

## A brief introduction to the SC2020 Methodological Toolkit

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This document was prepared by the team of the SC2020 Project, a supply chain strategy initiative at the Center for Transportation and Logistics (CTL) of the Massachusetts Institute of Technology (MIT.) For any further information, please contact SC2020's Director, Dr Roberto Perez-Franco ([roberto@mit.edu](mailto:roberto@mit.edu))

## Introduction

In 2004, MIT's Center for Transportation and Logistics launched the Supply Chain 2020 Project. From the early objective of identifying principles that promote supply chain excellence and preparedness, the project expanded to include fundamental questions about the structure of supply chain strategy, the nature of strategic alignment, and the logic of future visioning exercises.

Among the major contributions to date of the Supply Chain 2020 Project is a portfolio of methods generated at different points during the past seven years. Each was designed to address a pressing question facing a firm's supply chain from the strategic point of view, questions that range from how to diagnose today's alignment to how to prepare for the effects of an unpredictable future.

The *methodological toolkit* derived from the Project is composed of eight different methods. Although research is still ongoing for some, all the methods are available today to Partners of CTL and other SCALE Centers. Given their modular nature, they can be applied separately as stand-alone exercises; yet since they share a common philosophy, they can also be applied as sequences for strategy development.

This document provides an overview of the eight methods in the SC2020 Toolkit, including a summary of each method's objective, output and the length of engagement required. The document also includes some considerations regarding how firms may prepare to apply these methods to projects in their business units (BU), related to assembling the team, documents required in preparation for the exercise, etc.

An overall timeline is also provided, outlining time requirement from both participants and the facilitators.

## Overview of Methods

In terms of the depth of effort required, the methods fall roughly into two categories: **workshops** run as a single 1-2 day long interaction, each, with light or no preparation on the firm's side; and **exercises** conducted over 1-2 months, each, with multiple interactions, significant data collection, and a 8-12 hour requirement from each selected participant on the firm's side.

In terms of planning horizon, the methods belong to two groups: four focus on the **mid-term**, whereas the other four focus on the **long-term**. Figure 1 lists all eight methods from the SC2020 toolkit, arranged by horizon and depth.

	<i>mid-term focus</i>	<i>long-term focus</i>
<i>workshops</i>	Strategy Alignment Workshop	Scenario Planning Workshop
<i>exercises</i>	Strategy Capture Exercise Strategy Evaluation Exercise Mid-Term Reformulation Exercise	Assumptions Capture Exercise Scenario Generation Exercise Long-Term Reformulation Exercise

Figure 1: The eight methods from the SC2020 toolkit

Although the workshops are useful as stand-alone sessions, the methods are most effective when working in tandem, as *strategy development sequences*.

One such sequence, focused on development of a mid-term supply chain strategy, i.e. one with relevance for the next 2-5 years, is shown in the top part of Figure 2. A second sequence, geared towards developing a long-term supply chain strategy, i.e. one with relevance for the next 5-15 years, is shown in the bottom part of the same figure.

