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## **Industry Canada**

# Workbook for Developing a Technology NOV 2 0 2012 Roadmap

This workbook is intended to guide a facilitator through the process of developing a Technology Roadmap (TRM). It also provides a useful record of the actions and decisions taken through a TRM exercise.

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# Section 1:

Defining the Objectives and Scope of the Technology Roadmap

## **Defining the Scope**

1. Define the industry/sector/segment that the Technology Roadmap (TRM) is intended to cover.

2. Define the boundaries of the industry/sector/segment that the Technology Roadmap is intended to cover. (How inclusive or exclusive will the TRM exercise be?)

## **Pre-Analysis**

3. Describe the broad technological challenges/problems/obstacles facing this industry/sector/segment, or its various sub-components.

4. Describe why a Technology Roadmap could help address these technological challenges/problems/obstacles.

5. Once these challenges/problems/obstacles are addressed, describe the potential impact on the industry's/sector's/segment's market success (this may involve holding preliminary discussions with members of the industry).

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## **Defining the Objectives**

6. Define in one crisp statement the formal objective and anticipated outcomes from the Technology Roadmap.

## Section 2:

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Setting up and Holding the First Meeting of Stakeholders

### Finalizing the List of Invited Stakeholders

 Determine who from each segment should/must be invited to participate in the Technology Roadmap development process. Think about who the relevant stakeholders are from each of the following groups. List the stakeholders in Table 1. Levels of Government Federal Provincial Municipal Academia Training Research Federal/Provincial Labs Associations/Representative Groups Organizations Across the Supply Chain **Raw Materials** Processes Logistics Wholesale Retail After Sales Service Industry Leaders Technology Size Influence Exporters/Importers **Consumer Groups** Regulators International Bodies **Business Development Groups Related Professional Service Organizations** Investors Banks Venture Capitalists

Market Analysts

## **Table 1: List of Stakeholders**

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Name of Company / Organization	Where Company / Organization is from (i.e. private sector, government, academia)	Ranking (High/Medium/ Low)	Invite? (Yes / No)
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			No. of Street
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	Can the State		

2. In Table 1, based on your knowledge of the industry and each stakeholder, rank each stakeholder's credibility with respect to their orientation towards technology. Rank each stakeholder as a High, Medium, or Low. When ranking each stakeholder, consider who would be of most value to the process and who will be able to make the greatest impact on the industry through their involvement.

3. Determine how many individuals are wanted to be involved in the TRM process. To limit the number of participant to a practical size, it is best to invite only one individual from each stakeholder organization. 4. Based on the rankings given to each stakeholder in Table 1 and focusing on stakeholders ranked as "High", select the most desired stakeholders to invite to be involved in the TRM process. Remember that a TRM process should be industry driven; therefore, when selecting stakeholders, the distribution should include at least 50% private sector stakeholders. Furthermore, try to include a mix of small, medium, and large organizations from the private sector.

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5. From the invited stakeholders, identify the "Industry Champions" that must be involved in the TRM process. Their involvement will help to assure credibility of the TRM process throughout the industry. These "Champions" would be some of the first to be invited to participate in the TRM.

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### **Inviting the Desired Stakeholders**

6. Determine the person to invite from each desired stakeholder organization. List these individuals, their organizations, and their contact information in Table 2.

4.

7. Develop an "invitation strategy". This should include a script that outlines:

- The objective of the TRM;
- What the TRM process is;
- What the TRM would provide them, their organization;
- What other stakeholders are invited to participate; and
- What would be expected of them.

Determine who would be best to initially contact the desired stakeholders. This could be an ADM, DG, Director, Regional Director, researcher, 'perhaps a representative from an "Industry Champion", or an individual with considerable credibility within the industry.

8.

9. Make the first set of calls to the identified "Industry Champions" to get them involved. As mentioned earlier, their involvement will add credibility to the TRM process. Leverage off their involvement to gain a higher rate of participation from other stakeholders. Use Table 2 to track when stakeholders have been contacted and if they have accepted the invite to be involved in the TRM process. 10. Determine where and when to hold the first meeting. When determining where to hold the meeting, consider the industry's centre of gravity and the location of any industry clusters. With respect to when to hold the meeting, consider the industry's seasonal factors and other commitments of the "Industry Champions".

11. Contact and invite all the other desired stakeholders. Again, use Table 2 to track when stakeholders have been contacted and if they have accepted the invite to be involved in the TRM process. If a stakeholder ignores the invitation three times or declines the invitation, refer to Table 1 and find a suitable replacement.

Name	Organization	Email Address	Telephone Number	Date of First Contact	Date of Second Contact	Date of Third Contact	Accepted Invite? (Yes / No)
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		1.1.1.1.1		10 Land			
	A State State	1 Marshall		and the second second	12 12 1 ( D. 1		

Workbook for Developing a Technology Roadmap

### **Preparing Materials for the First Meeting**

12. Send out a pre-session questionnaire to all stakeholders that will be attending the first meeting. This questionnaire should include two or three questions related to the technologies they see being of most importance to the industry over the next five to seven years.

