



A review of strategic planning for dynamic supply chains: Preparing for uncertainty using scenarios

Megan M. Crawford  | Eoin Plant-O'Toole 

Edinburgh Napier University Business School,
Edinburgh, UK
Email: m.crawford@napier.ac.uk

Correspondence

Megan M. Crawford, Edinburgh Napier
University Business School, 219 Colinton Rd,
Edinburgh EH14 1DJ, UK.
Email: m.crawford@napier.ac.uk

Abstract

This is a book review of *Strategic Planning for Dynamic Supply Chains: Preparing for Uncertainty Using Scenarios* by Shardul S. Phadnis, Yossi Sheffi, and Chris Caplice (Cham, Switzerland, 226 p, 2022). The book covers three case studies, presented as vignettes, which illustrate three unique applications of a seven-step approach to scenario planning, modeled after the Intuitive Logics School. The book is aimed at executives and business leaders, as well as academics, and scenario planning practitioners. This review discusses the unique aspects the scenario team brings to the strategic space, the strengths of their pragmatic process, and key elements in practice that are often left out of the larger academic scholarship.

KEYWORDS

case study, intuitive logics, scenario planning, strategy, supply chain management

1 | INTRODUCTION

Phadnis and colleagues present a series of scenario planning case studies across three industries aimed at “formulating supply chain strategies” (Phadnis et al., 2022, p. vii). Their work largely took place within the first decade of the 21st century; However, insights shared throughout prove to have continuous benefits for present-day organizations, at all levels. Scenario planning workshops drove executives to take comprehensive, holistic views of their business environment, including historical governance, micro- to macro-political shifts, climate action, product life cycles, and nontrivially, executive myopia, to name just a few. The application of scenario planning techniques to supply chain management (SCM) is little explored in the scenario planning scholarship (Phadnis & Darkow, 2021) and even less in SCM literature, which brings a niche value to the book. The accessible language of the text and compact

storytelling for each case study make this book valuable to both practitioners and academia.

2 | STRUCTURE

The book opens with introductory chapters on both SCM and the Massachusetts Institute of Technology (MIT) Center for Transportation & Logistics (CTL) scenario planning approach. It is structured to present multiple iterations of the MIT CTL team's scenario process across three US-based case studies (i.e., vignettes) in three industries—commercial drinks (Hoppy Brew), pharmaceuticals (Medford), and transportation (Future Freight Flow). The book's authors avoid a common pitfall in scenario planning publications (i.e. a monotony that can come from repetitious presentations of the same method) by framing each case study through the lens of different organizational

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2023 The Authors. *Futures & Foresight Science* published by John Wiley & Sons Ltd.

roles: functional, business model, and infrastructural. Taking a different role with each organization illustrates one of the flexibilities of scenario planning methodology. The MIT CTL team guides each organization through the same multistep approach, yet the techniques employed within, and applications of emerging novel information alter each case study in their own unique, pragmatic, and internally valuable directions. The book closes with two chapters that present much-needed content in scenario planning literature. Chapter 8 explores some of the executive learning observed during the workshops often missing from the literature, though for understandable reasons. It is both difficult to measure learning in such short temporal, complex spaces, and just as difficult to value learning. Chapter 9 presents an appendix of final scenarios developed by the three organizations. From a learning perspective, including a client's final scenarios brings greater contextual understanding for the reader, as they are able to reference back to them as exemplars of output throughout the case study chapters.

3 | SCM

The book is a contrast to many others that focus on supply chain strategy from an academic perspective, such as Chopra (2018) and Lysons & Farrington (2020). The book is more practice-focused and further supports an approach to building resilience which has a similar ethos to Sheffi (2007). However, this book goes substantially further with a structured scenario planning approach and examples. Other books such as Gattorna & Ellis (2020) focus on transforming the supply chain for a dynamic world. This book would aid as a precursor to understanding the dynamics before building resilience (Sheffi, 2007) and transformation. It establishes the context of volatility and dynamism that supply chains experience and the need for an alternative approach to strategic supply chain planning.

