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**Building a Foundation for Effective Technology Transfer through Integration with the Research Process**

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This primer aims to increase the effectiveness of T2 activity in transportation by describing how T2 practices can be successfully integrated into the research process to capture the potential real-world benefits of our community’s research investment. This primer’s agenda can be summarized as follows:

- **Goal:** To help the transportation research community facilitate effective technology transfer
- **Audience:** Research program directors and others at the executive level in research organizations, research project managers and their supervisors, researchers, and others in the research community
- **Scope:** T2 activities centered on a particular R&D project, generally defined by a single statement of work or objectives, as opposed to program-level activities that support multiple projects.

In pursuing this agenda, the primer draws heavily on three recent Transportation Research Board (TRB) publications:

- *Accelerating Implementation of Transportation Research Results*, National Cooperative Highway Research Program (NCHRP) Synthesis 461,
- *Guide to Accelerating New Technology Adoption through Directed Technology Transfer*, NCHRP Report 768, and

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**Abstract**
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1 Introduction

In the fast-changing world of research and development (R&D), it is difficult for transportation professionals to stay abreast of the most promising approaches for addressing the real-world challenges they face. Researchers often feel obliged to focus on their research field, with no time or resources to study the specific context in which their research outputs might be used. In a budgetary era where every dollar must stretch as far as possible, the lack of planning to connect research to the needs that it intends to address—technology transfer (T2)—represents a missed opportunity for more efficient leveraging of scarce resources.

Responding to this situation, this primer aims to increase the effectiveness of T2 activity in transportation by describing how T2 practices can be successfully integrated into the research process to capture the potential real-world benefits of our community’s research investment. This primer’s agenda can be summarized as follows:

- **Goal:** To help the transportation research community facilitate effective technology transfer.
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In pursuing this agenda, the primer draws heavily on three recent Transportation Research Board (TRB) publications:

- *Accelerating Implementation of Transportation Research Results*, National Cooperative Highway Research Program (NCHRP) Synthesis 461 [1],
- *Guide to Accelerating New Technology Adoption through Directed Technology Transfer*, NCHRP Report 768 [2], and

References to the three core source documents above are provided throughout this primer to give the reader access to more detailed information and guidance on the concepts that are introduced here.

Before describing T2 activities and principles, it is important to define the terms of the discussion. (Note that these definitions are conceptually consistent with the ideas in the three source documents but are not taken verbatim from any of them.) The core terms in this primer are as follows:

- **Technology:** Any knowledge, process, system or other tangible or intangible thing that could be used to create benefits. Examples of technologies include a survey, a hiring process, a piece of software or “app,” a traffic model, a new road construction technique or an unmanned aircraft.
- **Research and Development:** Any activity that aims to create or improve a technology.
- **Adoption:** The state in which a technology has been made available for use in ordinary...
operational situations.

- **Technology Transfer Activities:** Activities designed to help ensure that technologies created or improved through R&D are adopted by someone outside or within the research-producing organization.

- **Innovation Process:** All the steps necessary to bring to reality an improvement in operations; the process may include various forms of R&D as well as an array of T2 activities; it is treated here as a single process in order to emphasize the need to keep beneficial use of an innovation as the ultimate goal of the R&D and T2 activities.

The Innovation Process is accomplished by multiple groups. In general, their relationships are complicated and their roles may overlap. The most important groups in the process are as follows.

- Research program directors provide financial support for the R&D and help identify R&D objectives.
- Research project managers oversee the R&D on behalf of the directors.
- Researchers conduct the R&D, developing the technology.
- Stakeholders include all of the groups identified in the present list and anyone else that may be impacted by the technology’s adoption, such as: senior management within the research organization, standards organizations, or professional associations. (Stakeholders are discussed in more detail throughout this document and especially in Section 3.2.)
- T2 coordinators act as brokers, managing all non-R&D activities necessary for the technology to be adopted.
- Adopters make the decision to put the technology into operational use.
- Users (often the general public) are able to use the technology after the T2 Process is complete and the technology is adopted.

Adopters and users may or may not be distinct, depending on the application. If the technology is a new traffic signal design, for example, then the adopters would include managers and engineers in a city highway department that installs the new signals. Users would be the drivers that interact with the signals on a day-to-day basis. On the other hand, if the technology is a new research tool such as a data analysis software package, then the researcher who decides to use it is both the adopter and user.
The Innovation Process, summarized in Figure 1 above, includes two distinct but integrated processes: the R&D Process and the T2 Process. As shown, the R&D Process involves two phases:

1. Define Need: A scope or statement of work is developed to establish the objectives and parameters of the R&D; any other steps to prepare to initiate the research are taken.
2. Research and Development: The R&D is carried out, resulting in a new or improved technology. The R&D may be limited to what is performed by an R&D contractor according to a statement of work, or it may also include follow-on development work conducted by another organization—the research-producer, the adopter, or a third party.