After receiving the completed questionnaires, conduct an analysis on the responses to determine what technologies seem to be the most identified by stakeholders. These findings can be used as a starting point for discussion during the first meeting.

As a practice, a common look and feel or brand should be established for all materials sent to stakeholders related to the TRM. This will help in the marketing and sustainability of the TRM.

13. Determine who will be facilitating the meeting. It should be an individual with a thorough knowledge of TRMs and in the potential role they can play in the industry.

- 14. Prepare and send advance materials to stakeholders that will be attending the first meeting. This should include:
  - An agenda;

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- Name of facilitator;
- Name of key-note (if applicable); and
- Program content (what the day will focus on).

### **Hold the First Meeting**

- 15. Before holding the meeting, consider and look after the following logistics:
  - Book a meeting room (ensure that the room has appropriate multi-media capabilities and can comfortably hold all participants);
  - Advise participants on flight arrangements and accommodations where needed;
  - Book a caterer to provide refreshments for the day (i.e. coffee, lunch);
  - Ensure writing materials are available for the meeting (i.e. whiteboards); and
  - Ensure someone is taking notes during the meeting to capture all pertinent points.

16. Hold the meeting. The first meeting should be primarily an introductory session for all participants. However, ensure that the discussion during the meeting remains focused on technology.

# Section 3:

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**Getting Participants to Advance Together** 

## **Continuing the TRM Meetings**

- 1. After holding the initial meeting, at least four other TRM meetings should be scheduled and held. The purpose of these meetings is:
  - First meeting Introductory meeting;
  - Second meeting more focused on specific technologies;
  - Third and fourth meetings analysis of discussion to date; and
  - Fifth meeting presentation of findings.

2. It is important during these meetings for all participants to become familiar with each other. The initial meeting should focus on "breaking down barriers" between the participants. Once a common goal has been established and participants are comfortable, the group can move to a "discovery stage" where discussion can focus on what organizations are currently working on. During this time, the exploration and establishment of complementary relationships between participants should be encouraged.

3.

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### **Analysis and Reporting**

4. Once relationships between participants have been established, the discussion should move towards an analysis of the technologies that need to be the focus of the TRM. The discussion should also focus on how best to achieve results related to developing these technologies.

5. Upon completion of the analysis discussion, the findings should be codified in a report, and presented to participants. As a model, use the following sample Table of Contents to develop the report. The final report may require a few draft iterations to suit all participants.

# Section 4:

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# Valuable Tools

### Meeting Agendas

The following are samples of meeting agendas from introductory meetings of previous Technology Roadmap exercises. These should give you a sense of how to structure the first meeting of stakeholders.

#### Sample 1

#### Introduction

- Purpose
- Schedule
- Context
- Who we are

#### Definition of TRMs

- What It Is
- Who Gets Involved
- Federal Government Officer's Role
- Three Phases of the TRM

**Critical Success Factors** 

Examples of Past TRM Processes

#### Qs and As

Possible Elements to Discuss in the Afternoon

- Does the Current Definition Apply?
- Clarifying Expectations from the TRMs
- Discussion on the Challenges Faced by the Five Climate Change TRMs
- Overview of Evaluating TRMs
- Possible Solutions, Tactics
- Future Opportunities for Discussions Between the Five TRM Officers

Summary of the Session

#### Sample 2

Background Funding Departments Steering Committee Members Roadmap • Defines Intelligent Buildings • Reports on Current State of Industry

- Provides Vision of Future for Intelligent Building Technology
- Notes Challenges Facing IBT
- Recommends Actions to Stimulate Use

What Are Intelligent Building Technologies?

Automation and Integration of Basic Building Systems

Previous Work Completed December 2002

- General Conclusions
- Barriers

#### Impact

- Strategic Guidance for Government and Industry Action
- Increased Awareness and Interest in Intelligent Building Technologies
- New Stakeholders Becoming Involved

#### **Concluding Remarks**

Opportunity to Partner

### Sample Reports

The following are samples of Tables of Content from previous Technology Roadmap exercises which should give you a sense of how to structure the reports.

### Sample 1: Table of Contents from the Lean Logistics TRM - Final Report

Executive	Summary
	Executive

- 2 Introduction
  - 2.1 Lean Logistics TRM Process

#### 3 Overall Issues from the Lean Logistics TRM

- 3.1 Investment Costs
- 3.2 Data Integrity
- 3.3 Interoperability
- 3.4 Cross Border Issues
- 3.5 Awareness
- 3.6 Critical Skills Technology Advancement
- 4 Key Future Technology Trends Across the Supply Chain (as discussed by the working committee)

- 4.1 Data Exchange Standards
- 4.2 The Internet
- 4.3 Multi-dimensional Bar Codes
- 4.4 Electronic Item ID Tags
- 4.5 Wireless Connectivity
- 4.6 Data clouds
- 4.7 Web-based Applications