The primer is excellent at demonstrating the need for planning and the strategic importance of SCM. It sets the scene with prediction difficulties to disruption, linked to the chip shortage. It argues for the need for better planning in a volatile and largely unpredictable external environment. The book is set in the supply chain planning and uncertainty context. It straddles the interests of practitioners and supply chain leaders alongside academics and postgraduate students. The applied nature through three case studies effectively integrates a scenario framework with real work examples. The book outlines roles and levels of SCM in various categories of organizations. It establishes a link between overall strategy and that of supply chain operational practices.

The book argues the case of absence of a decision-making process for dealing with systemic uncertainty. Traditional methods (e.g., forecasting time series) tend to be operational and short-term focused, thereby making them inadequate for longer time horizons. A holistic methodology is suggested to overcome many of the short-term focused limitations. The MIT CTL team's methodology takes an envision and evaluation approach, through a structured and logical manner. The authors provide helpful tips throughout, particularly on where to focus key implementation elements

(e.g., developing indicators for the changes in the environment, and developing a dashboard).

4 | SCENARIO PLANNING APPLICATIONS

The book's authors emphasize a little-discussed, yet intuitive and vital element in scenario planning leadership—Trust. “Our experience suggests that gaining initial confidence arises from empathetic listening and astute questioning. Empathetic listening to show a willingness to take time to understand the concerns of the client. Astute questioning to gently challenge the assumptions of the manager, to allow him/her to better articulate their concerns. This approach means a role reversal for the scenario practitioner” (Phadnis et al., 2022, p. 1021). They recognize three touchpoints in the process where trust can be built to maximize chances of success—preworkshop introductions with the lead executive/employee, during the workshop with participants (who may change throughout), and at the end, when insights need to be internalized at an organizational level so they align with future actions. Establishing trust between the client and facilitators may seem a self-evident truth, but without it, an intervention can become moot, if allowed to progress at all. It is due to the weight of importance that it should be standard to include a narrative, even if brief, on the *trust factor* in any scenario planning process.

The case studies appear to present a practice-oriented approach (Bowman & MacKay, 2020), utilizing scenario planning as a strategic *activity*, as opposed to prioritizing it as a *tool* (Bradfield et al., 2005; Grant, 2003; Porter, 1985; Spee & Jarzabkowski, 2009). A broader reading of the book shows how the MIT CTL team recognized the significance of time and place with each client organization, and reflected on the activities involved in each scenario planning intervention, including preprocesses, workshop applications (micro to macro), and long-term learning outcomes. However, the authors use this language more fluidly throughout the text, referring to their scenario-planning interventions as tools at various points. For example, Chapter 3 labels scenario planning as “a tool for organizational learning,” yet their approach and application of scenario planning across the vignettes reflects efforts aimed at integrating the practice into broader, long-term organizational strategy and learning. Their fluidity with the language is a common outcome in scenario planning literature. Some authors are clear when they switch between speaking from a utility position to a process position. Pulver and Van Deveer (2007) speak of scenarios (the artifacts) in terms of tool-based language, and the experience of scenario planning as a process. Other authors are less clear and adopt more interchangeable language. Franco et al. (2013) and Chermack (2003, 2005, 2011, 2018; Chermack & Lynham, 2002), for example, freely move between the two concepts for both the actions and the artifacts.

The MIT CTL team favors the intuitive logics school (ILS) of scenario planning, as championed by Pierre Wack (1985a, 1985b),

Schwartz (1991), and later by Paul Schoemaker (1991, 1993, 1995, 2004), Kees Van der Heijden et al. (1997), and George Wright (Wright & Cairns, 2011; Wright et al., 2009, 2008). Their scenario planning workshops used largely qualitative methods for gathering qualitative data, though their ILS techniques differed in some ways from other leading practitioners. Altering scenario planning approaches to fit the unique goals of the organization and the immediate needs of workshop attendees is one of the pragmatic strengths of the method, regularly discussed in the literature (Lindgren & Bandhold, 2009; Ringland, 1998; Schoemaker, 1995). The qualitative nature of an ILS method allows for modifications that account for any number of unique factors presented during a workshop. The MIT CTL team's key modifications are reviewed in the following sections.