The T2 Process shown in blue runs in parallel with the R&D Process. The list below is a very high-level overview of the T2 Process. The rest of this document describes it in more detail.

1. Create a T2 Plan: A rough conceptual outline of needed T2 activities is developed, including aspects such as which stakeholders must be engaged. The T2 plan evolves and solidifies as stakeholders are engaged and other aspects of the preliminary plan are implemented.
2. Engage Stakeholders: Stakeholders are engaged in a dialogue about what the technology must do to be successful and what role they can play in facilitating that success.
3. Secure Resources: Funds and other resources and tools are identified to support and accelerate T2 activities.
4. Execute and Manage: The range of activities outlined in the T2 plan are conducted and adjusted as necessary.

Unless otherwise noted in Sections 2 and 3, activities in the T2 Process should be coordinated by a formally designated T2 coordinator. This person may come from within the research organization, from the adopter organization (when research and adoption are completed within a single agency) or from outside. The T2 coordinator should be responsible to the research program director or, in the case where a single organization houses both research director and adopter activities, possibly a manager on
the adopter side. Too often, T2 activities are left to a research project manager or even a researcher, with less than ideal results. Researchers tend to focus on technology development—their core competency. Effective T2 requires:

- Clear understanding of the practical issues that affect the decision to adopt a technology
- An appreciation of the R&D
- Communication skills, and in particular, familiarity with the best approaches for engaging stakeholders and building support for a technology
- Accountability for results.

Usually, this diverse set of requirements can be achieved best by designating a point of contact for T2 activities related to a particular R&D project, the T2 coordinator, who then draws on other experts and resources to enable and manage the T2 Process. Depending on the scale of the R&D project and how far along it is in the R&D Process and other factors, a T2 coordinator may be effective by dedicating less than full time to the project. In other cases, a team of T2 coordinators may be needed.

**Example: Coordinating T2**

Like many State DOTs, the Virginia Department of Transportation (VDOT) funds research to meet its own operational needs and then adopts successful research results. To help manage the process, VDOT has a full-time staffer with the job title Implementation Coordinator (IC) who handles roughly 50 implementation projects at a time. The IC’s work on a particular R&D project begins with participating in the committees that define research objectives. Once the R&D is underway, conducted by either VDOT research scientists or contractors, the IC helps in research project progress reviews and further develops the T2 plan, especially the part that relates to post-R&D T2 activities, the implementation plan. After the R&D is completed, the IC executes the implementation plan with the assistance of other staff. An important aspect of the IC’s work is that he coordinates contributions from many different people in different positions to enable the T2 Process: executive management for T2 funding and overall support and direction, research scientists for their insight into the details of the R&D, and transportation practitioners—design engineers, operations engineers, equipment managers, and others—who understand the problems to be solved [5, 6].

Section 2 describes T2 activities that T2 coordinators should arrange and manage in terms of the principles with which the activities are aligned. Section 3 describes them in terms of the steps that must be taken.

**2 Principles**

T2 should be integrated with each phase of the R&D Process for a given R&D project. In each phase, effective T2 aims at accomplishing four critical objectives:

- Understanding potential adopters’ needs
- Understanding how the technology being developed could meet those needs
- Addressing potential barriers to adoption
- Communicating the value of adopting the technology in question.
Using these objectives as principles to guide them, T2 coordinators act as brokers, identifying and engaging the various stakeholder groups and facilitating a transactional dialogue between them to ensure technology adoption. The rest of this section discusses the four principles and describes how to integrate each one with the R&D Process before, during, and after an R&D project.

### 2.1 Understand Adopter Needs

For anyone conducting T2 activities, the primary guiding principle is to understand what a potential adopter needs. There are two aspects to this understanding: Functional Needs and Process Needs. Functional Needs are at the core of what the technology must do to solve a given problem. Process Needs have to do with other issues and factors that will likely shape an adopter’s decision-making process. Process Needs generally encompass institutional policies, regulations, economics, legal requirements, and other constraints.

