

# TECHNOLOGY TRANSFER: PLAN FOR SUCCESS

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## ABSTRACT

Technology transfer offers the promise of transforming research discoveries and development inventions into product innovations in the marketplace. However, successfully conducting technology transfer requires planning, resources, and know-how. A Technology Transfer Planning Template (TTPT) is currently under development to help improve the quantity and quality of innovations moving from lab to market, by providing investigators with information that helps them plan for and implement new product development best practices. This paper describes the need for the TTPT, and offers details of the user-centered development and testing processes, preliminary TTPT content, and technology transfer resources.

## BACKGROUND

The transfer of assistive technology from the lab to the marketplace offers great potential to improve the quality of life for people with disabilities. However, technology transfer (TT) is typically a very challenging process, which is often fraught with barriers. Project failures are associated with the absence of market and cost considerations (Galia & Legros, 2004; Miotti, & Sachwald, 2003), as well as inadequate project planning and insufficient resource allocation (Lane, 2008).

Fortunately, the likelihood of achieving positive outcomes can be improved with adequate project planning and the application of new product development (NPD) best practices (Lane, 2008). For example, Ozer (1999) notes the importance of continuously conducting market and business scoping activities to evaluate the viability of a proposed product, while it is being developed. Similarly, Neale (1994) found that NPD success requires sound evaluation methods for project screening and market

research activities. Moenaert & Souder (1990) echoed this same sentiment by calling for market research and business analysis to reduce uncertainty and improve the chances of NPD success.

The National Institute on Disability, Independent Living and Rehabilitation Research (NIDILRR) has recognized the importance of project planning by requiring its Rehabilitation Engineering Research Centers (RERCs) to prepare a technology transfer plan that details their development project activities. Similarly, all agencies funding Small Business Innovation Research (SBIR) grants require Phase II applicants to submit commercialization plans along with their proposals. Both of these requirements highlight the federal government's appreciation of the need for extensive planning to deliver proposed product-related outcomes.

Planning can be aided by process models. In particular, research by Golish, Besterfield-Sacre & Schuman (2008) has demonstrated that academic investigators are in need of operational models and tools that simplify the business and market analyses that can have a profound impact on the viability of their R&D outputs. A NPD and TT framework, named the Need to Knowledge (NtK) model, is aimed at doing just that. That is, helping investigators understand and apply tactics that are likely to lead to marketplace success and improved social outcomes (Flagg, Lane & Lockett, 2013).

While the NtK model has been well-received by grantees and program management alike, project investigators have called for assistance applying the model to their work. These investigators have specifically asked for a template to help them better understand what information is most critical in their plans, and where to focus their efforts. In response, a project was initiated to produce a technology transfer planning template, which can provide guidance for implementing NPD best practices.

## PURPOSE

The purpose of the TTPT is twofold:

1. To provide NIDILRR grantees with an easy way to create and implement technology transfer and commercialization plans.
2. To enhance the usability of the NtK model and related resources, such as examples and tools.

The TTPT will fulfill its purpose through use by NIDILRR-funded grantees who are generating technology transfer plans; SBIR proposal authors who are drafting commercialization plans; and project investigators who intend to generate new devices that have commercial potential. These stakeholders may use the TTPT to flesh out a project idea, to craft portions of grant proposals or technology transfer plans, to create reports and promotional materials that can be shared with potential partners, to log and report project milestones, and to seek ideas for overcoming project barriers.

## METHOD

The TTPT project was initiated in 2013 as a utilization project under the Center on KT4TT. The project began with a needs analysis, which was conducted with a sample of seven NIDILRR technology grantees, including recipients of awards for SBIRs (4) and RERCs (3). Needs analysis questionnaires were completed by participants prior to a phone interview. Questions asked about planning experience, current use of planning guides, use of the NtK model, the participants' ideal planning product, and plan implementation. Hour-long interviews were used to clarify participant responses to the questionnaires and gather additional information.

### Desired Functions and Features

The data resulting from the needs analysis was grouped into several categories, and used to shape the TTPT design specifications. Features and functions were given top priority when they were requested from at least one participant in both the

RERC and SBIR stakeholder groups, and include the following:

*Format and Structure-* Participants were seeking a web-based application that could be accessed from any computer or tablet, and shared with colleagues in remote locations. Participants requested that the TTPT show the NtK model structure to prompt users to complete necessary activities, and to show gaps in proposed plans.

*Inputs-* The TTPT should ask a series of questions, like a wizard or interview process. It should use the responses to determine which additional questions are applicable. The template should also ask users questions related to when to move forward with a project, and when to consider redirecting resources to other efforts.

*Resources and User Guides-* The template should suggest resources to use while creating and implementing plans. A wide range of examples should be provided so that users can locate information that relates to their own situation. Self-help options should be the first level of support, and should include written guidance and a Frequently Asked Questions guide. Live support should also be available via phone or chat.

*Implementation Considerations-* As with standard project planning software, timelines should dynamically adjust to changes, so that as delays are added, other deadlines are automatically pushed back. Guidance should be provided to aid with implementation of TT plans. Making updates to a TT plan should be simple and avoid duplication of effort.