4.1 | Techniques

The MIT CTL team followed a standardized, seven-step ILS approach. Chapter 4 presents their *Generic Scenario Creation Process*: defining and scoping, identifying local factors and driving forces, choosing the scenario logic, analyzing uncertainty, estimating impact, fleshing out and naming each scenario. Some facilitators combine steps for fewer, yet more comprehensive steps (Tetlock, 2005; Van der Heijden et al., 2002), while others further divide them into qualitatively different exercises (Chermack, 2011). Regardless, the aims are similar, which use a stepwise process to facilitate practitioner learning and influence organizational decision-making. Within the steps, the team employed a number of modified techniques aimed at maximizing the value of an intervention for each client.

To help motivate and challenge workshop participants, the MIT CTL team took a probing-question approach. This is a common technique that shifts critical thinking tasks from the facilitators to the executives and other workshop participants (Cairns & Wright, 2018). Employing a form of Socratic method in scenario planning is an effective technique to help motivate participants out of stagnant moments of creative or evaluative thinking (Derbyshire & Wright, 2017). Some questions were simple, requiring only a Yes/No answer; Some were directional, priming participants to determine the strength of agreed-upon influences; Other questions were more ambiguous, purposely challenging practitioners to develop novel scenario content (e.g., driving forces and local factors). Blending their probing-question approach across three different SCM roles created different journeys of inquiry within each case study, further illustrating the flexibility inherent in the methodology.

Though the authors emphasize a qualitative approach throughout the book, the MIT CTL team included simple, yet highly impactful quantitative measures to aid judgmental valuations during the workshops. These few quantitative techniques borrow from the Probabilistic modified trends school of scenario planning (see Gordon, 1994a, 1994b). The team justified their use of quantitative methods as a heuristic for determining capabilities value (Hoppy Brew), variation and implications (Medford), and desirability (Future

Freight Flow). An example is also given in Chapter 4, which illustrates a simple averaged voting system to help determine the impact of individual driving forces. For the largest case study (Future Freight Flow), the team also created context-rich, quantitatively based artifacts such as charts of global trends projected into the future to accompany each scenario. Using select quantitative methods such as voting, weighting, and correlational analysis can help facilitators maintain the qualitative feelings, emotions, and politics involved with the participants, while transforming their perceptions of the process through “the introduction of (seemingly) objective materiality” (Bowman & MacKay, 2020).

A final technique the MIT CTL team used throughout is also a common technique among the broader population of scenario planning facilitators, but less discussed in academic literature and deserves consideration. The team used the presence/level of disagreement across workshop participants to help determine whether a driving force was a *trend* or *uncertainty*. Participant and public disagreements were used as proxies for uncertainty. Such a technique is simple and intuitive, but can also be the first moment in a workshop when a participant's mental model truly begins to be challenged; Which makes it a highly valuable addition to the SP experience.

4.2 | Human capital factors

Arguably, the one factor that is discussed at length throughout the book, without being explicitly addressed, are the people involved in the interventions: facilitators, participants, stakeholders, and interviewees. Two main points of consideration are highlighted in this section for the purposes of helping to normalize the discussion of these factors within the larger scenario planning scholarship.

The first consideration questions to what extent the MIT CTL team's methods and techniques played upon the cognitive load of participating executives and their abilities to maintain consistently high levels of engagement and output. Full scenario planning strategy sessions lasted between a day's workshop and up to a year. The techniques employed by the team challenged executives to evaluate and reevaluate both micro- and macro-level factors, within and out with the organizations. The authors are clear in their motivations to challenge and change participants' mental models. Their techniques required several rounds of multi-level valuations by executives across hundreds of driving forces and factors. Furthermore, the team reported that scenario planning was new to many of the executives who were selected to participate.