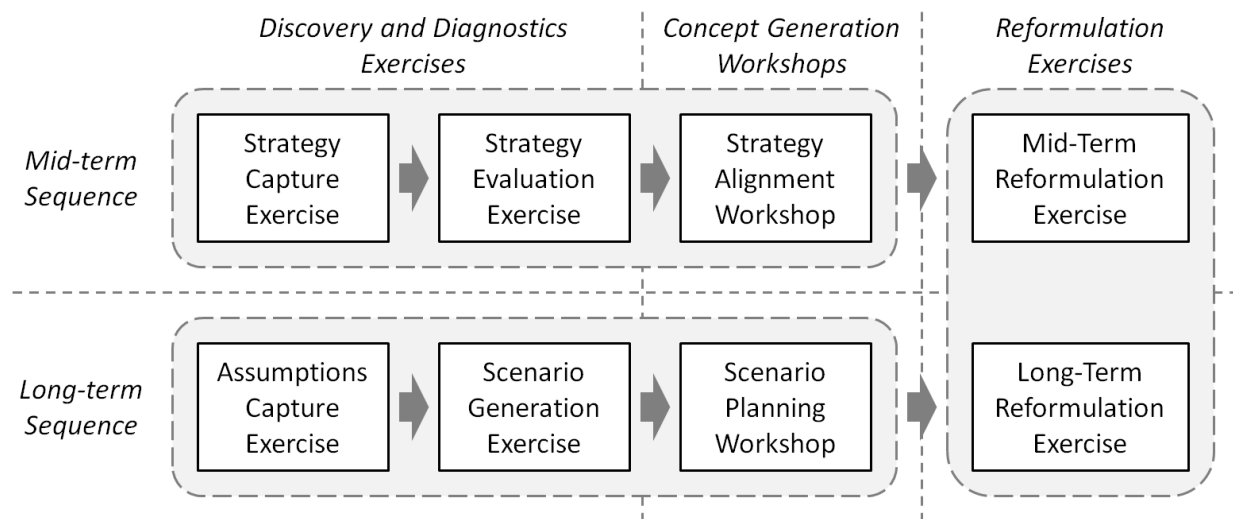


Figure 2: Sequences to develop a supply chain strategy

A firm interested in conducting **a diagnostics of their supply chain strategy** alignment is advised to apply the first three methods:

- The Strategy Capture Exercise lays the foundation for the diagnostics, by revealing the current supply chain strategy in explicit terms
- The Strategy Evaluation Exercise conducts the diagnostics of the supply chain strategy alignment, based on a series of evaluation criteria
- The Strategy Alignment Workshop generates concepts for the realignment of the supply chain strategy

Working summaries of all eight methods, including these three, are provided below.

## Strategy Capture Exercise

<b>Main Objective</b>	<b>Identify and make explicit the ‘as-is’ supply chain strategy of an organization, as reflected in its activities.</b>
Horizon	Present
Scope	Business Unit; Strategic Business Unit. (May be applicable at the Regional Platform and Corporate levels.)
Main Output	A summary of the ‘as-is’ supply chain strategy as the bridge between strategy and operations ( <i>Functional Strategy Map</i> .)
Primary Method	Data collected through open and semi-structured interviews is analyzed using qualitative techniques. Following a model of supply chain strategy, the concepts thus identified are arranged into a conceptual map (see Figure 3.)
Length of Engagement	Minimum 7 weeks: 1 week for scheduling interviews, 5 weeks for conducting and analyzing them, 1 week for validation.
Stage of Research	Research complete at the level of Business Unit. Applicability at the Regional and Corporate levels is still under research.
Primary Researchers	Dr Roberto Pérez-Franco, Dr Mahender Singh
Primary Facilitator	Dr Roberto Pérez-Franco
Dependencies	None
Documentation	The method is fully documented in a working paper.

