is successful, can lead to the commercial adoption of the research results. The first step is to determine if a license is needed to transfer the technology and, if so, whether it needs to be exclusive or non-exclusive (Figure 1). The tactical plan integrates technology transfer with the research plan in a step-by-step outline demarked by the proposed research objectives and milestone timelines (Figure 2). This new paradigm will align technology transfer with research objectives early in the project cycle, strengthening the impact of research outcomes.

Personalized Plan

One important characteristic of this new approach is its personalized and customized nature. ARS's four research areas span from crop production and protection to animal production and protection, from nutrition, food safety and quality to natural resources and sustainable agricultural systems. While full impact of a research project in nutrition can be realized by widely disseminating the nutritional content of a particular food in a publicly accessible database, when dealing with animal vaccines patent protection is a requirement.

Team Approach

A team's performance hinges on each member's individual expertise and strength and the team's collective ability to exhibit those strengths. This is no different in a research enterprise. The researcher possesses the scientific expertise and the vision as to the desired outcome of a research project; the technology transfer professionals strong suit is his or her ability to contextualize and analyze the business and legal (both contract and IP implications) aspects of research and recommend the appropriate mechanisms and legal instruments to achieve the desired impact. A complete picture requires both the scientist's input and the technology transfer professionals expertise.

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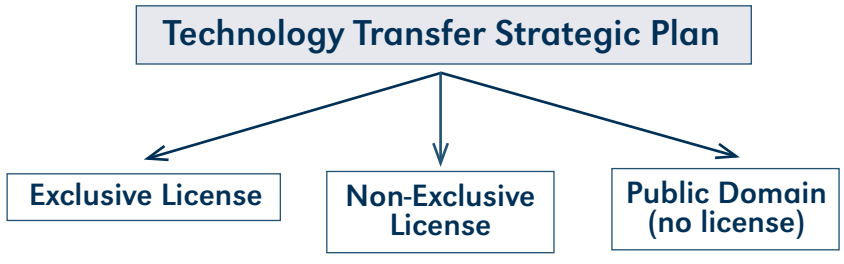
Timeline

During the implementation phase, every national program leader that we interviewed, irrespective of the research area, expressed that technology transfer professionals should be involved early on in the research cycle. Interestingly, 'early' meant different things to different people, some programs wanted TT involvement at the very conception of a research project, others wanted to obtain data prior to engaging with technology transfer, yet a select few considered proof of concept as the right time for TT involvement. While these appear to be different points along the research and development continuum, the diversity of responses make sense in the context of the research program. Scientists involved in food safety and animal health, two areas with products such as diagnostic tests or animal vaccines which have longer and more expensive development timelines and where patents and a subsequent

Figure 1. Technology Transfer Strategic Plan

The goal of tech transfer is to make research outcomes widely available. Adoption of research outcomes may require non-research assets (e.g. further product development, manufacturing facilities, marketing and distribution capacity, investment capital, product registration expertise, etc.). A license provides an incentive for the private sector to invest in making those research outcomes widely available. Depending upon the research outcomes, there at least three difference tech transfer strategies: (1) public domain; (2) exclusive license to a single party; or (3) non-exclusive license to multiple parties.



license play an important role, needed proof of concept studies prior to making TT decisions. Programs with multiple options in achieving impact such as plant breeding were more amenable to involving TT earlier on.

One-on-one Strategy Sessions

To further improve the chances that research outcomes will be adopted, a technology transfer strategy session is held for each of the invention disclosures reviewed by the patent committee. After the patent committee, the researcher, Area Technology Transfer Coordinator and a member from each of the OTT Partnership, Patenting and Licensing Sections discusses the strategy for moving forward. If the decision was not to pursue a patent-license strategy, the discussion focuses on what other mechanisms could be used to get the research results adopted (*e.g.,* trade journal article, workshops) or what other data was needed for a successful patent-license strategy (*e.g.*, research partnerships). If the decision was to pursue patent-license strategy for the technology, the discussion focuses on what claims are needed in the patent application to get the widest adoption and the ensuing licensing strategy (*e.g.*, exclusive license, target market sector). In either case, TT engages the scientist in a dialog that charters a path forward for the adoption of his/her research outcomes.

Conclusion

Technology Transfer works best when it is a part of the research plan and conducted in an iterative and collaborative manner. The earlier the interaction between the scientist and the technology transfer professionals starts, the more likely it is that the research outcomes will be adopted. Knowing how early Technology Transfer should get involved depends on the nature of the scientific research, as one size does NOT fit all. ■

References

Stephen R. Covey, "The 7 Habits of Highly Effective People," (New York: Franklin Covey, 1989).