Scenario planning is a cognitively laborious task, and potentially more so for those unfamiliar with the method. The greater the problem size, the more factors and driving forces must be evaluated, weighted, and causally linked, the greater the cognitive burden (Ram & Montibeller, 2013). Cognitive Load Theory posits that working memory is finite and when exceeded, learning becomes impaired (Sweller, 1988). Increasing cognitive load has direct effects on participants' capacities to identify relevant factors, driving forces,

causal relationships, and ultimately to have their mental models challenged. By Steps 4 and 5, the MIT CTL team acknowledged that treating each driving force individually, “would significantly increase the number of variables considered for scenario creation and complicate scenario development” (p. 91), complicated further by working with time-poor executives. In response to these potential cognitive barriers, the team used techniques that reduced the more exhaustive list of driving forces to a subset of factors that either illustrated controversy and high uncertainty in the public sphere (Hoppy Brew) or focused discussions on “salient unique aspects of the business environment” (p. 99; Medford). The book’s authors acknowledge some of the risks in reducing their data set, including potential loss of nuance.

The other element implicitly discussed throughout is the level of involvement, and by extension influence, the MIT CTL team had with each client organization. The different processes in each case study show how much of the interventions relied on facilitation. The pharmaceutical case study, for example, shows how the MIT CTL team performed most of the data gathering and analyses for the first three steps of the process. Even when they brought in the executive team for the later stages, the facilitators still had to play a heavy hand in the ongoing analyses, which guided the outcomes. There are numerous publications discussing the need for facilitation, and effective facilitation, in scenario planning (Bradfield et al., 2005; McLean & Egan, 2008; O’Brien, 2004). What should be taken into consideration with scenario planning case studies and anecdotal evidence are the levels of influence the facilitation team have on the process. Normalizing the inclusion of facilitation influence in scenario planning literature ultimately is an exercise in validity. There are no wrong answers, only incomplete methods of reporting experiences. The more evidence we collect about facilitation, the better we could potentially understand their impact on the process, artifacts, and the strategic actions advanced from such interventions.

5 | CONCLUSION

The book’s authors show how scenario planning methodology brings flexibility and pragmatism to the table that makes it a valuable interventional choice for any industry. Through case studies and shared artifacts, this book illustrates well the value of scenario planning to supply chain strategy. Useful terminology from both scenario planning and SCM can be learned from the book, bolstered by supplementary materials.

The MIT CTL team illustrates their own flexibility in facilitation by integrating additional strategic methods into each intervention, based on the needs of the client and conditions. Interviews were conducted for early data gathering and proof of concept testing. Mental maps were constructed from executive feedback to discover areas of convergence, as well as blind spots. Surveys were used at various stages, before, during, and after the workshops to document and evidence any number of perceptual changes within the

participants. Quantitative methods were introduced to lighten the cognitive load and time-intensive work.

Furthermore, the final two chapters create a well-rounded discussion of the three case studies for the reader. Chapter 8 provides a discussion on the most difficult element of scenario planning, and truly, any strategic intervention, “does it work?” (p. 167). The book explores common pitfalls of post-hoc evaluations and provides a general checklist of questions and factors to serve as proxies for impact measures. However, rather than stopping there, as many publications must (largely due to such realities as creative ownership and intellectual property rights), the book provides relevant outcomes for each case study that address the final question “does it work?” The book is explicit about a shared goal across the scenario-planning interventions. It frames supply chain managers as experts with a tendency to be short-term, operationally focused, thereby creating a myopia within their strategic vision, a perspective Van der Heijden (1997, p. 93) coined “short-termism.” The interventions aimed to alter management perspectives toward processing complex, qualitatively different, long-term visions. One client followed up with the MIT CTL team’s organization to develop a new project based on novel insights developed in their scenario planning workshops, thereby providing the authors with hands-on evidence of learning. One client showed changes in evaluations on key factors through a series of matched surveys (i.e., longitudinal data) that spanned before, during, and after the workshops. One client completed a series of post-hoc surveys which supported the conclusion that their preworkshop assumptions remained guiding and salient factors in their strategic perspective, indicating the intervention had less of an impact than with the other two. By providing evidence of outcomes, even by proxy, the book helps advance a much-needed dialog in scenario planning and strategy as a whole; Which is that there are a number of expressions an organization can use to illustrate impact, and interventions can impact at different levels.