In general, the two types of needs are handled differently. The Functional Needs must be directly addressed by the R&D; some Process Needs can be addressed through R&D while others cannot. The Process Needs that cannot be incorporated into R&D are “barriers” to adoption that must be handled differently. For example, liability risks associated with a new transportation technology may need to be managed through the development of legal opinions or new insurance options. Functionality can be tested during R&D; barriers to adoption cannot.

Understanding adopter needs and using that understanding to help make R&D relevant and adoptable involve a range of activities throughout the R&D Process. Table 1 lists activities that may be appropriate, depending on the specific R&D project. When the R&D project is more exploratory, with less clearly defined applications, it may not be necessary to involve potential adopters.

<table>
<thead>
<tr>
<th>Timing</th>
<th>T2 Activity</th>
</tr>
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</table>
| Before R&D| • Meet with members of the adopter community, especially those who are facing unique challenges that the researchers will want to understand and potential early adopters.  
• Gather information on the adoption decision context while developing a R&D project plan.  
• Involve potential adopters in proposal evaluations. |
| During R&D| • Involve adopters in project reviews or R&D advisory committees to help guide the R&D’s evolution [2:15].  
• Involve users in field testing, beta testing, etc., to get their input to the development of the technology. |
| After R&D | • Use insights from adopters to design communication strategies that will engage their community. |
2.2 Understand the Technology

T2 activities must be customized for the technology. Because different technologies are useful to different adopters and face different barriers to adoption, fully understanding the technology is fundamental to effective T2. How does the technology perform and under what conditions? What does it require as inputs? What are its policy implications or requirements? Table 2 describes activities that will generally be useful in applying this principle. The details of appropriate T2 activities depend on the specifics of the R&D project in question.

Table 2. Understanding the Technology

<table>
<thead>
<tr>
<th>Timing</th>
<th>T2 Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before R&amp;D</td>
<td>• Define clear R&amp;D objectives and metrics for the technology being developed [3:58]. Objectives and metrics for basic and exploratory research will likely differ from objectives and metrics appropriate to R&amp;D that is expected to be more immediately applied.</td>
</tr>
</tbody>
</table>
| During R&D | • Throughout R&D, and especially as contracted R&D draws to a close, monitor the anticipated project end state to get a head start on identifying barriers to adoption, planning communications, and planning follow-on technology development. For example, if data requirements for an analytical technique exceed data availability at potential adopter agencies, further development may be necessary to create a less data-intensive approach.  
• Watch for ancillary technologies that result from the R&D, such as databases and research tools. Even though they may not have been specified in the project objectives, they may have value to others, and may warrant formal evaluations and T2 plans. |
| After R&D | • Determine whether the technology performs as intended, and evaluate its practicality and feasibility in terms of system integration and compatibility [1:26], privacy, intellectual property rights, economic considerations, and standards [2:16].  
• Evaluate the technology to enable 1) effective communication about its value and 2) action on barriers to adoption. |
As mentioned above, there may be issues not directly related to the capability of the technology that will affect whether it can be adopted. What non-technical issues would someone have to confront before choosing to adopt the technology? In general, these Process Needs have to do with the implications of the technology in terms of policy, laws, markets, and society. The issues are typically identified in the course of understanding the need and the technology. This principle refers to the set of activities that address such barriers. Table 3 outlines general opportunities for applying the principle at different phases in the R&D Process. Specifics will depend on the details of the technology.

### Table 3. Addressing Barriers to Adoption

<table>
<thead>
<tr>
<th>Timing</th>
<th>T2 Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before R&amp;D</td>
<td>• Identify likely barriers to adoption and assess options for mitigating them.</td>
</tr>
<tr>
<td>During R&amp;D</td>
<td>• Take initial steps to mitigate barriers to adoption that arise or are confirmed as the technology evolves.</td>
</tr>
<tr>
<td>After R&amp;D</td>
<td>• With a clear understanding of the technology to be adopted, address barriers to adoption, customizing the approach to particular adopters as necessary (e.g. licensing agreements to manage particular IP concerns that may depend on the adopter agency).</td>
</tr>
</tbody>
</table>

### Example: Understanding the Technology

The Pipeline and Hazardous Materials Safety Administration (PHMSA) uses customized Technology Readiness Levels (TRLs) as a tool to manage its research portfolio. The TRL scale is a tool for assessing the maturity of a technology: How ready is a technology to fulfill its mission? PHMSA’s research scope ranges from relatively basic research on sensors, for example, up through more field-ready systems like sensor test rigs. PHMSA primarily uses its TRL scale to help inform management decisions about developing and transitioning technologies and then demonstrating them on the field under real operating conditions. Because the TRL scale does not address barriers to adoption including economics or regulatory acceptance, PHMSA uses it as one factor among many in its decision making [9].