#### 5 The SME Needs and Requirements

- 5.1 Key Technology, Features and Functions for SME
  - 5.1.1 Supply Chain Inventory Visibility
  - 5.1.2 Demand Planning
  - 5.1.3 Web-Based Supply Chain Management
  - 5.1.4 Supplier Relationship Management
  - 5.1.5 Available to Promise
  - 5.1.6 Supply Chain Event Management
- 6 Education
- 7 Resulting Action Items and Recommendations from the Steering Committee Based on Working Group Conclusions
- 8 Annex
  - 8.1 Committee Members
  - 8.2 Project Timetable
  - 8.3 Supply Chain Technology Matrix
  - 8.4 Glossary
  - 8.5 Online Resources

### Sample 2: Table of Contents from the Canadian Aluminum Industry TRM – Final Report

2	Sum	nary						
3	Intro	duction						
4	What	What is a Technology Roadmap?						
	4.1	The purpose of the Technology Roadmap						
	4.2	The benefits of the Technology Roadmap						
5	Cont	ext						
	5.1	Methodology						
6	The (	The Canadian Aluminum Industry						
	6.1	Canadian Aluminum Production						
	6.2	The Capital Equipment Industry and Aluminum Production						
		6.2.1 Emergence of the Capital Equipment Industry						
		6.2.2 Challenges Facing Canadian Equipment Suppliers						
	6.3	Is Canada Capable of Reducing its Reliance on Semi-finished Product						
		Imports?						
	6.4	The Primary Aluminum Transformation Sectors						
		6.4.1 Rolled Products						
		6.4.2 Extrusions						
		6.4.3 Castings						
	6.5	6.5 The Secondary Aluminum Transformation Sectors						
		6.5.1 Finished Products for the Transportation Industry						
		6.5.2 Finished Products for the Packaging Industry						
		6.5.3 Finished Products for the Construction Industry						
		6.5.4 Finished Products for the Electricity Industry						
		6.5.5 Other Finished Products						
7	Mark	Market Needs: Major Challenges Facing the Industry						
	7.1	Major Challenges						
	7.2	A Prerequisite: Protecting the Health and Safely of Workers and the						
		Population at Large						
8	Tech	nological Projects						
	8.1	The Aluminum Production Sector						
		8.1.1 Technological Project Profiles						

Forward

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- 8.2 The Primary and Secondary Aluminum Transformation Sectors
  - 8.2.1 Technological Project Profiles
- 9 Observations and Recommendations
  - 9.1 Recommendations
- 10 Conclusion

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Appendix A - List of Technological Projects

Appendix B - Technological Projects Under Way in Canada

### Sample 3: Table of Contents from Canada's Computer Equipment Industry TRM – Final Report

**Executive Summary** 

- 1.0 Introduction
- 2.0 The Canadian Computer Industry
  - 2.1 Overview
  - 2.2 Rationale for a Computer Equipment Technology Roadmap

#### 3.0 Computer Technology Roadmap

- 3.1 The Study Process
- 3.2 The Study Results
  - 3.2.1 Product Applications
  - 3.2.2 Core Technologies
  - 3.2.3 Human Resources Findings
  - 3.2.4 Foreign Markets

#### 4.0 Possible Follow-up Actions

- 4.1 Information Dissemination
- 4.2 Academic Incentives
- 4.3 Foreign Market Distribution Channels

#### Appendix A - Core Technologies

Parallel Processing and Real Time Operations

Wireless and Networking

Signal/Noise Improvement Technologies

Compression/Decompression Technologies

Advanced Computer Aided Software Engineering

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**Object Oriented Programming** 

Artificial Intelligence and Neural Networks

Appendix B - Firm Descriptions

### Websites

The following are samples of websites from previous Technology Roadmap exercises. They were used to coordinate the process and communicate ideas as well as other helpful information. It might be useful to implement a similar strategy.

### Sample 1: Website from the Medical Imaging TRM





http://www.ic.gc.ca/epic/site/mitr-crtim.nsf/en/hm01517e.html

### Sample 2: Website from Canada's Clean Coal TRM





Source: Retrieved November 2007 from

http://www.nrcan.gc.ca/es/etb/cetc/combustion/cctrm/htmldocs/cctrm\_main\_e.html

# Section 5:

Moving to Phase 2 of the TRM

### Self-Sustainability of the TRM

1. Participants should be asked to define and initiate projects that reflect the TRM. These projects should involve multiple participants; however, oversight for each project should be formally defined. The progress of projects, as well as any results achieved, should be shared with all participants.

2. Identify participating organization(s) that could become the steward of the TRM once developed (What organization(s) could help most in the self-sustainability of the TRM?). Try to focus on the participants that were the most vocal and enthusiastic throughout the TRM process. Keep in mind that the TRM should be industry-driven; therefore, the steward(s) should be from the private sector.

3. Establish a plan to hand over the oversight role of the TRM to the steward and communicate to them the assistance you are able to provide in the future, if needed. This plan should involve subsequent iterations of the TRM process.

4. Assist the steward(s) establish a performance measurement framework for the TRM. This should include intended results for the TRM and key performance indicators to monitor.

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