Strategic level ←

→ Operational level

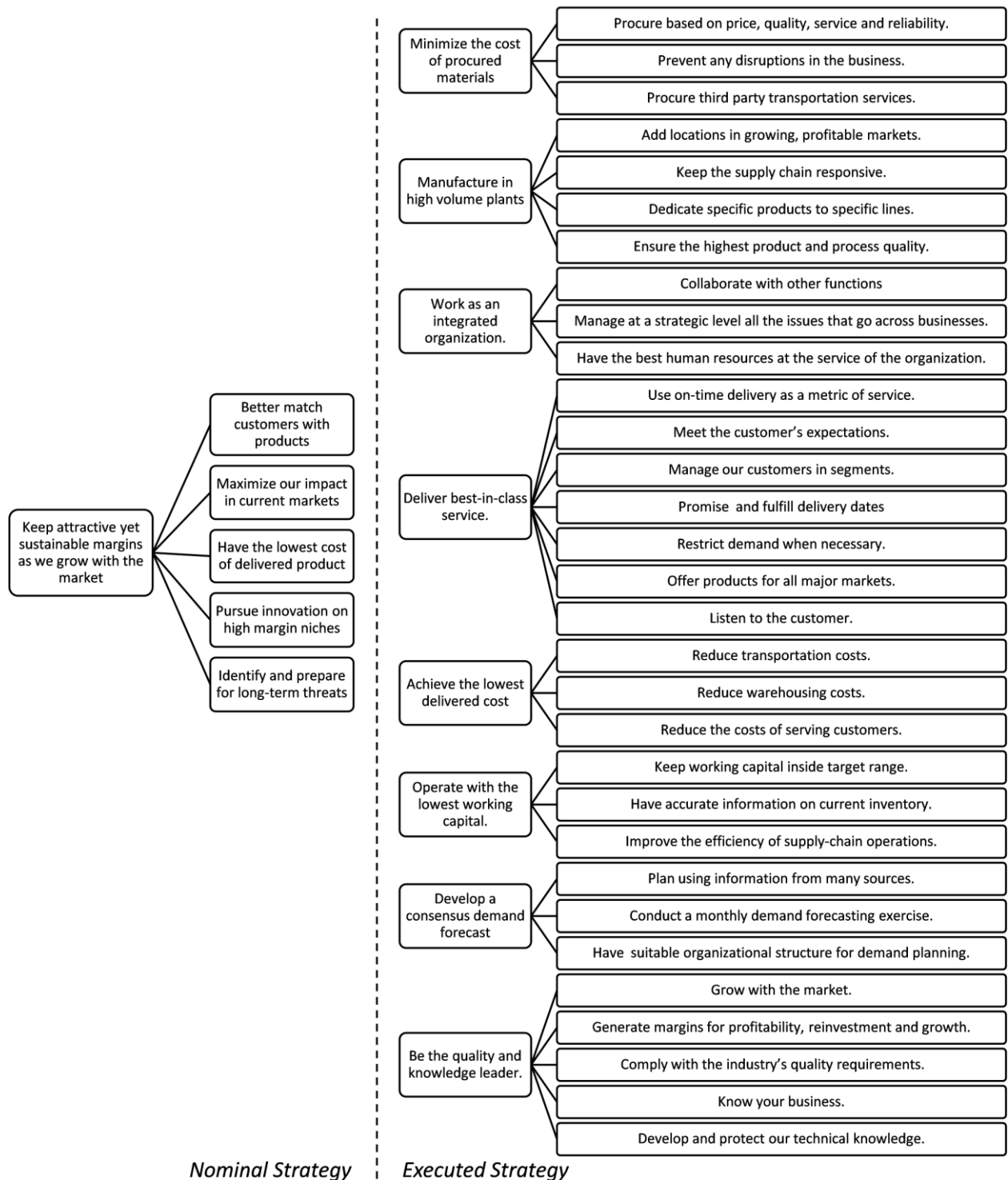


Figure 3: Sample Functional Strategy Map

## Strategy Evaluation Exercise

<b>Main Objective</b>	<b>Assess shortcomings, strengths of the ‘as-is’ supply chain strategy as the link between operations and strategy.</b>
Horizon	Present
Scope	Business Unit; Strategic Business Unit. (May be applicable at the Regional Platform and Corporate levels.)
Main Output	An evaluation of the ‘as-is’ supply chain strategy along the criteria of coverage, consistency, support and sufficiency (Figure 4).
Primary Method	A questionnaire exploring coverage, consistency, support and sufficiency, based on the Functional Strategy Map, is administered. Answers are arranged into matrices (Figure 5) that reveal patterns of support and conflicts (Figure 6).
Length of Engagement	Minimum 3 weeks: 1 week for preparing questionnaire, 1 week for collecting data, and 1 week for validation of results.
Stage of Research	Research complete at the level of Business Unit. Applicability at the Regional and Corporate levels is still under research.
Primary Researchers	Dr Roberto Pérez-Franco, Dr Mahender Singh
Primary Facilitator	Dr Roberto Pérez-Franco
Dependencies	Requires the Strategy Capture Exercise
Documentation	The method is fully documented in a working paper.