Federal Technology Transfer Act of 1986, an Act to amend the Stevenson-Wydler Technology Innovation Act of 1980, codified in 15 USC § 3710.

Available at Social Science Research Network (SSRN): *https://ssrn.com/abstract=2961849.*

Figure 2. Technology Transfer Tactical Plan: A.) No License (Public Domain), B.) Exclusive License, C.) Non-Exclusive License.

1. IP landscape (*i.e.*, freedom to operate). Do you know of any patents on technologies that would be similar to the predicted research outcomes of the project plan? Do you know of any publications on similar research which would preclude a patent on the predicted research outcomes of the project plan?

2. Partner/Funded Need. How do I plan my research so I am best prepared for a partnership? How do I stay out of trouble when working with companies?

3. Collaborative Research Relationship. Once an outline of a research plan is developed, the technology transfer team can then determine the appropriate type of agreement to formalize the research collaboration.

4. Invention Disclosure. Once the research is completed and data has been collected, an invention disclosure should be submitted.

5. Patent Committee. Invention disclosures are reviewed by one of the National Patent Committees: (1) Life Sciences, (2) Chemical, or (3) Mechanical and Measurement. Patenting decisions are based on technology transfer requirements.

6. Scientific Publication. In order to retain patent rights, publication (paper, abstract, talk, poster, etc.) cannot occur before the patent application is submitted to the USPTO.

7. Trade Journal. The adoption of research outcomes (*i.e.*, impact) may not necessarily occur through a scientific publication. The presentation of research outcomes through a trade journal article, newsletter, website, field days, etc. may be a more appropriate way to reach the users of research outcomes.

See charts A, B, C continued on pages 88-89.

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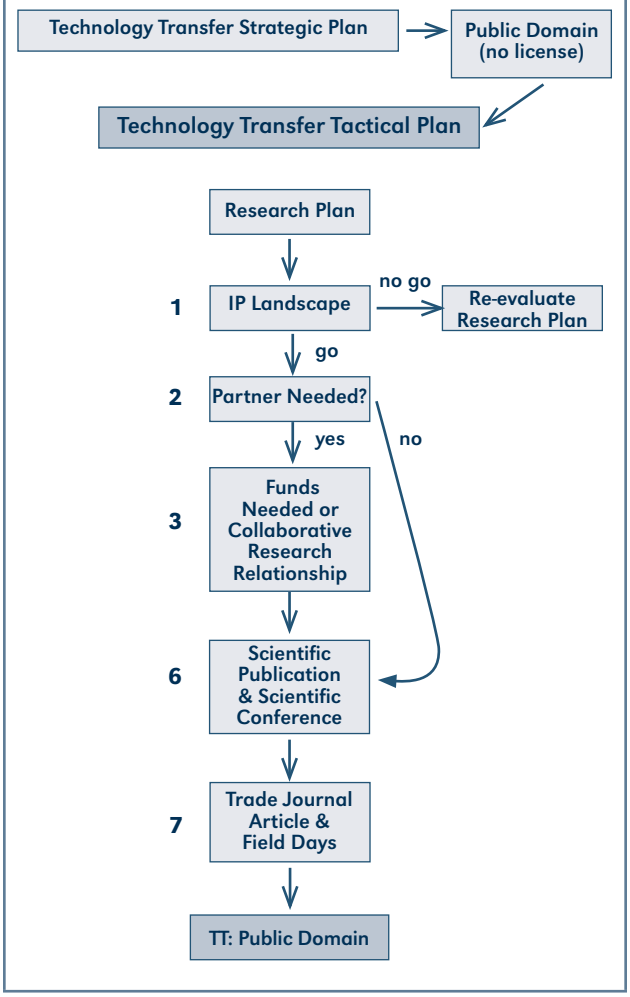