### 2.3 Address Barriers to Adoption

As mentioned above, there may be issues not directly related to the capability of the technology that will affect whether it can be adopted. What non-technical issues would someone have to confront before choosing to adopt the technology? In general, these Process Needs have to do with the implications of the technology in terms of policy, laws, markets, and society. The issues are typically identified in the course of understanding the need and the technology. This principle refers to the set of activities that address such barriers. Table 3 outlines general opportunities for applying the principle at different phases in the R&D Process. Specifics will depend on the details of the technology.

### Example: Addressing Barriers to Adoption

Protected-permitted left-turn (PPLT) signal phasing at traffic signals has existed for many years in the U.S., but the lack of a standard display created driver confusion. Research to develop a uniform display for the PPLT that could be easily understood and would enhance safety culminated in the development, testing and recommendation of a new flashing yellow arrow (FYA) display. Adoption of this innovation was impeded largely by hesitancy on the part of potential adopters (inherently risk-averse traffic engineers) and was delayed by the six year process of approval for including the FYA display in the Manual on Uniform Traffic Control Devices (MUTCD). The concerns of the traffic engineers were addressed both through continued R&D with positive results and through collaboration with legal practitioners such as the TRB Standing Committee on Tort Liability and Risk Management to ensure risks were managed and minimized. Leadership from the FHWA was required in order to complete the approval process needed before the FYA could be included in the MUTCD. These steps removed the barriers to adoption and cleared the way for successful deployment [3:121].
2.4 Communicate Value

The need to communicate the value of the technology is the final guiding principle. It is about “closing the deal,” and it is fully possible only when armed with an understanding of the need and the technology designed to meet it. Despite its position at the end of the principles list, though, communicating about the technology needs to happen throughout the R&D project, not only at the end. See Table 4 for a sample of possible communication activities appropriate for each phase of the R&D Process. In each phase, it is important to communicate via multiple channels. T2 must engage a broad range of stakeholders, and no single communication approach will reach them all [2:45, 3:91, 3:134].

Table 4. Communicating Value

<table>
<thead>
<tr>
<th>Timing</th>
<th>T2 Activity</th>
</tr>
</thead>
</table>
| Before R&D | • After ensuring that the R&D will be relevant by listening to stakeholders and defining the technology objectives appropriately (see Sections 2.1 and 2.2), build support for the R&D among stakeholders who influence funding and staffing decisions.  
• Identify “champions,” who have a particular sense of ownership in the R&D and the influence necessary to help it be successfully implemented. |
| During R&D | • Publish research alerts for adopters and report on progress regularly to key stakeholders, including upper management and technical leaders who will ultimately be responsible for overseeing implementation[2:45].  
• Once the technology has passed all testing and is confirmed to operate effectively in real-world circumstances, conduct pilot demonstrations to show potential adopters that the technology works [2:57, 3:133]. |
| After R&D | • Conduct showcases to demonstrate the technology's practical and economic merit to upper management and technical staff at adopter agencies, reducing the political, professional, and financial risks they face in implementing the technology [2:57, 3:133].  
• Involve early adopters of the technology in peer exchanges to provide potential adopters more easily trusted third-party evidence of the technology’s value.  
• Provide implementation guidance and training to help adopters understand how to get value from the technology, which increases their confidence in it [1:33, 2:65, 3:133].  
• Track progress on implementation, collecting quantitative and qualitative information about benefits gained by users (if possible, measure before and after outcomes); communicate the results to inform other users, encourage new users, and demonstrate to T2 funders that their support is showing results. |
3 Process

The previous section emphasized understanding T2 as a distinctive set of activities related to brokering a transaction. In contrast, this section emphasizes that T2 activities are similar to other activities that can be managed with standard project management methods. Although informed and guided by the T2 principles above, the process for T2 is familiar to any project manager: make a plan, engage stakeholders, marshal other resources, execute the plan and manage the process. The following sections describe the steps and issues that the T2 coordinator should consider.

3.1 Create a T2 Plan

A T2 plan outlines the people and organizations involved in the T2 Process and the roles they play, the activities they undertake, and the desired outcomes. It describes how the principles identified above will be applied to help assure that a particular technology will be adopted. T2 plans will vary in scale and scope depending on the specific technology and other factors. They may encompass plans for certain parts of the T2 Process, such as a stakeholder engagement plan or an implementation plan that focuses on T2 activities that occur after R&D is completed. The T2 plan may specify target market penetration rates and a comprehensive menu of approaches to reach that target, or it may be more limited [4].