Chapter 9 shares not only the scenarios developed from each case study—something often absent in the literature due to creative ownership or intellectual property rights of the client organization—but external, supplementary sources that provide context-rich outputs from their largest scenario planning project, aimed at national levels of application (Future Freight Flow).

This book provides detailed insights to both ILS scenario planning applications and contemporary SCM. The questions posited throughout the text provide valuable tools for advancing teaching pedagogy as well as practitioner learning.

ACKNOWLEDGMENTS

This review and affiliated work were not funded by any internal or external funding bodies. There are no data associated with the review.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

ORCID

Megan M. Crawford  <http://orcid.org/0000-0002-5114-7219>

Eoin Plant-O'Toole  <http://orcid.org/0000-0001-7563-8189>

REFERENCES

- Bowman, G., & MacKay, R. (2020). Scenario planning as strategic activity: A practice-orientated approach. *Futures & Foresight Science*, 2, e0032. <https://doi.org/10.1002/ffo2.32>
- Bradfield, R., Wright, G., Burt, G., Cairns, G., & Van Der Heijden, K. (2005). The origins and evolution of scenario techniques in long range business planning. *Futures*, 37(8), 795–812. <https://doi.org/10.1016/j.futures.2005.01.003>
- Cairns, G., & Wright, G. (2018). *Scenario thinking* (2nd ed.). Palgrave Macmillan.
- Chermack, T. J. (2003). A methodology for assessing performance-based scenario planning. *Journal of Leadership & Organizational Studies*, 10(2), 55–63. <https://doi.org/10.1177/107179190301000206>
- Chermack, T. J. (2005). Studying scenario planning: Theory, research suggestions, and hypotheses. *Technological Forecasting & Social Change*, 72, 59–73. <https://doi.org/10.1016/j.techfore.2003.11.003>
- Chermack, T. J. (2011). *Scenario planning in organizations: How to create, use, and assess scenarios* (1st ed.). Berrett-Koehler.
- Chermack, T. J. (2018). An analysis and categorization of scenario planning scholarship from 1995-2016. *Journal of Futures Studies*, 22(4), 45–60. [https://doi.org/10.6531/JFS.201806.22\(4\).0004](https://doi.org/10.6531/JFS.201806.22(4).0004)
- Chermack, T. J., & Lynham, S. A. (2002). Definitions and outcome variables of scenario planning. *Human Resource Development Review*, 1(3), 366–383.
- Chopra, S. (2018). *Supply chain management: Strategy, planning, and operation, global edition* (6th ed.). Pearson.
- Derbyshire, J., & Wright, G. (2017). Augmenting the intuitive logics scenario planning method for a more comprehensive analysis of causation. *International Journal of Forecasting*, 33(1), 254–266.
- Franco, L. A., Meadows, M., & Armstrong, S. J. (2013). Exploring individual differences in scenario planning workshops: A cognitive style framework. *Technological Forecasting and Social Change*, 80(4), 723–734.
- Gattorna, J., & Ellis, D. (2020). *Transforming supply chains: Realign your business to better serve customers in a disruptive world*. Pearson.
- Gordon, T. J. (1994a). *Cross-impact method*. American Council for the United Nations University.
- Gordon, T. J. (1994b). Trend impact analysis. In J. C. Glenn & T. J. Gordon (Eds.), *Futures research methodology: The millennium project* (2nd ed.). American Council for the United Nations University.
- Grant, R. M. (2003). Strategic planning in a turbulent environment: Evidence from the oil majors. *Strategic Management Journal*, 24(6), 491–517. <https://doi.org/10.1002/smj.314>
- Van der Heijden, K. (1997). *Scenarios: The art of strategic conversation*. John Wiley.
- Van der Heijden, K., Bradfield, R., Burt, G., Cairns, G., & Wright, G. (2002). *The sixth sense: Accelerating organizational learning with scenarios*. John Wiley & Sons.