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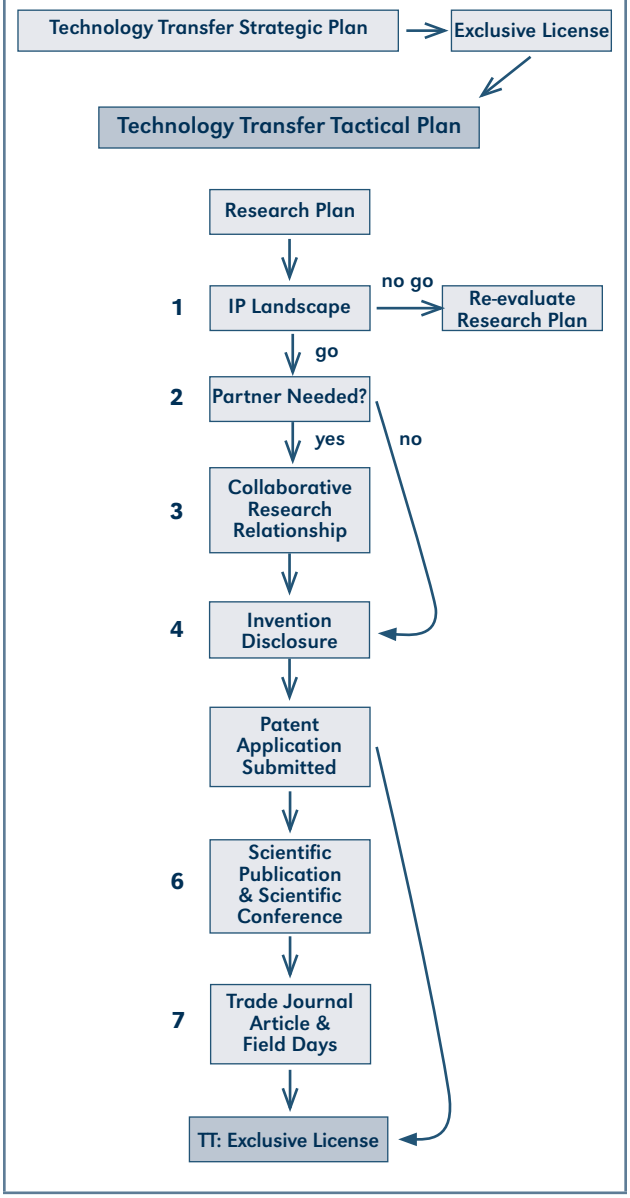

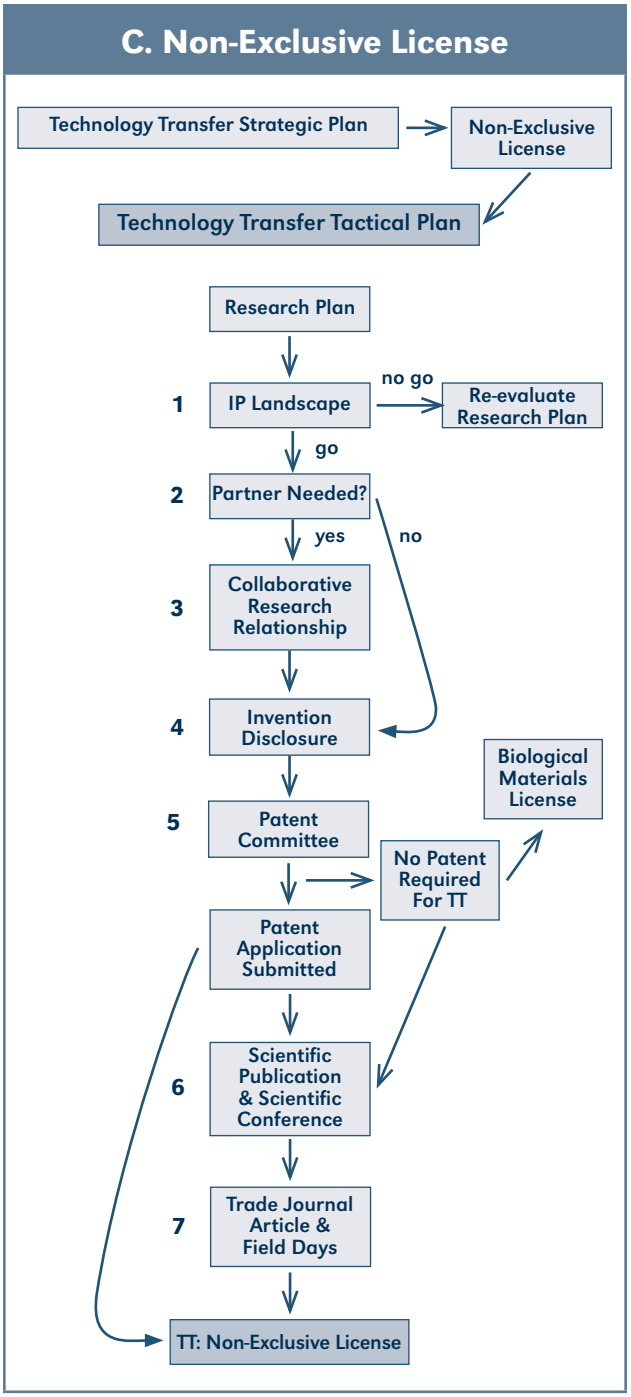
C. Non-Exclusive License
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Research Plan
1
IP Landscape
no go
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