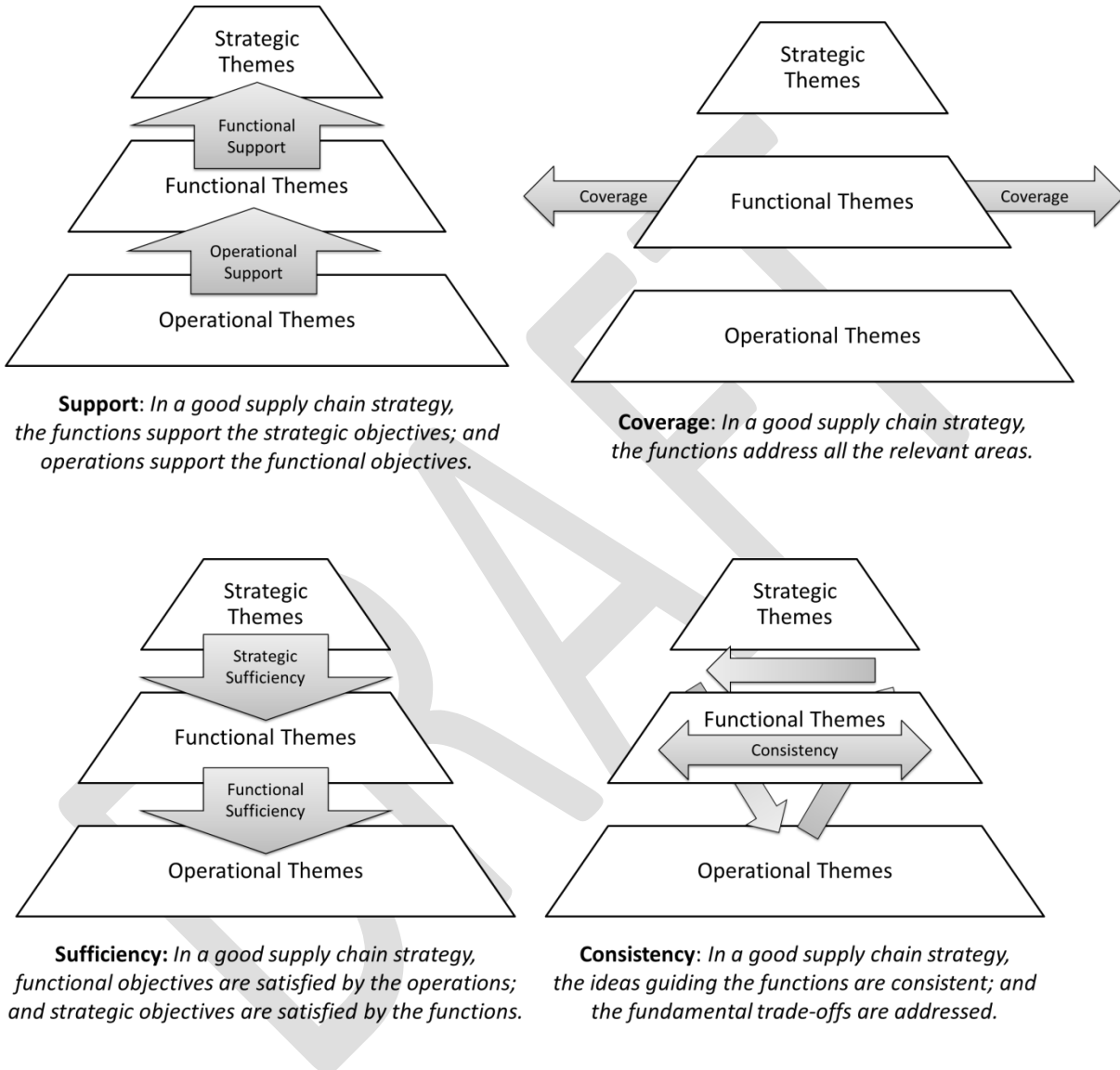


Figure 4: Evaluation criteria for supply chain strategies



## Strategy Alignment Workshop

Main Objective	<b>Explore how to improve the alignment between supply chain strategy and the overall business strategy.</b>
Horizon	Next 3 to 5 years
Scope	Business Unit; Strategic Business Unit.
Main Output	First, the identification of tailored practices that support the operating model and are best suited to deliver required performance objectives. Second, the framework for an aligned supply chain strategy for the firm, moving forward.
Primary Method	Interviews with a few stakeholders are conducted to identify the go-to-market strategy and the key players. Then a facilitated 1 to 2 day workshop is conducted with the team.
Length of Engagement	1-2 day workshop. As preparation, a few interviews with stakeholders are conducted in the preceding 2 to 3 weeks.
Stage of Research	Research complete.
Primary Researchers	Dr Larry Lapide, Dr Mahender Singh
Primary Facilitator	Dr Larry Lapide
Dependencies	May be run as a stand-alone workshop. May benefit from the Strategy Capture Exercise and Strategy Evaluation Exercise.
Documentation	

## Mid-Term Reformulation Exercise

<b>Main Objective</b>	<b>Generate a new formulation of the supply chain strategy, superior to the one currently in place.</b>
Horizon	Next 3 to 5 years
Scope	Business Unit; Strategic Business Unit. (May be applicable at the Regional Platform and Corporate levels.)
Main Output	New supply chain strategy formulation, superior to the <i>status quo</i> in terms of coverage, consistency, support & sufficiency.
Primary Method	A conceptual design methodology created at CTL, the <i>progressive conceptual system assembly</i> is used to assemble (i.e. Figure 7) preliminary and formal candidates that might replace the current supply chain strategy of the firm.
Length of Engagement	Minimum 4 weeks: 1 for preparing inputs, 1 for preliminary candidates, 1 for revising inputs, and 1 for formal candidate.
Stage of Research	Tested at the level of Business Unit. Applicability at the Regional and Corporate levels is still under research.
Primary Researchers	Dr Roberto Pérez-Franco, Dr Mahender Singh
Primary Facilitator	Dr Roberto Pérez-Franco
Dependencies	Strategy Capture Exercise, Strategy Evaluation Exercise
Documentation	An early version of the method is documented in a dissertation.