Creating a T2 plan outline is the first step in the T2 Process, but the T2 plan is a living document, evolving and becoming more concrete as stakeholders are engaged and as the R&D progresses. Completing the initial plan is critically important for securing the resources to implement it. It also provides a framework for assessing T2 progress.

Putting a T2 plan together involves these steps:

1. Identify and clearly articulate the reasons for and benefits of the technology.
2. Assess the market for the technology. Who will adopt it and why?
3. Consider the barriers to adoption. Even if the technology performs the function that the
adopter needs, other issues may prevent the adopter from employing it. What are those issues? How can they be managed?

4. Map out the stakeholders. Who will be affected if the technology is adopted? How could they influence the adoption process? Who might be effective partners in implementation?

5. Design a sequence of T2 activities that will engage needed stakeholders, mitigate barriers to adoption, and convince adopters of the technology’s value.

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**Example: Creating a T2 Plan**

Every Day Counts (EDC) is an FHWA-initiated, State-based model to identify and deploy proven yet underutilized technologies, cases where the R&D has been completed but adoption has not been achieved. EDC operates on a two-year cycle. Every two years, FHWA issues a call for proven, deployment-ready technologies. After a selection process, transportation leaders from across the country gather at regional summits to discuss challenges to adoption of each of the selected technologies. On a technology-by-technology basis, FHWA innovation deployment teams provide technical assistance to partners, developing and executing multi-faceted implementation plans. Activities in the plans include technology evaluations, case studies, informational articles, implementation workshops, and published implementation guides. FHWA staff also monitor and report on nationwide use of each EDC technology. Through three cycles of EDC, a total of 32 technologies—innovations and enhanced business processes—have been promoted. Every State transportation agency has used eight or more of the EDC technologies, and some have adopted over 20. **FHWA’s success results from its comprehensive approach to implementation planning and its strong commitment to execution [11].**

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### 3.2 Engage Stakeholders

Engaging stakeholders is essential throughout the R&D Process. A broad range of people stand to benefit from the advancement of the R&D and the adoption of the resulting technology. Partnering with them helps bring new resources into the process and also clarifies objectives and challenges.

The best way to engage different T2 stakeholders depends on the specifics of the technology and the sponsoring and adopter organizations. Table 5 summarizes the core stakeholders in a T2 Process, the people who are *most* important for a T2 coordinator to engage. For brevity’s sake, some T2 stakeholders are not listed here, such as the people and organizations that influence the stakeholders in the table—that is, the stakeholders’ stakeholders.
Table 5. T2 Process Stakeholders

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Stakeholder Contribution to the T2 Process</th>
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<tbody>
<tr>
<td>Adopters (management and staff)</td>
<td>• Help clarify the problem that the technology must solve</td>
</tr>
<tr>
<td></td>
<td>• Help identify decision process/policy issues that could be barriers to adoption</td>
</tr>
<tr>
<td></td>
<td>• Help vet and refine strategies for communicating with the adopter community</td>
</tr>
<tr>
<td>Early adopters</td>
<td>• Participate in technology demonstrations</td>
</tr>
<tr>
<td></td>
<td>• As a trusted 3rd party, vouch for the technology to other potential adopters</td>
</tr>
<tr>
<td>Research directors and other upper management</td>
<td>• Provide resources for T2</td>
</tr>
<tr>
<td></td>
<td>• Advocate for the technology</td>
</tr>
<tr>
<td>Technical experts (such as the researcher’s peers)</td>
<td>• Provide guidance to T2 team (research director, research project manager, T2 coordinators, et al.) and/or other stakeholders</td>
</tr>
</tbody>
</table>

A “champion” for the technology is a special kind of stakeholder. Champions have a sense of ownership in the technology, and are personally vested in its successful adoption. Champions often emerge from the ranks of management, on both the research-producing and the adopter side. They are most effective when they are influential within an organization and/or industry and can help secure resources or other people’s support. Champions are extremely valuable for effective T2 [1, 2, 3].