*RERC and SBIR Respondent Differences-* Some participant requests for TTPT functionality were specific to the type of grantee responding. For example, the SBIR grantees requested that the TTPT provide them with market information and guidance on estimating market size. They also asked that the TTPT provide suggestions related to product launch and funding production activities. RERC grantee participants asked that the TTPT provide them with advice on how best to work with technology transfer offices, and that the TTPT outputs can be used to complete their required annual performance reporting.

These functions and features, which were requested by participants from one stakeholder group or the other are included in a “wish list” that will be integrated into the final design as resources allow. With proposed specifications in hand, the project team began developing the questions that would be asked by the TTPT.

### TTPT Questions

As a starting point, the project team reviewed the SBIR commercialization plan evaluation criteria for grant proposals that are used by four different federal agencies (National Institutes of Health, National Science Foundation, Department of Education, and Department of Agriculture). Those criteria were then matched up to the NtK model steps to paint a complete picture of new product development and transfer. Simple questions were formed and paired with the NtK model’s tools and case examples. The questions were separated into two groups- those questions that elicit a high-level overview of a project, and those that provide a detailed report of specifics, such as the proposed device’s market; research, development, and production plans; and the device’s path to market.

*High-level Overview-* Questions in this section of the planning template include the basics, such as “What are you creating/developing?” “As described by end users, what problem does your proposed device solve? Or, what unmet need does it fulfill?” Questions cover the identification of stakeholders, competing products, and potential barriers.

Once users have responded to these questions, they are presented two types of output reports- a narrative executive summary as well as a listing of all responses in a table format. The executive summary can then be edited and used in a proposal, technology transfer plan, or in correspondence with project team members or external partners. The table would be useful for editing the initial responses and quickly accessing the resources and examples that are associated with each question.

*Detailed Descriptions and Timelines-* The next set of questions delves deeper into project specifics, such as who will carry out the proposed research, development, and/or production activities, and when

will those activities take place. This set of questions also probes deeper into the proposed target market by asking for more specific information, such as where the target buyers are located geographically, in what type of settings the product will be used, etc. This set of questions also gathers details regarding collaborations with manufacturing partners and technology transfer offices.

*Output Reports-* Both sets of questions offer TTPT users an opportunity to create output reports in the form of executive summaries and tables of responses. The detailed question set also enables users to create more tailored reports such as value propositions and timelines of planned activities.

### TTPT Testing

The front-end interface of the TTPT is being developed as a semi-functioning mock-up to allow for user testing and the incorporation of user feedback. Once complete, participants who took part in the needs analysis will be asked to interact with the mock-up TTPT, and offer their input regarding its form and function. An online testing tool, Loop 11 (2016) will be used to ask participants to complete objectives and tasks, and respond to questions. The Loop 11 tool will then provide the project team with responses, as well as clickstream analysis and heatmaps to demonstrate where users may be encountering problems or where they have found interesting information on which to dwell. All suggestions resulting from analysis of the Loop 11 data will be considered for inclusion in the refined TTPT specifications.

Testing activities will be completed in the spring of 2016, leading to an anticipated release date for the fully functioning TTPT in late 2016. Interested parties are encouraged to contact the project team if they would like to engage in user testing of the TTPT.

## **DISCUSSION**

Prior research and the needs analysis described in this paper have demonstrated that TT planning tools are needed by grantees. Employing a user-centered design process will help to ensure that the final TTPT product is usable by, and desirable to the target audience of funded grantees, as well as those

individuals who are engaged in developing grant proposals. While the TTPT is under development, many resources are available for use on the Center on KT4TT's website, including the following:

- The Need to Knowledge Model: <https://sphhp.buffalo.edu/cat/kt4tt/best-practices/need-to-knowledge-ntk-model.html>
- Personalized technical assistance: <https://sphhp.buffalo.edu/cat/kt4tt/technical-assistance-and-resources.html>
- Resource materials grouped by topic area: <https://sphhp.buffalo.edu/cat/kt4tt/technical-assistance-and-resources/resources-for-non-nidilrr-grantees.html>

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### REFERENCES

Flagg, J., Lane, J., & Lockett, M. (2013). Need to Knowledge (NtK) Model: an evidence-based framework for generating technological innovations with socio-economic impacts. *Implementation Science*, 8(21), 1-10.

Galia, F. & D. Legros. 2004. Complementarities between obstacles to innovation: evidence from France. *Research Policy* 33(8), 1185-1199.

Golish, B.L., M.E. Besterfield-Sacre, & L.J. Schuman. 2008. Comparing academic and corporate technology development processes. *Journal of Product Innovation Management* 25(1), 47-62.

Lane, J. (2008). Delivering on the 'D' in R&D: Recommendations for increasing transfer outcomes from development projects. *Assistive Technology Outcomes and Benefits, Special Issue*, 1-69.

Loop 11. (2016). Loop 11 homepage. Retrieved from <http://www.loop11.com/>

Miotti, L. & F. Sachwald. 2003. Cooperative R&D: Why and with whom? An integrated framework of analysis. *Research Policy* 32(8), 1481-1499.

Moenaert, R. K. & Souder, W. E. (1990). An information transfer model for integrating marketing and R&D personnel in new product development projects. *Journal of Product Innovation Management*, 7(2), 91-107.

Neale, C.W. (1994). Successful new product development: A capital budgeting perspective. *Journal of Marketing Management*, 10(4), 283-296.

Ozer, M. 1999. A survey of new product evaluation models. *Journal of Product Innovation Management*, 16(1), 77-94.