	FT1	FT2	FT3	FT4	FT5	FT6	FT7	FT8
ST1	2.2	0.3	2.7	2.2	2.0	-0.1	1.7	2.2
ST2	1.4	1.4	1.6	0.5	2.9	0.4	1.2	1.4
ST3	3.6	2.0	2.2	-1.6	4.0	0.7	1.7	0.4
ST4	0.3	-0.7	2.2	0.4	0.9	0.6	0.1	1.3
ST5	1.9	0.3	2.3	1.5	2.0	0.5	0.9	2.0

Figure 5: Sample evaluation matrix

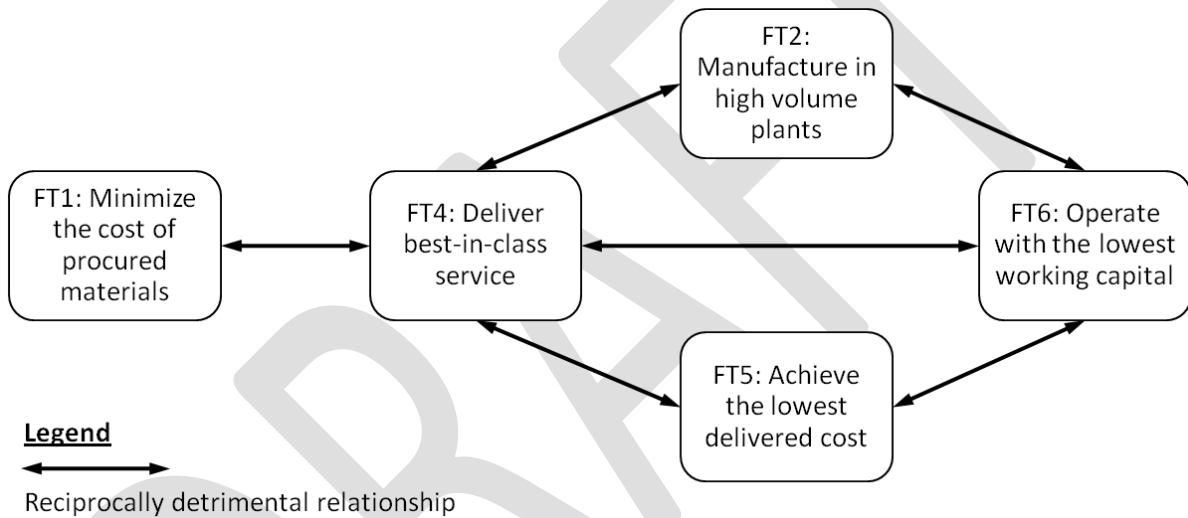


Figure 6: Sample graphical representation of conflicts

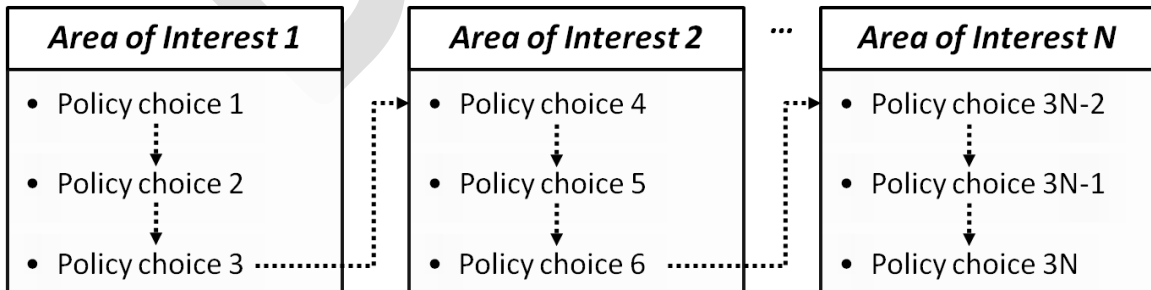


Figure 7: A graphical representation of 'vertical assembly' of a candidate

## Assumptions Capture Exercise

<b>Main Objective</b>	<b>Capture and make explicit the assumptions and mental map of the firm's strategic managers of the firm's future business environment and strategies.</b>
Horizon	Next 7 to 15 years
Scope	Business Unit; Strategic Business Unit. (May be applicable at the Regional Platform and Corporate levels.)
Main Output	Mental map of each manager (Figure 8); Dimensions of the business environment; Core beliefs of the management team
Primary Method	Semi-structured interviews are used to capture managers' mental maps. Qualitative coding is used to identify categories in the map. Mental maps are generated and validated for each manager. A questionnaire is used to identify the perception of the team on various dimensions of the business environment.
Length of Engagement	Minimum 8 weeks: 1 week for scheduling interviews, 5 weeks for conducting and analyzing them, 1 week for creating mental maps, 1 week for validation.
Stage of Research	Completed for one firm
Primary Researchers	Shardul Phadnis, Dr Mahender Singh
Primary Facilitator	Shardul Phadnis
Dependencies	None
Documentation	In progress