Example: Engaging Stakeholders

In the 1990s, the Federal Aviation Administration (FAA) collaborated with multiple stakeholders to study how Runway Safety Area (RSA) requirements might be met at runways without sufficient area for full compliance. This collaboration developed a technique called an Engineered Material Arresting System (EMAS) that used crushable concrete placed at the end of runways to safely stop overrunning aircraft. The FAA had the job of transferring this technology to airport user organizations and brought stakeholder organizations on board early in the implementation of the new technology to ensure that the technical needs of the airports would be satisfied. The Port Authority of New York and New Jersey loaned one of its senior engineers to the FAA to provide customized input to facilitate the transfer of the technology. This valuable input included identifying implementation issues that were critical to the ultimate success and usability of the technology by airports. Currently, EMAS is installed at 99 runway ends at 60 airports in the US, and more are planned. There have been nine incidents where EMAS has safely stopped overrunning aircraft with a total of 243 crew and passengers aboard [2:47, 12, 13].

3.3 Secure Resources

Like any other activity, T2 requires resources, both human and monetary. Funds to support T2 can come from the funder of the R&D, the adopter—especially when the adopter group and the R&D group reside within the same organization—and/or a third party organization with a stake in the technology’s adoption. The particular source(s) depend on the details of the technology and the organizations.
involved. The critical point here is that, regardless of the source, T2 activities do require funding. The following actions should be considered for inclusion in any strategy to secure that funding.

- Use the T2 plan to explain the steps in the process and describe their value.
- To make the most of ongoing and planned T2 activities, identify complementary R&D projects within the R&D-producing organization (which may also be the R&D-adopting organization) that could support or leverage T2 for the R&D project at hand.
- To ensure and demonstrate that T2 funds will be used wisely, identify and plan to use existing T2 infrastructure—internal experts and practices (such as newsletters and other information outlets) and external offices and organizations involved in T2.
- Work with the technology’s stakeholders and look broadly to find organizations that would benefit from the technology’s adoption and may be willing to support it.

### Example: Securing Resources

In 2004, the Michigan DOT (MDOT) kicked off its Local Safety Initiative to assist local agencies in Michigan to reduce crashes in their communities. MDOT’s goal was to transfer knowledge and resources to local agencies to build their technical capabilities and ultimately reduce the number and severity of road crashes. Useful resources for T2 are more than financial. MDOT’s creative approach was to provide resources in the form of direct engineering support, training, and several safety software tools. MDOT continues to builds partnerships with local agencies by teaching their staff how to access and analyze crash data, conduct field reviews, and determine appropriate countermeasures. MDOT also directs local agencies toward funding sources. By providing these resources as part of the transfer of safety technologies, MDOT is making progress towards reducing crashes on Michigan’s roads [2:52].

### 3.4 Execute the Plan and Manage the Process

Executing the T2 plan involves taking the steps outlined throughout this document. Managing the T2 Process involves measuring progress and taking corrective action when necessary, which requires defining metrics that matter for a specific project’s technology. That is often challenging in T2. The difficulty may arise from the large and diverse set of stakeholders, from uncertainty about who will be the ultimate adopters of a technology or from the challenge of identifying the “tipping point”—the information or event that is the last or most influential piece leading to adoption. For example, defining market penetration as a metric for measuring success can be challenging. Not all agencies may have a need for a particular technology, and those that need it may not have the same level of need. It may be that deep and thorough adoption by one agency would be better in terms of producing on-the-ground benefits than having five agencies adopt at a more superficial level. Regardless of the challenges, attempting to measure progress and use the metrics to guide the process is critical to maintain focus on making an impact.
4 Summary and Next Steps

The most important points made in this primer are as follows:

- T2 activities are distinct from R&D activities. Whereas R&D creates or improves a technology, T2 activities help ensure that the technology is adopted.
- The T2 Process is integrated with R&D throughout the Innovation Process: T2 begins before R&D and feeds into it; it also continues after R&D concludes, relying as it does on R&D results.
- T2 should be managed by a designated T2 coordinator—someone with the explicit responsibility of facilitating the T2 Process, the time to dedicate to it, and the appropriate training and resources.
- T2 practices are project-specific. The principles and process apply universally, but the details of the technology, the organization managing the research, the adopter organization, and the adoption context will determine particular T2 practices.

The next step in using this primer depends on the reader’s current relationship with the T2 Process. For anyone who has already been involved with T2, the next step would be to re-assess past and current T2 practices to identify potential areas of improvement. For those new to T2, the next step would be to work toward creating your first T2 plan by choosing a promising R&D project and beginning to go through the steps outlined here. In either case, it would help to consult the documents referenced in this primer and contact the U.S. DOT Technology Transfer Program Manager at TechTransfer@dot.gov with any questions.
References


5. Jimmy White (Virginia Department of Transportation), in conversation with author, December 2015.


