



Scenario Planning in Supply Chain Planning

A QAD DynaSys Leadership White Paper
Scenario Planning in Supply Chain

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INTRODUCTION

There are events we take for granted when we go about our personal life. We expect that the car will start each morning. We expect that our credit card will work at the store. We expect that we will not become ill. Experience shows us, however, that some everyday situations may bring about unforeseen outcomes. We acknowledge this by employing mitigation strategies like insurance, spare keys, and calling on friends. But what happens when the magnitude, frequency, and volume of unforeseen outcomes overwhelms even the most well-calculated mitigation efforts? We are forced to think quickly on our feet; in other words, we are forced to be agile.

Likewise, a manufacturing supply chain design is based on a series of assumptions that underpin an underlying model to synchronize supply and demand within the confines of a myriad of constraints and costs. The majority of these assumptions, in normal times, are, like expecting the car to start, beyond reproach. These include material available and capacity.

What happens when even the most confident assumptions become a potential area of risk? Is a new supply chain model required? Is a more flexible model required? How do planners navigate unprecedented disruption? This is where dynamic scenario planning comes into play.

DYNAMIC SCENARIO PLANNING

Scenario management has been evolving for some years. Historically it was relegated to long term strategic planning to model alternate business landscapes. It is equally applied in best practice Sales & Operations Planning (S&OP) to present alternative tactical plans for an executive signoff.

In 2021, scenario planning has become more dynamic and earned a place in day-to-day supply chain decision making. It's inclusion has been driven by disruption and digitization. Unprecedented and continuous disruption has forced typical tactical decisions like sourcing and capacity into the operational planning horizon. At the same time, the digitization of everything means planners can access copious volumes of often real-time demand and supply signals. Only some of these signals have the potential to influence current plans.

Dynamic scenario planning is a form of scenario planning which is pervasive in everyday planning both operational and tactical. Dynamic scenario planning is used to chart a business response to a potential disruption or unexpected outcome that triggers an investigation. A dynamic scenario may last one hour, one day or an entire planning cycle. Scenarios must fall into step with the existing planning process and are subject to the same checks and approvals as a baseline plan. A scenario is a true parallel plan that exists separate from and concurrent with the baseline.

“If the alternative scenario outcomes are better for the business, it becomes the new baseline.”

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WHERE DO SUPPLY CHAIN SCENARIOS COME FROM?

Supply Chain scenarios originate from several sources, which can be categorized into three types; pre-defined, speculative, or unforeseen.

Predefined scenarios are usually recurring scenarios that exist in each planning cycle and have labels such as “Upside,” or “Conservative”. These scenarios may be as simple as a consumer product manufacturer who simultaneously plans with and without promotional activity. The types of scenarios used within S&OP scenarios are usually predefined to offer executives a choice of tactics to deploy.

Speculative scenarios are events that have not yet occurred or that may never occur. An example would be the possible bankruptcy of a key supplier that is known to be in financial trouble. Scenario planning for speculative events generally focuses on contingency rather than mitigation. In the case of a possible bankrupt supplier, this would focus on increasing raw material inventories and fast-tracking alternative sourcing. An advantage to speculative scenarios is that often there is time available to collect the data, simulate the impact, and properly prepare. The disadvantage is that the likelihood of the occurrence is unknown.

Unforeseen scenarios are events that, as the name suggests, are not planned, but have recently occurred or have a known and imminent date. Examples include natural disasters or unexpected changes to tax or trade legislation. In early 2020, the COVID19 pandemic would have been classified as an unforeseen scenario. Such scenarios are the most difficult to manage due to the lack of lead time, poor access to reliable data, and the changing nature of the event.

Unforeseen scenarios are not the same as operational exceptions like a late supplier shipment. A late supplier shipment has a known and precise impact on the plan. There is no value to reproduce the “what if it was on-time?” scenario. Unforeseen scenarios, on the other hand, have an unspecified impact on the plan and require intelligence gathering and modeling to simulate the appropriate response or responses.

An important component of planning for unforeseen scenarios is early identification, which allows planners to maximize the available bandwidth needed to formulate an accurate and timely response.

BEST PRACTICE

The lifecycle of a scenario has four stages:

1. The initiation phase that focuses on data collection and validation
2. The planning phase determines the event impact and a preferred course of action
3. The scenario analysis and comparison phase
4. Publication



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In practice, supply chain practitioners manage several stages concurrently. During a single planning cycle, the scenario considered the “best” may change several times as new data comes to light. Some scenarios may never be seriously considered due to excessive risk or incomplete data.

The initiation phase builds a parallel plan which usually inherits all values, risks, assumptions, and process status from a baseline plan or another scenario. The biggest challenge in any scenario planning exercise is access to accurate data. This is especially true for unforeseen events where it may take some time to source and validate the appropriate data. Often this process is iterative as updates are received.

The planning phase updates the demand and supply plans incorporating any new data. This may generate a scenario-specific set of exceptions and required plan approvals. All plans must be subject to the same planning process or workflow. Early scenario management techniques, often based on Business Intelligence technologies, make the mistake of copying Plan-A to Plan-B, changing some values, and performing a Delta. A planner cannot equally compare “Plan-A” to “Plan-B” if only one plan has been subject to an approval and exception management process. Each plan has its own set of assumptions and risks.

The most important role of scenario management is analysis and comparison. Stakeholders must agree on the list of metrics that will be used to compare scenarios. They should also agree on the relative weighting given to each metric. The comparison metrics should be cross-functional including financial KPIs such as profitability and revenue, as well as regular supply chain metrics such as inventory, service level, and resource utilization. Of course, no plans come risk-free, so comparing the risk profiles of each scenario gives a qualitative data influence on each candidate plan. Beauty being in the eye of the beholder, the “best plan” is subjective to the bias of the stakeholders. Therefore the collaborative scenario analysis process must facilitate an auditable record of the decision-making process.

The final step is to “Publish” the result. This establishes the new baseline plan and represents the activities that will be executed, providing of course another compelling event doesn’t take precedence. Scenario analysis is a continuous process.

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MINEFIELDS AND PITFALLS

Scenario analysis is a powerful tool that can help to guide a company through disruption, giving management information it can use to make the best possible decisions for the company. It can, however, consume resources and time.

“Scenarios should be used only when there is, or soon will be, a genuine fork (or forks) in the road ahead.”

Here are several pearls of wisdom from our experts.

- Planners should be clear on the purpose of a scenario. What is the event and do we have access to the corresponding data points?
- A single disruptive event may dictate several courses of corrective action and therefore multiple scenarios.
- Scenario simulation and analysis is highly analytical. It requires competence in data literacy and risk management.

- Collaborative qualitative insight is crucial to determining the scenario risk. Share and invite collaboration on each scenario to harness the collective knowledge of the stakeholders.
- Not every scenario can be validated. Sometimes the data just is not available when you need it. In this case, it is more effective to record a Risk against the current plan rather than execute a scenario. The Risk creates a placeholder for mitigation or a later scenario.
- Scenario planning should be used for all levels of planning including operational decision making. This is different from traditional techniques that focus on strategy and tactical planning.

CONCLUSION

The frequency, concurrency, and scale of disruption in global supply chains will most likely continue post-pandemic due to natural, geopolitical, economic events. Preparation for the unknown provides at best a contingency and at worst a shock-absorber. In some cases, proper scenario planning negates an existential threat.

Dynamic scenario planning is a prerequisite for supply chain agility.



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