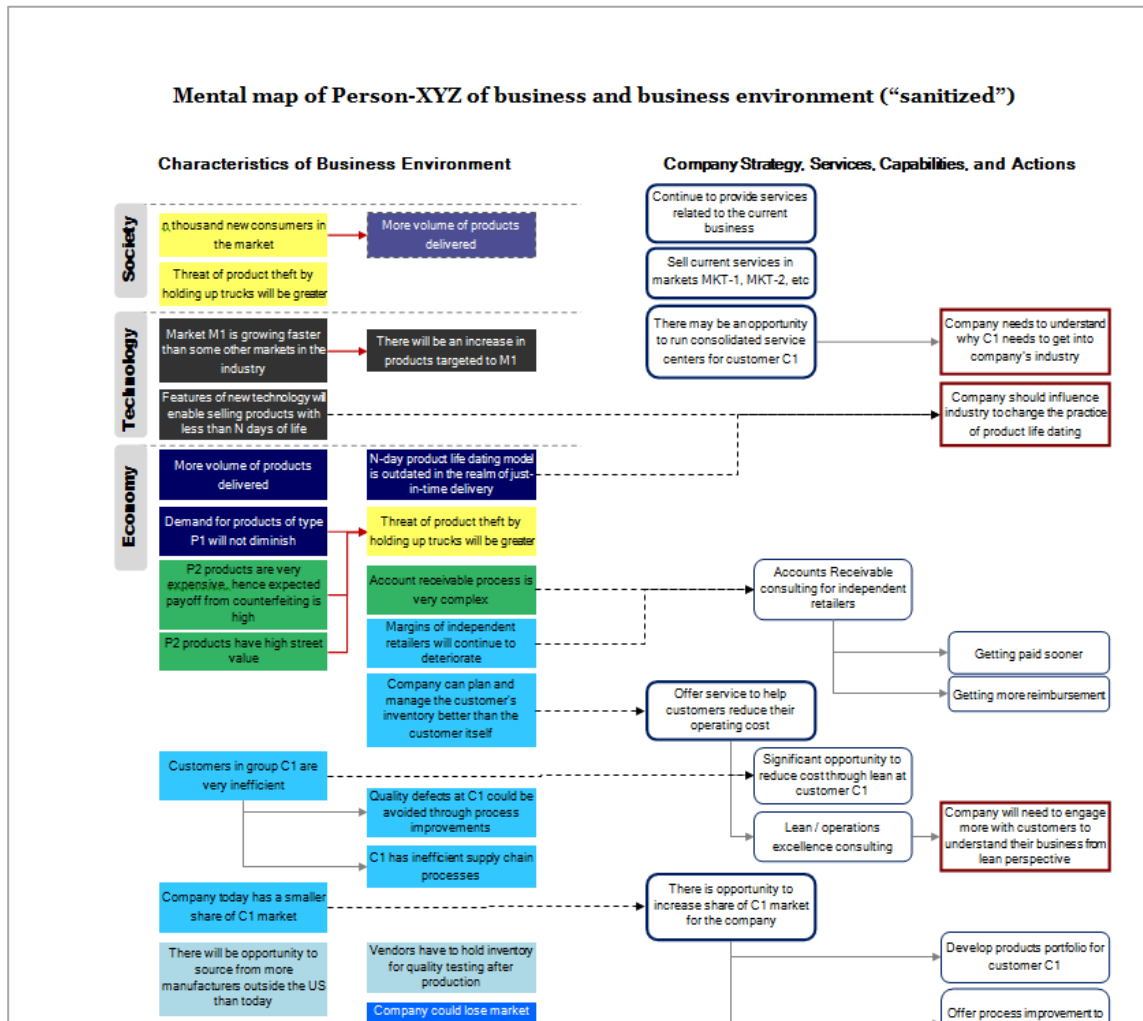


Figure 8: Sample partial mental map of a manager (some info. disguised)