- Lindgren, M., & Bandhold, H. (2009). *Scenario planning—revised and updated: The link between future and strategy*. Springer Link. <https://doi.org/10.1057/9780230233584>
- Lysons, K., & Farrington, B. (2020). *Procurement and supply chain management*. Pearson.
- McLean, G. N., & Egan, T. M. (2008). Applying organization development tools in scenario planning. *Advances in Developing Human Resources*, 10(2), 240–257. <https://doi.org/10.1177/152342230731332>
- O'Brien, F. A. (2004). Scenario planning: Lessons for practice from teaching and learning. *European Journal of Operational Research*, 152(3), 709–722. [https://doi.org/10.1016/S0377-2217\(03\)00068-7](https://doi.org/10.1016/S0377-2217(03)00068-7)
- Phadnis, S., & Darkow, I. (2021). Scenario planning as a strategy process to foster supply chain adaptability: Theoretical framework and longitudinal case. *Futures & Foresight Science*, 3(2), e62. <https://doi.org/10.1002/ffo2.62>
- Phadnis, S. S., Sheffi, Y., & Caplice, C. (2022). *Strategic planning for dynamic supply chains: Preparing for uncertainty using scenarios*. Palgrave Macmillan.
- Porter, M. E. (1985). *Competitive advantage: Managing for the future*. John Wiley.
- Pulver, S., & Van Deveer, S. (2007). Futurology and futurizing: A research agenda on the practice and politics of global environmental scenarios. *Amsterdam Conference on the Human Dimensions of Global Environmental Change "Earth Systems Governance: Theories and Strategies for Sustainability"*, (pp. 1–22). Amsterdam, Netherlands.
- Ram, C., & Montibeller, G. (2013). Exploring the impact of evaluating strategic options in a scenario-based multi-criteria framework. *Technological Forecasting and Social Change*, 80(4), 657–672.
- Ringland, G. (1998). *Scenario planning: Managing for the future*. Wiley.
- Schoemaker, P. J. (1995). Scenario planning: A tool for strategic thinking. *MIT Sloan Management Review*, 36(2), 25–50.
- Schoemaker, P. J. (2004). Forecasting and scenario planning: The challenges of uncertainty and complexity. In D. J. Koehler & N. Harvey (Eds.), *Blackwell Handbook of Judgment and Decision Making* (pp. 247–296). Blackwell.
- Schoemaker, P. J. H. (1991). When and how to use scenario planning: A heuristic approach with illustration. *Journal of Forecasting*, 10, 549–564. <https://doi.org/10.1002/for.3980100602>
- Schoemaker, P. J. H. (1993). Multiple scenario development: Its conceptual and behavioral foundation. *Strategic Management Journal*, 14, 193–213.
- Schwartz, P. (1991). *The art of the long view: Scenario planning, protecting your company against an uncertain world*. Doubleday.
- Sheffi, Y. (2007). *The resilient enterprise: Overcoming vulnerability for competitive advantage*. The MIT Press.
- Spee, A. P., & Jarzabkowski, P. (2009). Strategy tools as boundary objects. *Strategic Organization*, 7(2), 223–232. <https://doi.org/10.1177/1476127009102674>
- Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive science*, 12(2), 257–285.
- Tetlock, P. E. (2005). *Expert political judgment: How good is it? How can we know?* Princeton University Press.
- Wack, P. (1985a). Scenarios: Shooting the rapids. *Harvard Business Review*, 139–150.
- Wack, P. (1985b). Scenarios: Uncharted waters ahead. *Harvard Business Review*, 73–89.
- Wright, G., & Cairns, G. (2011). *Scenario thinking: Practical approaches to the future*. Palgrave Macmillan.
- Wright, G., Cairns, G., & Goodwin, P. (2009). Teaching scenario planning: Lessons from practice in academe and business. *European Journal of Operational Research*, 194(1), 323–335.
- Wright, G., Van der Heijden, K., Burt, G., Bradfield, R., & Cairns, G. (2008). Scenario planning interventions in organizations: An analysis of the causes of success and failure. *Futures*, 40(3), 218–236. <https://doi.org/10.1016/j.futures.2007.08.019>