## Scenario Generation Exercise

<b>Main Objective</b>	<b>Develop scenarios for the management team to test or generate the firm's business or supply chain strategy</b>
Horizon	Next 7 to 15 years
Scope	Business Unit; Strategic Business Unit. (May be applicable at the Regional Platform and Corporate levels.)
Main Output	A set of scenarios (generally, between 2 and 4)
Primary Method	“Strategic imperative – Driving force mapping” exercise is used to identify driving forces that take strategic imperatives in opposite directions. Spider charts are used to capture the magnitude and speed of impact and evolution of forces.
Length of Engagement	Minimum 8 weeks: 1 week conducting exercise, 1 week for analyzing data, 2 weeks for industry research, 1 week to choose scenario logic, 1 week to finalize scenario structure, 2 weeks for writing scenarios.
Stage of Research	Data collection, choice of scenario structure complete for one firm. Scenario writing in progress.
Primary Researchers	Shardul Phadnis, Dr Mahender Singh
Primary Facilitator	Shardul Phadnis
Dependencies	Assumptions Capture Exercise
Documentation	In progress

## Scenario Planning Workshop

Main Objective	<b>Two formats possible: (1) Strategy generation: Generate ideas for business or supply chain strategies in different scenarios, or (2) Strategy testing: Test preselected strategies in different scenarios</b>
Horizon	Next 7 to 15 years
Scope	Business Unit; Strategic Business Unit. (May be applicable at the Regional Platform and Corporate levels.)
Main Output	List of strategies in different scenarios; Identification of robust and contingent strategies; Sensors in the ground
Primary Method	Brainstorming is used to generate ideas for strategies and sensors in the ground. A voting exercise is used to assess the utility of a set of strategies under different scenarios. Cross-scenario comparison is used to identify robust and contingent strategies.
Length of Engagement	1 week for workshop and data analysis
Stage of Research	Conducted multiple times for strategy evaluation
Primary Researchers	Shardul Phadnis, Dr Mahender Singh
Primary Facilitator	Shardul Phadnis
Dependencies	Assumptions Capture and Scenario Generation Exercises
Documentation	Documented in case reports for different workshops for a project in progress; Documentation in a working paper

## Long-Term Reformulation Exercise

<b>Main Objective</b>	<b>Generate a new formulation of the supply chain strategy by considering multiple scenarios.</b>
Horizon	Next 7 to 15 years
Scope	Business Unit; Strategic Business Unit. (May be applicable at the Regional Platform and Corporate levels.)
Main Output	Strategic options for contingent strategies; New supply chain strategy consisting of robust elements and options for contingent elements; Sensors in the ground linked to strategic options
Primary Method	Brainstorming and industry research to identify options for contingent elements, sensors in the ground
Length of Engagement	Approximately 4 weeks: 2 weeks to identify options; 1 week to identify appropriate sensors in the ground; 1 week to assemble robust elements of strategy, options and sensors
Stage of Research	Under development. Planned for execution at a first company
Primary Researchers	Shardul Phadnis, Dr Roberto Perez-Franco
Primary Facilitator	Shardul Phadnis
Dependencies	Mental Mapping, Scenario Generation, Scenario Planning
Documentation	In development.



## Preparing for the Project

For each BU where a strategy development project, composed of either one or both of the sequences, is going to be executed, there are several preliminary activities that should be conducted to ensure its success.

### Getting the team ready

The first is setting up the right team. This includes: a project sponsor, one or two facilitators, and around two dozen participants. Details are as follows:

- **Sponsor:** A senior member from the target BU is appointed to serve as sponsor of the project. This person should be willing to champion the project, in order to keep it moving and see it through to completion. The person should be senior to motivate the participants to complete their assigned work, even in the face of other tasks that compete for their time. A weak sponsor may result in an incomplete project.
- **Team:** A team of approximately two dozen participants is to be selected from the target BU. The selection of these participants should be done as prescribed in the documentation of the method. The team should include people representing all the functions that are relevant to the activities of the supply chain, and several hierarchical levels.
- **Facilitators:** One or two facilitators should be selected to manage the exercises. It is important that these facilitators should *not* be under the jurisdiction of the sponsor of the project, since they must retain the freedom to steer the exercise without fear of retaliation. The facilitators should be persons with enough time available to conduct the intense data analysis required by the exercises.

## Prepare key documents

For each BU, the following documents would be useful in developing a mid-term strategy and would expedite the completion of the sequence. We recommend they are obtained from the BU before starting the sequence.

- A clear summary of the organizational structure, including a list of all the functions relevant to the supply chain in that BU (i.e. procurement, manufacturing, logistics, sales, etc.). Also the names of the head of these functions and of at least two key people that reports to them.
- A list of any initiatives or projects currently ongoing in the BU (i.e. an Operational Excellence initiative, a Customer Satisfaction project, etc.) , and the name of the person leading the initiative a one of the reports.
- The stated business strategy of the BU, in any form that it may exist.
- If this BU has already decided on it, the Customer Interaction Model (CIM) of the BU and the results from their Pathfinder exercise.
- A summary of the product families they carry in their portfolio. If these products are in categories or segments, then a list and description of these categories, alongside with a description of what characterizes each segment (i.e. this one is high-end, high-profit; this other is low-profit, high-volume).
- A summary of the customer portfolio. If the BU segments the customers, then the list of these segments, along with what characterizes each segment (i.e. this segment expects fast delivery and is willing to pay a premium for it, while this other segment is more driven by price, etc.)
- A summarized description of any important processes that affect the supply chain (i.e. a summary of S&OP processes, procurement planning processes, etc.)
- A summary of what supply-chain-related decisions are made at the BU level, and what decisions are left to the regional platform or corporate level (i.e. procurement contracts are negotiated at the regional platform level, whereas actual procurement orders are done at the BU level; raw materials

are stored in warehouses of the regional platform; manufacturing is done in our plants; finished products are stored in our own warehouses, etc.)

### Minimum timeline

A tentative timeline for the sequence to develop a mid-term supply chain is provided in Figure 9. This timeline assumes no delays, so it should be considered a minimum of the time required. In other words, all delays caused by postponement of meetings, scheduling conflicts, late replies from participants, etc., will extend the timeline for completing the sequence.

As a rough estimate, a similar timeline could be expected for the long-term sequence.

### Knowledge transfer

One of the goals in the interaction between the firm and MIT's CTL is to transfer knowledge regarding the methods created in the SC2020 Project to the firm's personnel. In order to achieve this, we propose the following:

- During the first project (e.g. the first time the strategy development sequence is applied to a BU), the firm's facilitators will be closely guided by experts from the SC2020 Project. In simple terms, MIT facilitators will *do* while the firm's facilitators *watch and learn*.
- In the second project, the involvement of MIT facilitators will decrease and the responsibility of the firm's facilitators will increase. The work will be, at most, equally spread between MIT and the firm's facilitators.
- By the third project, the firm's facilitators are expected to running the exercise by themselves, under the guidance and advise of an MIT expert.

		Minimum Timeline	Type of interaction required	Commitment from each team member	Commitment from facilitator
Strategy Capture Exercise	Step 1	Week 1	Phone conference	-	6 hours
	Step 2	Week 1-4	Phone interviews	1 hour	48 hours
	Step 3	Week 1-5	-	-	144 hours
	Step 4		-	-	72 hours
	Step 5	Week 6	Physical meeting	4 hours	24 hours
	Step 6		-	-	16 hours
	Step 7		-	-	8 hours
	Step 8	Week 7	-	-	8 hours
	Step 9		-	-	8 hours
	Step 10		Online meeting	4 hours	24 hours
Strategy Evaluation Exercise	Step 1	Week 8	-	-	8 hours
	Step 2		-	-	32 hours
	Step 3		Online survey	1 or 2 hours	8 hours
	Step 4	Week 9	-	-	16 hours
	Step 5		-	-	8 hours
	Step 6		-	-	8 hours
	Step 7		-	-	8 hours
	Step 8		-	-	16 hours
	Step 9		-	-	24 hours
	Step 10		Physical meeting	4 hours	24 hours
Strategy Alignment Workshop		Week 10	Physical meeting	8 to 16 hours	32 hours
Mid-Term Reformulation Exercise	Step 1	Week 11	Physical or Online meeting	1 hour	2 hours
	Step 2			-	8 hours
	Step 3		Online survey	1 or 2 hours	8 hours
	Step 4			-	8 hours
	Step 5			1 or 2 hours	8 hours
	Step 6	Week 12	Online meeting	4 hours	16 hours
	Step 7			2 hours	8 hours
	Step 8	Week 13		1 hours	4 hours
	Step 9	Week 14	Physical meeting	4 hours	16 hours
	Step 10			2 hours	8 hours

Time requirement for a participating individual: 33-44 hours

Time requirement for a participating individual: 600-650 hours

Figure 9: Tentative timeline for the sequence to develop a mid-term strategy